Malawi Standard Treatment Guidelines(MSTG)

Incorporating Malawi Essential Medicines List (MEML)

Ministry of Health

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Copies may be obtained through:
The Secretary for Health
PO Box 30377, Lilongwe 3, Malawi
Tel : {265} 01 788 371
Fax : {265} 01 788 502

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FOREWORD

The **6th Edition of the Malawi Standard Treatment Guidelines** has additional conditions and detailed clinical descriptions. This edition has been developed to meet the needs of prescribers at different levels, in selecting and prescribing the right medicines for right conditions. In addition, it is a valuable resource in the provision of medicine information and promotion of rational use of medicine in general.

The **Malawi Standard Treatment Guidelines (MSTGs)** incorporates the **Malawi Essential Medicines List (MEML**) in order to standardise prescribing patterns and practices, thereby enabling a more consistent and uniform range of available medicines at different levels of care. The MSTG is also instrumental in informing quantification, procurement, and supply of required medicines.

With the emergence of AMR in Malawi, it is emphasized that optimizing antimicrobial use through stewardship approaches is essential in promoting good health outcomes for the Malawian population, while preserving this crucial group of medicines. The MSTG has incorporated the Access Watch and Reserve (AWaRe) categorization of antibiotics through the Essential Medicines List.

At a minimum and in the context of Malawi, the MSTG should be used as a reference material and adhered to in the clinical setting. However, medicine is a very complex and dynamic field with emerging clinical conditions and treatment options, hence professional, knowledgeand judgement are of paramount importance, and where necessary, these should be supplemented by information from relevant and specialized reference materials.

The Ministry of Health urges health practitioners in the public sector to always use this **6th Edition of the Malawi Standard Treatment Guidelines** in their line of duty and recommends the same to health practitioners in the private sector. On behalf of the Ministry of Health,

I would like to acknowledge the contributions in terms of time, effort and knowledge of all professionals involved in the compilation of the 6th edition of the MSTG.

Dr Charles Mwansambo
Secretary for Health

REFERENCES

The following are national guidelines or reference text which should be consulted for further information on specific areas or topics:

- 2021 Clinical Management of HIV in Children and Adults (5th edition, 2021)
- 2021 Malawi Integrated HIV, Viral Hepatitis and Syphilis Testing Services Guidelines
- Clinical Guidance for Hepatitis B and C Provision in Malawi (1st edition, 2021)
- National Tuberculosis Control Program Manual (8th edition, 2018)

The Ministry of Health wishes to extend its sincere thanks and appreciation to all those who dedicated their time and effort in producing this ***6th Edition of the Malawi Standard Treatment Guidelines (MSTGs),*** *which for convenience's sake incorporates the* ***Malawi Essential Medicines List (MEML).*** *The core list of those who contributed either through physical attendance in workshops or through email correspondence is shown on the next page.*

LIST OF CORE CONTRIBUTORS TO THE 6TH EDITION OF MSTG/MEML

MoH Headquarters

Dr Queen Dube	Chief of Health Services
Dr George Chithope Mwale	Director of Curative and Medical Rehabilitative Department
Godfrey Kadewere	Director Health Technical Support Services
Dr Jones Kaponda Masiye	Deputy Director, Curative and Medical Rehabilitative Department
Charles Chimenya	Chief Pharmacist, Health Technical Support Services

National Medicines Committee

Dr Chimota Phiri (Chairperson)	Queen Elizabeth Central Hospital
Dr Peter Banda	Queen Elizabeth Central Hospital
Dr Olive Liwimbi	Zomba Mental Hospital
Mr Felix Kaminyoghe	UNDP
Mr Frank Mpotha	Malawi College of Health Sciences
Mr Edwin Chipala	Pharmacy and Medicines Regulatory Authority
Dr Gift Kawalazila	Director of Health and Social Services
Mr Paul Kaseka	Mzuzu Central Hospital
Mrs Lonnie Mkwepele	Zomba Central Hospital
Mr John Nepiyala	Ministry of Health
Mr Sam Nowa	Kamuzu Central Hospital
Dr Ethel Nyenje	Ministry of Health

Editorial Team

Chikhulupiliro Yiwombe	Ministry of Health
Godwin Nyirenda	CHAI
DysonTelela	CHAI
Andrews Gunda	CHAI

Bernadette Chibwana	Ministry of Health
Lightwell Zomba	Ministry of Health
Noel Kasomekela	Partners in Health
Tadala Hamisi	Global Health Supply Chain Procurement and Supply Management Project
Denver Raisi	Global Health Supply Chain Procurement and Supply Management Project
Nathan Jere	Village Reach
Henry Phiri	Queen Elizabeth Central Hospital
Ellen Nzima	Antimicrobial Resistance National Coordinating Committee
Ronald Chitatanga	Antimicrobial Resistance National Coordinating Committee
Hope Chadwala	Kamuzu Central Hospital
Hermes Mlambe	Global Health Supply Chain Procurement and Supply Management Project
Evelyn Chibwe	Partners in Health

Specialist Subgroups

Internal Medicine	
Dr Ndaziona Peter Kwanjo Banda	Queen Elizabeth Central Hospital
Dr Tamara Phiri	Queen Elizabeth Central Hospital
Dr Chimota Phiri	Queen Elizabeth Central Hospital
Dr Martin Kamponda	Kamuzu University of Health Sciences
Dr Emanuel Mabutwa	Kamuzu University of Health Sciences
Dr Yohannie Mlombe	Kamuzu University of Health Sciences
Dr Stephen Njolomole	Kamuzu University of Health Sciences
Dr Tiwonge Phiri	Queen Elizabeth Central Hospital
Dr Bridon M'baya	Ministry of Health
Dr Kingsley Magomero	Malawi Defence Force
Isaac Chirwa	Asamala Hospital

Dr Dan Namarika	Kamuzu University of Health Sciences
Surgery	
Dr Palesa Chisala	Queen Elizabeth Central Hospital
Dr Lucy Kaomba	Kamuzu University of Health Sciences
Dr Chifundo Kajombo	Kamuzu Central Hospital
Obstetrics and Gynacology	
Dr Gladys Gadama	Queen Elizabeth Central Hospital
Dr Bernadetta Zuze	Zomba Central Hospital
Mrs Hlalapi Kunkeyani	Kamuzu Central Hospital
Dr Chisale Mhango	Kamuzu University of Health Sciences
Oncology	
Dr Ireen Chidothe	Queen Elizabeth Central Hospital
Dr Precious Makondi	Kamuzu Central Hospital
Medical Rehabilitation	
Dorothy Chinguo	Ministry of Health
Yaseen Ntenje	Queen Elizabeth Central Hospital
George Milanzi	Queen Elizabeth Central Hospital
Paediatrics	
Dr Tamanda Hiwa	Queen Elizabeth Central Hospital
Dr George Chagaluka	Queen Elizabeth Central Hospital
Dr Beatrice Chikaphonya	Queen Elizabeth Central Hospital
Dr Yamikani Chimalizeni	Kamuzu University of Health Sciences
Dr Josephine Langton	Kamuzu University of Health Sciences
Orthopaedics	
Dr Nohakhela Nyamulani	Queen Elizabeth Central Hospital
Dr Boston Munthali	Lilongwe Institute of Orthopaedics and Neurosurgery
Anaesthesia	
Dr Singatiya Chikumbanje	Queen Elizabeth Central Hospital
Dr Mtisunge Kachingwe	Queen Elizabeth Central Hospital
Ear Nose and Throat	

Dr Wakisa Mulwafu	Queen Elizabeth Central Hospital
Olipa Kathebwe	Queen Elizabeth Central Hospital
Dr Moses Chirwa	Queen Elizabeth Central Hospital
Emergency Medicine	
Dr Caroline Brady	Queen Elizabeth Central Hospital
Dr Grace Chatsika	Queen Elizabeth Central Hospital
Matron Bodole	Queen Elizabeth Central Hospital
Dental	
Dr Martha Chipanda	Mzuzu Central Hospital
Dr Jessie MLotha Namarika	Kamuzu Central Hospital
Mr Gelson Kuweluza	Queen Elizabeth Central Hospital
Dermatology	
Dr Kelvin Mponda	Queen Elizabeth Central Hospital
Dr Tenganawo Mzumara	Kamuzu Central Hospital
Ndamiwe Kaseko	Kamuzu Central Hospital
Palliative Care	
Dr Jane Bates	Kamuzu University of Health Sciences
Zenaida Phiri	Ministry of Health
Linely Chitete	Ndi Moyo Palliative Care Centre
Mr Chiputula	Palliative Care Association of Malawi
Psychiatry	
Dr Olive Liwimbi	Zomba Central Hospital
Dr Kazione Kulisewa	
Dr Michael Udedi	Ministry of Health
Opthalmology	
Dr Moira Chinthambi	Kamuzu Central Hospital
Dr Amos Nyaka	Kamuzu Central Hospital
Dr Shaffi Mdala	
Nutrition	
Dr Adjib Phiri	Kamuzu University of Health Sciences
Sylvester Kathumba	Ministry of Health
Public Health	
Dr Fatsani Ngwalangwa	Kamuzu University of Health Sciences
John Ndaferankhande	Malawi Liverpool Welcome Trust
Vaccines	
Mrs Temwa Mzengeza	Expanded Program for Immunization

Disease Programs	
Stanford Miyango	National TB and Leprosy Program
Elizabeth Mkandawire	National Malaria Control Program
Rose Chikumbe	Reproductive Health Directorate
Dr Humphreys Nsona	Integrated Management of Childhood and Neonatal Illnesses
Dr Wongani Mzumara	Directorate of HIV and AIDS
Dr Arnold Kapachika	Directorate of HIV and AIDS
Other Contributors	
Elias Mwalabu	Global Health Supply Chain Procurement and Supply Management Project
Florah Kalimba	Global Health Supply Chain Procurement and Supply Management Project
Sam Nowa	Kamuzu Central Hospital

PRESCRIBING GUIDELINES

1.0 GENERAL POINTS

Consider each of the following general points before writing a prescription:

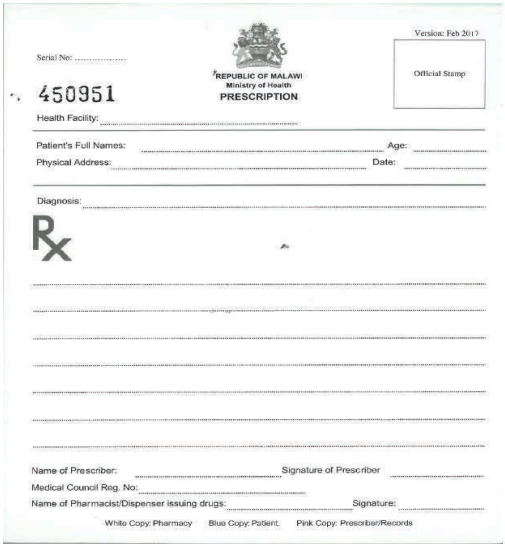
- Not all patients need a prescription for medicines. Non-medicine treatments and/or giving of simple advice may be more suitable in certain situations.
- Good therapeutics practice depends on:
  - Accurate diagnosis, based on thorough history-taking, necessary careful physical examination and, if required, supporting laboratory testing and radiology services.
  - Knowledge of the medicines available
  - Careful selection of the appropriate medicines
  - Correctly prescribing the selected medicines
  - Ensuring that the patient understands fully how to use each prescribed medicine properly.
- Resist patient demand to prescribe injections or other expensive dosage forms. e.g., capsules and oral liquids. Always try to explain to the patient that these may not represent the best form of treatment for the condition.
- In life threatening conditions, always prescribe the most effective medicine available irrespective of the cost or limited availability.
- To avoid possible confusion, always prescribe medicines by their generic name and not by the brand name e.g., diazepam {not Valium}, paracetamol {not Panado} or abbreviations i.e., PCM.
- Avoid prescribing combination medicines unless they have a known significant therapeutic advantage over single ingredient preparations.
- When prescribing any medicine, always take into consideration factors such as:
  - Patient's age
  - Patient's sex
  - Patient's weight
  - Co-morbidities
  - Drug Interaction
  - Side effects.
  - Pregnancy
  - Breast-feeding
  - The likely degree of patient compliance with treatment
- In all cases the likely benefit of any prescribed medication/s must be weighed against potential risks.
- Avoid overuse of symptomatic treatments for minor self- limiting conditions.
- Avoid multiple prescribing {polypharmacy}, especially when the diagnosis is not clear.

- Whenever prescribing a particular medicine, care should be taken to avoid problems of interactions with other medicines, whether these are:
    - Also prescribed at the same time
    - Previously prescribed by another prescriber for the same or another condition and currently being taken by the patient
    - Purchased or otherwise obtained by the patient for the purpose of self-medication.
- Before prescribing a medicine, always obtain other details of any medication currently being taken by the patient.
- Where a medicine interacts with alcohol {e.g., metronidazole, diazepam, anti-diabetic medicines, tricyclic antidepressants etc.} remember to counsel the patient to avoid taking alcoholic drinks during treatment and for at least 48 hours after completion of the course.

2.0 PRESCRIBING OF PLACEBOS

- Avoid this whenever possible. Instead spend time reassuring and educating the patient
- If it is necessary to prescribe a placebo, always choose a safe, cheap medicine which is not essential for the treatment of other important conditions, e.g., multivitamin tablets or vitamin B compound tablets
- Never prescribe injections as placebo
- Never prescribe tranquilizers e.g., diazepam, phenobarbitone, as placebos

3.0 PRESCRIPTION WRITING



Version: Feb 2017

Serial No: .....

REPUBLIC OF MALAWI
Ministry of Health
PRESCRIPTION

Official Stamp

450951

Health Facility: .....

Patient's Full Names: ..... Age: .....

Physical Address: ..... Date: .....

Diagnosis: .....

Rx

Name of Prescriber: ..... Signature of Prescriber .....

Medical Council Reg. No: .....

Name of Pharmacist/Dispenser issuing drugs: ..... Signature: .....

White Copy: Pharmacy Blue Copy: Patient Pink Copy: Prescriber/Records

Note: Whenever possible, return all incomplete, inaccurate, illegible, or unclear prescriptions to the prescriber for clarification, completion, or correction, before dispensing

- Write all prescriptions legibly in ink. Poor writing may lead to errors in interpretation by the dispenser which may have harmful and possibly disastrous consequences for the patient.
- Write the full name and address of the patient, and sign and date the prescription form
- Write the name of the medicine or preparation using its full generic name. Do not use unofficial abbreviations, trade names, or obsolete names as these may cause confusion
- Always state the strength of the preparation required where relevant
- For solid dosage forms:
    - Quantities of one gram or more should be written as 1g, 2.5g, 10g, etc.
    - Quantities of less than one gram but more than one milligram should be written as milligrams rather than fractions of a gram, e.g., 500mg and not 0.5g
    - Quantities less than one milligram should be expressed as micrograms {in full} and not as fractions of a milligram, e.g., 100 micrograms rather than 0.1 mg or 100mcg.

- If decimals are used, always write a zero in front of the decimal point where there is no other figure, e.g., 0.5ml and not .5ml
- Always state the full dose regimen, i.e.
  - Dose size
  - Dose frequency
  - Duration of treatment
  - The quantity to be dispersed will be deduced from this.
- Avoid use of the direction "to be used/taken as required". Instead state a suitable dose frequency. In the few cases where 'as required' is appropriate, the actual quantity to be supplied should be stated
- Avoid using unknown abbreviations for medicine. The following abbreviations can be used when writing a prescription:

b.d	twice a day
IM	Intramuscular
IV	Intravenous
mane	in the morning
n et m or n.m.	night and morning
nocte	at night
p.o.	by mouth
p.c.	after meals
prn	when necessary
q4h	every 4 hours
q6h	every 6 hours
q8h	every 8 hours
q.i.d	4 times a day
stat	immediately or at once
sig	Label
t.d.s.	3 times a day

- For oral liquids, doses should be stated in terms of 5ml for a teaspoon and 15ml for a tablespoon
- Doses other than 5ml or 15ml or multiples of these will be diluted to the nearest equivalent 5ml or 15ml quantity for dispensing
- Where relevant, always remember to include on the prescription any special instructions necessary for the correct use of a medicine or preparation, e.g., "before food" etc.

4.0 IN-PATIENT PRESCRIPTIONS

- Write these prescriptions and records of dispensing andadministration on in-patient treatment sheet
- Only use one sheet per patient at any one time
- Clearly state a suitable dose frequency, or time of administration on medicines to be given 'as required'
- Always state the route of administration for all medicines prescribed.
- When any changes or cancellations are made to a prescription sheet, or if treatment is to be stopped, clearly sign and date the sheet in the appropriate place.
- If the timing of a medicine dosage is critical, ensure that suitable arrangements are made for the medicine to be given at the specific time/s required.

5.0 PRESCRIPTIONS FOR CONTROLLED MEDICINES

- These medicines are regulated by the laws of Malawi, the Pharmacy and Medicines Regulatory Authority Act (No. 9 of 2019). Consult the relevant sections of the Act for details of the appropriate legal requirements in each case
- Controlled medicines covered by the Act, and which are also used in the MSTG are:
    - Morphine sulphate injection
    - Morphine sulphate solution
    - Pethidine hydrochloride injection
    - Morphine sulphate tablets
    - Codeine tablets
    - Fentanyl pachets
    - Fentanyl Injection
    - Nalbuphine injection
    - Misoprostol tablets
    - Mifepristone tablets
- These medicines have potential for abuse which may result in dependence. Carefully record all procedures involving them in the appropriate record books
- Prescriptions for these medicines may only be written by registered medical practitioners
- The following legal requirements must also be observed when writing such prescriptions:
    - The prescription must be in the prescriber's own handwriting
    - It must be signed and dated
    - The prescriber's address must be shown
    - The name and address of the patient must be stated
    - The total amount of the item to be supplied must be stated in words and figures
    - the prescription should include the prescriber’s registration number

- It is an offence for the prescriber to issue and for the pharmacy/dispensary to dispense prescriptions for controlled medicines, unless the requirements of the law are fully complied with

Notes:

- In certain *exceptional* circumstances, senior nurses in charge of departments, wards, or theatres, and midwives, may also obtain and administer certain controlled medicines as part of their work. The relevant sections of the Act should be consulted for the details of the appropriate legal requirements in each case.
- Hospital in-patient prescriptions for controlled medicines should be prescribed on a separate prescription as well as written on treatment cards or case sheets and signed/dated by the person administering the medicine.

6.0 ADVERSE DRUG REACTIONS (ADRS)

- Nearly all medicines may produce unwanted or unexpected adverse effects, some of which may be life threatening e.g., anaphylactic shock, liver failure
- Prescribers should immediately report any serious or unexpected adverse effects thought to be due to a medicine to:

  The Registrar,

  Pharmacy and Medicines Regulatory Authority, PO Box 30241, Lilongwe.

  Tel: 01 755 165/166 Fax: 01755 204

- Ways to minimize ADRs

Never use a medicine unless there is a clear indication for its use

- Only use medicines in pregnancy if essential
- Check if the patient has had any previous reactions to the medicine or to similar medicines
- Remember to reduce doses when necessary e.g., in the young, the elderly, and if liver or renal disease is present
- Always prescribe the minimum number of medicines possible.
- Carefully explain the dose regimens to patients, especially those on multiple medicines, the elderly and anyone likely to misunderstand.
- If possible, use medicines with which you are familiar
- look out for ADRs when using new or unfamiliar medicines
- Warn patients about likely adverse effects and advise them on what to do if they occur

- Patients on certain prolonged treatments e.g., Anticoagulants, corticosteroids, Insulin etc. should carry a health passport giving information about the treatment

7.0 PAEDIATRIC PRESCRIBING

- 7.1 In these guidelines, paediatric medicine doses are usually given according to body weight and not age, and are therefore expressed as mg/kg etc. The main reason for this is that children of the same age may vary significantly in weight. Thus, it is safer and more accurate to prescribe drugs according to body weight. Moreover, this should encourage the good practice of weighing children whenever possible.
- 7.2 When a weighing scale is not available the following equation can be used to estimate the weight of the child: [Age (in years) + 4] x 2
- 7.3 Neonates have delayed hepatic and renal excretion of medicines and unpredictable absorption of oral medication. Therefore, give special consideration when prescribing for children less than 30 days old and especially premature infants.

8.0 PRESENTATION OF INFORMATION

ARRANGEMENT OF SECTIONS

- Standard treatments have been grouped in sections according to either body systems {e.g., respiratory conditions, gastrointestinal conditions, etc.} or types of disorder {e.g., parasitic diseases, nutritional disorders, etc.} Use the table of contents, page ii, to locate the section required.

9.0 PRESCRIBER'S GUIDANCE POINTS

- These are given for most standard treatment and are key points to be considered before prescribing for a patient with a particular condition.
- Certain points as well as warnings are given added emphasis by inclusion in a boxed bolder.

MEDICINE ADMINISTRATION

- Unless otherwise specified, the *oral route* is to be used. Even when a parental route is specified, with medicines which are well absorbed orally, and which are available

as an oral dosage-form, it is often possible to switch to oral administration once the patient has improved and is able to swallow/tolerate oral medication.

- Additional guidance on medicine administration is given, where relevant, as bulleted points after dosage regimen.

MEDICINE NAMES

- Medicines recommended for use are those on the current Malawi Essential Medicine list, 2022. Generic names are used and indicated in bold type. Where necessary, proprietary names are indicated in *italic* type.

ALTERNATIVE MEDICINES

- They should be used only when the recommended medicine is not available or is not suitable for a particular condition.
- In some cases (where indicated) alternative (2nd line) medicines may be used when a satisfactory response has not been obtained with the recommended 1st line medicination.

ABBREVIATIONS

ARI	Acute Respiratory Infections
ART	Anti-Retroviral Therapy
BF	Blood Film examination
BP	Blood Pressure
COC	Combined Oral Contraceptive
CSF	Cerebrospinal Fluid
CVA	Cerebrovascular Accident
CXR	Chest X-ray
DIC	Disseminated Intravascular coagulopathy
DNS	Dextrose Normal Saline
FBC	Full blood count
FFP	Fresh Frozen Plasma
g	gram
Hb	haemoglobin
HIV	Human immunodeficiency Virus
IM	Intramuscular
IV	Intravenous
IU	International units
JVP	Jugular venous pressure
Kg	Kilogram
l	litre
lP	lumbar puncture
lRTI	lower Respiratory Tract Infection
mg	milligram
ml	millilitre
mmol	millimole
MU	mega {1 million} units
NGT	nasogastric tube
PCV	packed cell volume
s/c	subcutaneous
STI	sexually transmitted infections
TB	Tuberculosis
TTP	Thrombotic thrombocytopenic purpura
URTI	upper respiratory tract infection

METRIC UNITS

1 kilogram {kg}	= 1,000 grams {g}	
1 g	= 1,000 milligrams {mg}	
1 mg	= 1,000 micrograms	
1 litre {l}	= 1,000 millilitres 1 ml of water	= 1 g
1% {m/v}	= 10 mg/ml	

EQUIVALENTS

1 litre	= 1.8 pints	
1 pint	= 568.3 ml	
1 kg	= 2.2 pounds	
1 lb	= 453.4 g1 ounce {oz}	= 28.35 g

CHAPTER 1:
MANAGEMENT OF EMERGENCIES

1.1 MANAGEMENT OF EMERGENCIES AND TRAUMA IN ADULTS

Note: Initial Emergency Management: For all emergencies and trauma, the following format should be applied in management {ABCDE}:

A - Airway

- Assess for patency.
- Suctioning, Positioning, Jaw thrust, Guedel (oropharyngeal) airway, immobilize C-Spine in trauma patients.

B - Breathing

- Respiratory rate, O_2 Saturations, O_2 Therapy, Inspection, Palpation, and Auscultation of chest Assist respirations if needed.

C - Circulation

- In trauma patient compress active bleeding.
- BP and HR, Capillary refill time, Check warmth of hands.
- IV access {use green or grey cannula in adults}, obtain appropriate blood samples.
- Palpate abdomen for tenderness and pelvis for instability in trauma patients.

D - Disability

- AVPU or GCS {see table below}
- Don't forget to check Glucose
- Check for neurological deficits

E - Exposure

- Check Temperature
- Expose the rest of the body looking for rashes, bruising, petechiae or other signs of trauma

Key points:

- Apply pelvic binder for unstable pelvic fractures
- For suspected fractures aim to immobilize and give analgesics before referral

- Open fractures require sterile dressing and IV antibiotics
- TTV for all wounds and open fractures

AVPU TABLE	
Awake	Patient is Awake
Verbal	Patient responds to Verbal Stimulus
Pain	Patient responds to Pain Stimulus
Unresponsive	Patient is Unresponsive to any stimuli

GCS TABLE	1	2	3	4	5	6
Motor	Unresponsive	Extension to pain	Flexion to pain	Withdraws from pain	Localizes pain	Obeys commands
Verbal	No sounds	Incompre-hensible sounds	Words but no conversation	Confused conversation	Comprehensive speech	
Eye	No eye opening	Opens to Pain	Opens to voice	Opens sponta-neously		

1.2 MANAGEMENT OF EMERGENCIES AND TRAUMA IN CHILDREN

All sick children must be triaged upon arrival. This should be done using the ABCCCD approach.

There are three triage categories:

- **Emergency**: Children must be assessed and treated immediately. Emergency signs include obstructed breathing, central cyanosis, severe respiratory distress, weak or absent breathing, signs of shock (cold hands with capillary refill >3 seconds, weak, fast pulse), slow (<60 bpm) or absent pulse, coma, convulsions, severe dehydration.
- **Priority**: Children not needing emergency treatment can be prioritized using 3TPRMOB. Tiny baby (<2 months old), temperature (very hot or cold), trauma, pallor, poisoning, pain (severe), respiratory distress (mild-moderate), restlessness, referral (urgent), malnutrition, oedema, burns.
- **Queue**: Non-urgent cases who can wait to be seen.

EMERGENCY MANAGEMENT IN CHILDREN

AIRWAY:

- Clearing and opening the airway:
  - Suctioning:
    - Only as far as you can see
  - Positioning:
    - If no trauma: use a chin lift and head tilt
      - ✓ <12 months neutral position
      - ✓ >12 months sniffing position
    - If trauma use a jaw thrust. Also remember C-spine immobilization.
    - **NEVER** use neck collars in children.
- Airway adjuncts:
  - Oropharyngeal airway
  - Nasopharyngeal airway
  - Laryngeal mask airway
  - Endotracheal intubation

ACUTE UPPER AIRWAY OBSTRUCTION:

Stridor: e.g., croup

- Keep the child calm
- Minimize invasive procedures
- Oxygen
- Steroids
  - Prednisolone 2mg/kg PO (maximum 40mg) STAT OR
  - Dexamethasone 600 micrograms/kg PO (maximum 12 mg) STAT
- Nebulized Adrenaline 1-2ml of 1:1000 in 2mls of 0.9% saline
- May need intubation

ANAPHYLAXIS:

Often caused by insect stings (bees), drugs and blood products

- Oxygen
- **IM Adrenaline**: is the PRIORITY; 0.01 ml/kg of 1:1000
- **Nebulized Adrenaline** 1-2ml of 1:1000 in 2mls of 0.9% saline
- **IV Hydrocortisone** 4mg/kg 6 hourly
- **Chlorpheniramine** IV:
  - 6 months-6 years: 2.5 mg
  - 6-12 years: 5mg
  - 12-18 years: 10mg
- **Nebulized Salbutamol** for wheeze:
  - <4 years: 2.5 mg

- >4 years: 5mg
- If also in shock: 10ml/kg 0.9% saline or ringer's lactate over 20 minutes
- May need PICU admission for respiratory and ionotropic support

CHOKING

Encourage to cough. If ineffective cough and conscious

- 5 back blows
- Followed by 5 chest thrusts (infant), abdominal thrusts (>2 years) or Heimlich maneuver (older child)

If ineffective cough and unconscious

- Open airway, assess breathing, commence BLS

BREATHING:

- Look, listen, and feel: Are they breathing?
- If not breathing commence bag and mask ventilation
- If breathing assess:
  - Effort
  - Respiratory rate
  - Evidence of increased work of breathing
  - Efficacy
  - Chest expansion
  - Auscultation

Effect

- Evidence of cyanosis, oxygen saturations
- Heart rate
- Level of alertness

Detailed review of breathing

- Inspection
- Palpation
- Percussion
- Auscultation

1.3 COMMON EMERGENCY RESPIRATORY CONDITIONS

1.3.1 BRONCHIOLITIS

Supportive treatment

- Oxygen
- If severe respiratory distress, commence CPAP
- Regular suctioning
- Feeding support

Note: There is no need for antibiotics

1.3.2 ACUTE EXACERBATION OF ASTHMA

CLINICAL FEATURES

Severity of asthma are categorized as follows.

Mild: Audible wheeze, no respiratory distress, feeding well, O2 Saturation >92%

Moderate: Respiratory distress, use of accessory muscles, still feeding well, Saturation >92%

Severe: Marked respiratory distress, too breathless to talk/feed, RR>30 if 5 years and >50 if 2-5 years, Saturation<92%

TREATMENT

NB: if inhalers and spacers cannot be obtained start with nebulized salbutamol at below mentioned doses and switch to inhaler later.

Mild Asthma

- **Salbutamol** inhaler vial spacer 2 puffs q6h for 2-3 days
- Discharge with advice on inhaler and spacer technique

Moderate Asthma

- **Salbutamol** inhaler via spacer; <4y- 5puffs every 20mins x3, >4yrs- 10puffs every 20mins x3
- **Prednisolone** 1mg/kg (max 30mg q24h) for 3/7

Severe Asthma

- **Oxygen** at 1-2 L/min over nasal prongs and at least 5 L/min over face mask
- **Salbutamol nebulizer (start with 3 back-to-back to start with)**
  - <4yrs: 2.5mg
  - >4yrs: 5mg

- Start steroids if no improvement but still continue Nebulizer
- **STEROIDS**
  - **Prednisolone** 1-2mg/kg PO STAT- (Max. dose 40mg) OR
  - **Dexamethasone** 0.6mg/kg PO STAT – (max. dose 10mg) OR
  - **Hydrocortisone** IV <5yrs: 50mg; >5yrs:100mg IV STAT
- If no improvement continue Nebulizer but start IV therapy;
- **Magnesium Sulphate** IV 40mg/kg (diluted to at least 10%) over 20 min OR with caution use
- **Aminophylline** IV 5mg/kg (max. 300mg) diluted (maximum concentration 25mg/ml) and administered over 20min (maximum rate should not exceed 25mg/min)

1.3.3 SEVERE PNEUMONIA

Oxygen (2L/min to start)

Antibiotics

In children

- **Benzyl penicillin** 50,000 IU/kg IV/IM q6h for 5 to 7 days
- **Gentamicin** 7.5 mg/kg IM/IV q24h for 5 to 7 days
- if improving switch to **Amoxicillin** 40mg/kg PO q12h x 5 days
- If not improving switch to **Ceftriaxone** 80mg/kg IV q24h x 5-7 days

In adult

- **Ceftriaxone** 2g IV q24h for 5 -7 days

If trauma:

- Tension pneumothorax
  - High flow oxygen
  - Needle thoracocentesis
  - Chest-drain insertion
  - Analgesia
- Open pneumothorax
  - High flow oxygen
  - Cover the wound with a 3-sided dressing
  - Chest-drain insertion
- Flail chest
  - High flow oxygen
  - Analgesia
  - Consider intubation and ventilation

1.4 SHOCK

CLINICAL DESCRIPTION

Acute circulation failure resulting in inadequate tissue perfusion and cellular hypoxia, generally with a low blood pressure.

This is a medical emergency which needs to be promptly treated. Causes are;

- Hypovolemic {hemorrhage, cholera, severe vomiting, diabetic ketoacidosis}
- Cold, clammy skin; weak pulse,
- tachycardia
- Cardiogenic {myocardial infarction, abnormal heart rhythm}

Signs of heart failure, tachycardia or bradycardia – for treatment see heart failure section

- Obstructive {pericardial tamponade, tension pneumothorax}
- Raised jugular venous pulse, pulsus paradoxus
- Distributive {sepsis, anaphylaxis, neurogenic}
- May have hyperthermia or hypothermia, tachycardia, altered mental status

Important emergency assessment: Is there a pulse?

- If no pulse, start CPR
- **Give Adrenaline** immediately and every 4 minutes: 0.1 ml/kg of 1:10,000 IV/IO
- If able to assess the cardiac rhythm, a defibrillator is available, and staff are trained to use
    - Shockable rhythm identified (VF or pulseless VT)
    - DC shock 4 J/kg every 2 minutes
    - Continue CPR
    - Give **Adrenaline** every 4 minutes 0.1 ml/kg of 1:10,000 IV/IO
    - Give **Amiodarone** 5 mg/kg IV/IO after 3rd and 5th shock

If there is a pulse assess for signs of shock = a mismatch between circulatory supply and tissue demand

- Cold peripheries
- Capillary refill time >3 seconds
- Weak thready peripheral pulse

1.4.1 HYPOVOLEMIA (HYPOVOLEMIC SHOCK)

CLINICAL FEATURES

- It is most precipitated by fluid loss or blood loss
- Causes of fluid loss include vomiting, diarrhea, diuresis, poor PO intake
- Causes of blood loss include trauma, GI bleeds, PV bleeding

Management:

- IV fluid resuscitation is a priority
- Start with 20ml/kg of Sodium chloride 0.9% or Ringer's lactate as a bolus
- Repeat bolus if required
- Trauma or other bleeding patients should be given whole blood if blood pressure and heart rate not improved with IV fluids.
- Treat cause of fluid loss or blood loss

1.4.2 SEPSIS (SEPTIC SHOCK)

CLINICAL DESCRIPTION

It is most precipitated by infections such as pneumonia, meningitis, abscesses, peritonitis or septic miscarriages

Management:

- IV fluid resuscitation is a priority
- Start with 30ml/kg of Normal Saline or Ringers Lactate as a bolus unless patient has signs of heart failure
- Broad spectrum IV antibiotics (e.g. Ceftriaxone 2g IV q24h x 5/7 must be given as soon as possible)
- Control/treat the source of infection

Example: remove infected catheters, drain abscesses,

- If patient remains hypotensive repeat bolus of 500ml-1L may be required and Adrenaline infusion may be considered (discuss with senior)

1.4.3 ANAPHYLAXIS (ANAPHYLACTIC SHOCK)

CLINICAL DESCRIPTION

It requires prompt treatment for laryngeal oedema, bronchospasm, and hypotension

It is most precipitated by:

- Drugs {antibiotics, NSAIDs}

- Insect stings {especially wasps and bees}
- Blood products and blood transfusions
- Certain foods e.g., eggs, cow's milk, nuts

General Measures:

- Adrenaline IM is a priority
- Determine and remove cause

Management:

- Give Adrenaline 0.01 mg/kg IM anterior lateral thigh with max dose (0.5mg is max dose).
- Repeat as required (several times if necessary) every 10 minutes according to BP and pulse until improvement occurs
- Give Normal Saline 20 ml/kg by IV as a bolus
- Give **Promethazine** 25-50 mg by deep IM or, in emergencies, slow IV, as a solution containing 2.5 mg/ml in water for injection
- Promethazine should be repeated q8h. It is given after adrenaline and continued for 24-48 hours to prevent relapse.
- Steroids should also be given after initial treatment with adrenaline to prevent further deterioration

Adults:

- Give **Hydrocortisone** 200 mg by slow IV push q6h for 24-48 hours
- When hydrocortisone not available Prednisolone may be used at 1mg/kg PO with max dose 60 mg q24h for 3 days
- Monitor pulse, BP, bronchospasm, and general response/condition every few minutes
- If there is continuing deterioration or no improvement the following may be necessary:
- Give **NEBULISED SALBUTAMOL** as for asthma if bronchospasm persists {see Section 16.2.1}
- Ventilation and/or tracheotomy if laryngeal oedema severe

1.4.4 MANAGEMENT OF SHOCK IN CHILDREN

There are many causes of shock in children:

- Hypovolemic: gastroenteritis, hemorrhage, burns
- Distributive: sepsis, anaphylaxis
- Dissociative: severe anemia

- Cardiogenic: heart failure
- Obstructive: cardiac tamponade

Management of shock is dependent on the underlying cause:

Gastroenteritis

- High flow oxygen
- Plan C **using Ringer's Lactate** or 0.9% saline
    - < 12 months = 30 ml/kg over 1 hour
    - >12 months = 30 ml/kg over 30 minutes
    - Then reassess
    - If no improvement, repeat the 30 ml/kg
    - If improved continue with the 70ml/kg for 5hrs in <12 months and 2.5hrs in >12 months

Sepsis

- High flow oxygen
- 10 ml/kg over 1 hour, then reassess
- If no improvement, repeat up to a maximum of 40 ml/kg
- If still no improvement, consider blood, CPAP/ventilation, inotropic support
- Antibiotics as directed by the likely source of infection.

Anaemia

- Blood transfusion
- **NEVER** give a fluid bolus
- If no blood available, then give maintenance fluids

Trauma

- Apply pressure to any sources of catastrophic hemorrhage
- Immediate management of internal hemorrhage
    - High flow oxygen
    - Vascular access: 2x large bore
    - Take blood samples
    - Tranexamic acid 15 mg/kg IV/IO q8h for 5days
    - Fluid resuscitation if shocked
    - Urgently request blood
    - 10 ml/kg 0.9% saline over 20 minutes, repeated up to a total of 40 ml/kg whilst awaiting blood.
    - Keep warm
    - Analgesia
- Source of internal bleeding

    - Massive hemothorax
    - Chest-drain insertion
- Abdomen
    - eFAST scan, surgical review and intervention
- Pelvis
    - Application of a pelvic binder
- Long bone
    - Splinting of fracture
- Cardiac tamponade
    - Oxygen
    - Pericardiocentesis

If able assess the cardiac rhythm

- Ventricular tachycardia with a pulse; Treat underlying cause which is often due to hyperkalemia.
- Supraventricular tachycardia: treatment options include vagal maneuvers, adenosine, and synchronized DC shock.
- **Adenosine**
    - First dose: 100 micrograms/kg IV (150 micrograms/kg if < 1 year of age)
    - Second dose: 200 micrograms/kg IV
    - Third dose: 300 micrograms/kg

Coma:

Assess the level of conscious using BCS, AVPU, GCS or children's GCS

If reduced level of consciousness

- Ensure airway patent: recovery position, consider airway adjuncts or need for intubation and ventilation
- Put on high-flow oxygen

Establish the cause by assessing for:

- Signs of meningism: neck stiffness, Kernig's sign, tone, photophobia, fontanelle
- Neurology: posture, focal signs, pupil size and reactivity
- Blood pressure
- Random blood sugar (RBS)
- Blood gas if available
- Urine dipstick

Treat underlying cause

Hypoglycemia

- Administer 10% dextrose (5ml/kg)

Malaria

- Treat with **IV/IM Artesunate**
  - < 20 kg: 3.0 mg/kg at admission, then at 12 hours and 24 hours, then once per day
  - > 20 kg: 2.4 mg/kg at admission, then at 12 hours and 24 hours, then once per day

Meningitis

- Treat with IV antibiotics
  - Neonate: **Benzylpenicillin** 100,000 IU/kg q6h and Gentamicin 5 mg/kg q24h for 5-7 days
  - Children >1 month of age: Ceftriaxone 100 mg/kg q24h for 5-7 days

Encephalitis

- Treat with IV **Acyclovir**
  - 3 month – 12 years: 500 mg/m2 q8h for 14 days
  - 12-18 years: 10 mg/kg q8h for 14 days

Organophosphate poisoning

- **Activated charcoal** if available and ingestion occurred < 4 hours ago
- Neonate – 12 years 1 g/kg PO (max. 50 g)
- 12 – 18 years 50g

If respiratory compromise give oxygen and treat with Atropine 20 micrograms/kg IM /IV. Repeat every 15 minutes until the chest is dry.

May need referral to Pediatric ICU

Diabetic ketoacidosis

- ABCCCD: give oxygen to patients with circulatory impairment or shock.
- Fluid replacement
- If in shock give 10 ml/kg 0.9% saline over 1 hour
- Fluid requirement = maintenance (for 48 hours) + deficit
- Deficit (ml) = % dehydration x weight (kg) x 10
- Do not calculate above a 7.5% deficit
- Correct over 48 hours
- Do not include bolus fluids in this calculation unless a total of 20 ml/kg or more has been given

- Insulin therapy
    - Should be short acting, soluble, 'clear'
    - Ideally administered via a syringe pump
    - Start IV at 0.05 units/kg/hour
    - Once RBS <15 mmol/l change fluid to 0.9% saline and 5% dextrose. Do not reduce the rate of insulin.
- Potassium replacement
- Needed for every child in DKA if they are passing urine
- Add Potassium Chloride to IV fluids (20 mmol to each 500 ml bag)

Ongoing management

Monitor blood sugar levels hourly

Head injury

- Aim to prevent secondary brain injury
- High-flow oxygen
- Maintain normovolaemia
- Tranexamic acid 15 mg/kg IV/IO
- Maintain normoglycemia
- Tilt bed to 30°
- If evidence of raised ICP give either 3% hypertonic saline (3-5 ml/kg) or mannitol (250-500 mg/kg).
- Manage convulsions
- Maintain normothermia

Convulsions:

- Emergency treatment of seizures
- ABCCCD approach:
- Ensure the airway is open
- Administer oxygen
- Manage circulatory impairment
- Treat hypoglycemia with 5 ml/kg of 10% dextrose
- Convulsions lasting longer than 5 minutes require anticonvulsants

Child > 2 weeks of age

- Paraldehyde IM 0.2 ml/kg OR PR 0.4 ml/kg
- Still fitting after 10 minutes repeat **Paraldehyde** IM 0.2 ml/kg OR PR 0.4 ml/kg
- Still fitting after 10 minutes **Diazepam** IV 0.25 mg/kg OR PR 0.5 mg/kg

(Note this will be given first if no paraldehyde available)

- Still fitting after 10 minutes **Diazepam** IV 0.25 mg/kg OR PR 0.5 mg/kg
- Still fitting after 10 minutes **Phenobarbital** IM 20 mg/kg
- Still fitting after 20 minutes repeat Phenobarbital IM 20 mg/kg
- Still fitting after 20 minutes Phenytoin IV 18 mg/kg over 20 minutes
- Still fitting after 20 minutes consider Levetiracetam IV/NGT 30 mg/kg OR Ketamine IV 1-2 mg/kg

Child ≤ 2 weeks of age

- Do not give **diazepam** in neonates <2 weeks of age
- Phenobarbitone IM 20 mg/kg
- Still fitting after 10 minutes Phenobarbitone IM 20 mg/kg
- Still fitting after 10 minutes Paraldehyde IM 0.2 ml/kg OR PR 0.4 ml/kg

Note: Paraldehyde MUST NOT be given IV, Diazepam MUST NOT be given IM

Once the convulsion has been managed Identify and treat underlying cause of the seizure

Common causes of convulsions in children include:

- Fever, Malaria, hypoglycemia, intracranial infections, hypoxia, head injury, stroke, epilepsy, poisoning, hypertensive encephalopathy.

Common causes of convulsions in neonates include:

- Hypoglycemia, birth asphyxia, intracranial infection, intracranial hemorrhage, fecal ischaemic injury.

Dehydration:

Assess for signs of severe dehydration: sunken eyes, reduced skin turgor and lethargy.

Treat with Plan C using Ringer's Lactate or 0.9% saline.

Plan C: for severe dehydration +/- shock	
< 12 months	**>12 months**
• 30 ml/kg over 1 hour • Reassess • If no improvement: repeat 30 ml /kg • If improved: 70 ml/kg over 5 hours	• 30 ml/kg over 30 minutes • Reassess • If no improvement: repeat 30 ml /kg • If improved: 70 ml/kg over 2.5 hours

1.5 DIABETIC KETOACIDOSIS (DKA)

- Persons at extra risk: newly diagnosed T1DM, onset of pregnancy in T1DM, T1DM diabetics with poor compliance, inter-current infection, failure to administer insulin when ill and not eating
- Investigate immediately blood sugar, urine dipstick for glucose and ketones, electrolytes and urea, venous blood gas if possible.
- Check malaria as well FBC +/- Blood culture if suspecting infection.
- Hypoglycemia, subdural hematoma (elderly), stroke, malaria, meningitis, sepsis may also precipitate DKA
- If blood sugar levels cannot be obtained, it may be difficult to distinguish clinically between hypoglycemic and hyperglycemic coma, in that case
    - give 50 ml 50% Dextrose stat: in case of hypoglycemia, it will wake the patient up; in case of hyperglycemia, it will do no harm

TREATMENT:

- Fluid Management
    - Fluid deficit 4-6 litres
    - Give 0.9 % normal saline, 1 litre stat, 1 litre over 1 hour, 1 litre over 2 hours, 1 litre over 4 hours and 1 litre 6hrly
    - Use 5 % dextrose if blood glucose <15 mmol/L within 24 hrs. of admission.
        - Be cautious with fluid management in patients with heart failure
- Potassium Replacement (added to normal saline litre)
    - Withhold potassium in first litre and do not give > 20mmol/L of Potassium over 1 hour

Potassium level(mmol/L)	Potassium replacement (mmol/L)
<3	40
3-4	30
4.1-5	20
5.1-6	10
>6	Do not give

NB: Monitor Potassium 4 hourly

- Insulin
- Via an infusion pump:
    - mix 50 IU of Soluble Insulin (0.5 ml) with 50mls of normal saline in a 50-cc syringe
    - start insulin infusion at 0.1 IU/kg/hr. (e.g., 70 kg patient give 7 IU/hr.)

- with hourly glucose monitoring switch to Variable Rate Intravenous Insulin Infusion (VRIII) as follows (VRIII *was formerly referred to as Sliding Scale)*

Blood glucose(mg/dl)	No infections Insulin required (IU)	With infections Insulin required (IU)
0-72	0	0
72-143	1	2
144-215	2	3
216-288	3	5
289 – 360	4	6
361 – 432	6	8
>432	8	10

If no pump available

- Load with 10 IU soluble insulin IV then 4-6 units q2h until glucose is < 14 mmol/L

Blood glucose mg/dl (mmol/l)	Dose of soluble insulin	Type of fluid
>300 (16)	10	NS 0.9%
200-299 (11-16.5)	5	NS 0.9%
< 200 (11)	5	5% dextrose

NB: When to switch to scheduled insulin

- Patient is out of DKA evidenced by; no ketones in urine (or serum) and normal acid base balance (pH and bicarbonate). In our context when there is 2++ or less ketones in the urine and patient is well and eating.
- Before discontinuation of the IV-Insulin infusion, administer a fast acting/soluble insulin subcutaneous dose an hour before the iv is stopped to allow an overlap.
- Use the rule of 2/3 and 1/3 and titrate according to insulin requirements as described in the diabetes mellitus section 6.1

Note: *Patient should continue with their NPH/protaphane insulin as before whilst still on the IV-Insulin infusion*

1.6 HYPEROSMOLAR NON-KETOTIC COMA (HONK)

Persons at risk: elderly patients

Triad of diagnosis:

- Hypovolemia.

- Hyperglycemia (as high 30mmol/L or 545mg/dl),
- Hyperosmolality (> 320mOsmol/kg; calculated as [2Na+] (mmol/L) + glucose (mmol/L) + BUN (mmol/L))

SIGNS AND SYMPTOMS:

- Confused / reduced consciousness and, dehydration.

TREATMENT:

- Fluid replacement is more important than insulin even if blood sugar is high; however, fluids should not be given too rapidly to avoid large electrolyte shifts.
- Give 2 liters Sodium Chloride 0.9% in the first hour, then 1 litre every hour. Adjust to slower rate if elderly patient with risk of heart failure.
- Change to Dextrose 5% when blood sugar approaches normal levels. Aim for blood glucose levels of 180 – 270mg/dl (10 to 15mmol/l) in first 24hrs.
- Insulin should only be given if urine ketones ≥ 2+ at presentation or blood glucose falling at a rate of ≤90mg/dl (5mmol/l) despite adequate rehydration. If there is an infusion pump use rate of 0.05 units/kg/hr. of short acting/soluble insulin; Or give 10iu **Soluble Insulin** IV stat; this is usually enough.
- Do not try to lower the blood sugar rapidly at all costs by giving high doses of insulin.

Potassium Chloride

- Aim to keep potassium level between 4 to 5mmol/L
- Withhold potassium chloride in the first two liters and do not give > 20mmol/L of K over 1 hour.
- Adjust / individualize insulin treatment when fully conscious and eating as described in section 6.1

CHAPTER 2: CARDIOVASCULAR DISEASES

2.1 ACUTE LEFT VENTRICULAR FAILURE

CLINICAL DESCRIPTION

Pulmonary edema due to left ventricular failure.

Note: pulmonary edema can also occur to due excessive intravenous fluid administration or massive blood transfusion or renal failure

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Dyspnea, cough {often with frothy, pink-tinged sputum}, tachypnoea, signs of increased respiratory effort and diffuse rales or crackles.

INVESTIGATIONS

- FBC, U+E+Creatinine, RBS, Cardiac enzymes (where available), Urinalysis, HIV test, ECG, CXR, Echocardiogram

TREATMENT

General measures: Treatment objectives

- Early recognition and treatment

NON-PHARMACOLOGICAL

- Prop up patient to sitting position
- Restrict fluids and salt intake
- Active Cycle Breathing Technique

PHARMACOLOGICAL

- Oxygen therapy
- Drain pleural effusions if present and huge.
- If BP >120/80, give sublingual Nitroglycerin for pulmonary vascular dilation
- Alternatively, Digoxin if low systolic BP and normal renal function

Adults:

- **Frusemide** 40-80 mg slow IV (over 5 mins). Repeat if required
- Intravenous Morphine 2.5 mg -5-10mg

(Be cautious of patients with low blood pressure) and Metoclopramide 10mg IV

- Repeat both if required

Alternatively:

Second Line action (refer patient to next level of care)

- Depends on systolic blood pressure
- Nitrates if SBP >100mmHg
- Dopamine /Epinephrine if SBP 70- 100 mmHg and with signs and symptoms of shock

Children:

- Give **Morphine** 0.1-0.2mg/kg slow IV {over 5 mins} Repeat every 4 hours if required
- Give **Frusemide** 1-2mg/kg IV, PO.
- Specific treatment should be given according to the cause e.g., hypertension

2.2 CONGESTIVE HEART FAILURE

CLINICAL DESCRIPTION

Defined as a clinical syndrome in which patients have typical symptoms and signs resulting from abnormalities of Ventricular function. There is reduced cardiac output and increased venous pressures. Heart failure is a syndrome not a final diagnosis therefore it is very important to establish the cause

Causes

- Congenital heart diseases, Cardiomyopathies, Rheumatic heart disease, Ischemic heart disease, Hypertension

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Shortness of breath, Cough, fatigue, Orthopnea, Exercise intolerance, Paroxysmal nocturnal dyspnea, Diaphoresis, Failure to thrive, Tachycardia, tachypnoea, Oedema

INVESTIGATIONS

- Chest Xray, ECG, Echocardiography, Urea, electrolytes, and creatinine, Full blood count, HIV, Cardiac enzymes

TREATMENT

Objective

- To reduce preload, afterload and improve myocardial contractility

NON-PHARMACOLOGICAL

- Patient and family education on heart failure
- Restriction of fluids and salt
- Reduce salt intake
- Bed rest
- Daily weights
- Moderate exercises
- Stop smoking and alcohol intake
- Clinicians to screen and treat other comorbidities
- Active Cycle Breathing Technique

PHARMACOLOGICAL

Children

Initial treatment:

- **Frusemide** 1mg/kg PO/IV one to four times a day
- **Spironolactone** 1mg/kg PO one to two times a day

Discuss with cardiologist before commencing patient on ACE-inhibitors and digoxin

Referral

- All patients for diagnostic work up

Adults

Symptomatic relief:

- Give **Frusemide** 40-160 mg in divided doses

- Give **atenolo**l 50-100mg daily or **Digoxin** (0.125 mg daily) which is recommended in patients with heart failure and rapid atrial fibrillation
- Oxygen supplement if hypoxic

Symptomatic relief and mortality benefit in heart failure with reduced ejection fraction:

- ACE inhibitors: **Enalapril,** start at low doses 2.5-5mg and escalate to 10 mg twice a day.
- Spironolactone: 25 mg daily dose for patients with persistent symptoms of heart failure (NYHA II-IV)
- Beta-blockers e.g., **Atenolol** 50mg od and titrate up to 100mg od po or carvedilol, start at low dose 3.125mg bd then increase to 6.25mg bd then 12.5mg bd then increase to 25mg bd. Dose should be increased at intervals of at least two weeks up to highest tolerated dose or nebilong (nebivolol) 5mg OD po

Note: *ARB (Angiotensin Receptor Blocker) or Hydralazine + Nitrate can be an alternative if a patient cannot tolerate ACE inhibitors or has acute renal failure.*

2.3 CONGENITAL HEART DISEASE

CLINICAL DESCRIPTION

Acyanotic e.g. Ventricular Septal Defect (VSD, Atrial Septal defect (ASD), Atrioventricular Septal Defect (AVSD), truncus arteriosus

Cyanotic e.g., Tetralogy of Fallot, Tricuspid atresia, Transposition of Great arteries

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Failure to thrive, Diaphoresis, Shortness of breath especially on feeding, Shock, Finger clubbing, Cyanosis, Cyanotic spells

TREATMENT

If in heart failure, treat as per heart failure protocol

NON-PHARMACOLOGICAL

Management

- Awake proning
- Active Cycle Breathing Technique
- Light functional exercises

If in shock, treat and discuss with cardiologist

PHARMACOLOGICAL

- Antibiotic prophylaxis against bacterial endocarditis when undergoing dental or any surgical procedure.
- **Amoxicillin** 45mg/kg PO STAT or Ceftriaxone 50mg/kg IV STAT

Cyanotic congenital heart disease presenting in newborn as cyanosis:

- Consider if blue baby doesn't pink up with oxygen, check oxygen saturations. The baby may or may not have signs of heart failure. It may be difficult to distinguish from persistent pulmonary hypertension
- Investigate with chest x ray and cardiac echo

Management of hyper cyanotic spell

- Place child in knee chest position or
- encourage squatting in older child.
- Give oxygen
- Give 10ml/kg bolus crystalloid
- Give **Morphine** 0.1mg/kg IV or PO
- Oral **Propranolol** 0.5mg/kg
- phenylephrine 2-10mcg/kg STAT IV then 1-5mcg/kg/min intravenous infusion
- *if acidotic give sodium bicarbonate 8.4% 2ml/kg IV, dilute 1:1 with normal saline*
- *if not responding to above treatment, consult pediatric cardiologist*

Long term management

- Propranolol 0.5 -1mg/kg BD to prevent Spells
- Iron supplementation

Surgical Treatment

Surgery for those with operable congenital heart diseases

Complications

- Pulmonary hypertension
- Infective endocarditis

Cyanotic congenital heart disease complications

- Stroke
- Brain abscess
- Iron deficiency anemia

Referral

Refer all patients for diagnosis

2.4 ACUTE RHEUMATIC FEVER

CLINICAL DESCRIPTION

Multisystem condition resulting from immune response to group B streptococcus throat infection

CLINICAL FEATURES

SIGNS AND SYMPTOMS

New revised Jones criteria

1. Evidence of preceding Group A strep throat infection
2. Major criteria
    a. Carditis
    b. Polyarthritis/polyarthralgia
    c. Subcutaneous nodules
    d. Erythema marginatum
    e. Sydenham's chorea
3. Minor criteria
    a. Fever >38°C
    b. Raised acute phase reactants, ESR>30mm/hr., CRP>3
    c. Prolonged PR interval
    d. Monoarthralgia

To make diagnosis you need one major and 2 minor or 2 major or 3 minor criteria

INVESTIGATIONS

- FBC, ESR, CRP, Anti-Streptolysin O titer, Throat swab, ECG, Echocardiograph

TREATMENT

PHARMACOLOGICAL

Acute management

- **Penicillin V Potassium** <5years 250mg PO 6 hourly >5years 500mg BD for 10days
- **Aspirin** 25mg/kg 6 hourly for at least 14 days

If persistent fevers, joint pains consider steroids

- Bedrest for 14 days
- Chorea: **Haloperidol** 25 micrograms/kg daily
- If not responding, sodium valproate 20mg/kg twice daily, titrate according to response
- or Phenobarbital 5mg/kg once daily

Long term

- Antibiotic prophylaxis, Benzathine Penicillin 0.6MU IM < 30kg, 1.2MU > 30kg IM STAT monthly
- Follow up in pediatric clinic

Complications

- Rheumatic heart disease
- Valvular damage

Referral

- Children with complications of acute rheumatic fever
- Children with Persistent symptoms

2.5 RHEUMATIC HEART DISEASE

CLINICAL DESCRIPTION

Valvular heart disease which occurs as a complication of recurrent acute rheumatic fever.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Symptoms and signs of heart failure
- Murmurs

INVESTIGATIONS

- Chest Xray
- ECG
- Echocardiography

TREATMENT

PHARMACOLOGICAL

- Antibiotic prophylaxis, benzathine penicillin 0.6MU IM < 30kg, 1.2MU > 30kg IM STAT monthly
- Treat heart failure as per heart failure protocol

Surgery: refer to tertiary facility

Complications

- Heart failure
- Infective endocarditis

Referral

All children to be referred to a tertiary facility

2.6 INFECTIVE ENDOCARDITIS

CLINICAL DESCRIPTION

Infection of the endocardium, mostly affecting the valves.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

Duke's criteria

Major Criteria

1. Blood culture positive for typical microorganism (e.g., Staphylococcus aureus, Enterococcus, Viridans streptococcus)
2. Echocardiogram showing valvular vegetation

Minor Criteria

1. Predisposing cardiac lesion
2. Temperature >38°C
3. Embolic phenomena (e.g., stroke, septic pulmonary infarcts, mycotic aneurysm, intracranial hemorrhage, conjuctival haemorrhage or Janeway lesions)
4. Immunologic phenomena (e.g., glomerulonephritis, Osler's nodes, Roth spots, positive rheumatoid factor)
5. Positive blood culture not meeting above criteria

Definite infective Endocarditis

- 2 major or 1 major plus 3 minor criteria

Possible Infective Endocarditis

- 1 major and 1 minor OR 3 minor criteria

INVESTIGATIONS

- FBC, blood culture: 3 samples, 12 hours apart, inflammatory markers: ESR, CRP, urine dipstick, echocardiography

TREATMENT

- **IV benzyl Penicillin** (50 000 IU/kg every 4-6 hours for 6 weeks *and*
- **Gentamicin I**V (3 mg/kg OD) for 2 weeks and
- **IV Flucloxacillin** 50mg/kg (to max 2g) IV QDS for 6 weeks

OR

- IV Benzyl Penicillin 50 000 IU/kg IV every 6 hours for 6 weeks *and Gentamicin 3mg/kg IV od for 2 weeks. Please monitor renal function when giving gentamicin.*

OR

- Ceftriaxone 100mg/kg (to max 2g) IV OD for 6 weeks

Adjust antibiotics as guided by culture and sensitivity.

Complications

- Stroke
- Metastatic infection (e.g., septic pulmonary infarcts, gangrenous foot)
- Thromboembolic phenomenon

Referral

All children with infective endocarditis to tertiary facility.

2.7 HYPERTENSION

CLINICAL DESCRIPTION

- Diagnosis is based on a raised blood pressure measured while patient is at rest on at least 3 separate readings.
- Hypertension is generally asymptomatic.
- Essential hypertension is unusual in children and young adults and an underlying cause should be excluded at hospital level
- Hypertension in children is dependent on the age, sex, and height

	1 to 13 years	≥ 13 years
Normal BP	Systolic (SBP) and diastolic BP (DBP) < 90th percentile	<120/80
Elevated BP (Previously prehypertension)	SBP and/or DBP ≥ 90th percentile but < 95th percentile	SBP 120-129, DBP <80
Stage 1 hypertension	SBP and/or DBP ≥ 95th percentile to < 95th percentile + 12mmHg or 130/80 to 139/89 (whichever is lower)	130/80 – 139/89
Stage 2 hypertension	SBP and/or DBP ≥ 95th percentile + 12 mmHg or ≥ 140/90 mmHg (whichever is lower)	BP ≥ 140/90

Causes include:

Renal disease (glomerulonephritis, Hemolytic uremic syndrome, renal failure, cystic renal disease)

- Renovascular {renal artery stenosis}
- Cardiovascular {coarctation of the aorta}
- Endocrine (Cushing's Syndrome, neuroblastoma}

2.7.1 HYPERTENSION IN CHILDREN

CLINICAL DESCRIPTION

Refer all children with hypertension to a doctor for management

- In children, hypertension is defined statistically because BP levels vary with age and outcome. Based data are not available for this population. Hypertension is defined

as systolic and /or diastolic pressure levels greater than the 95th percentile for age and gender on at least 3 occasions

- The upper limit for normal systolic Bp in children greater than ~~0~~one year may be calculated as follows:
    - {Age in years x 3} +100
    - Diastolic BP is 2/3 of systolic BP
    - 90% of hypertension in children is caused by renal conditions

The table below shows normative blood pressure levels {systolic/diastolic} in children up to age 5 years. Blood pressures above the 95th percentile indicate hypertension

Age	Mean BP levels	95th Percentile
1-3 days	64/41 {50}	78/52 {62}
1mo -2yr	95/58 {72}	110/71 {86}
2-5yr	101/57 {74}	115/68 {85}

Remember to use the correct cuff size when measuring BP. It should cover 2/3 of the upper arm

Primary hypertension

- Idiopathic

Secondary hypertension

Renal disease

- Renal parenchymal disease: glomerulonephritis
- polycystic kidney disease
- congenital abnormalities of kidney and urinary tract,
- chronic kidney disease

Renovascular disease

- Renal artery stenosis
- Takayasu arteritis

Endocrine

- Pheochromocytoma
- Agangliomas

- Hyperthyroidism
- Cushing's syndrome

Cardiac

- Coarctation of the aorta

Drugs

- Steroids

Tumors

- Wilm's tumor
- neuroblastoma
- adrenal carcinoma

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- seizures, claudication, sweating, headache, tachycardia, altered level of consciousness, signs of underlying condition

INVESTIGATIONS

- limb BP, Urine dipstick and urinalysis, Urea, electrolytes, and creatinine, FBC, Abdominal ultrasound scan and doppler, ECG, Echocardiography, Fundoscopy, rest of investigations dependent on underlying cause

TREATMENT

NON-PHARMACOLOGICAL

- Reduce salt intake
- Regular monitored exercise
- Weight loss

PHARMACOLOGICAL

1. Calcium channel blocker
    a. **Nifedipine** slow release 0.1-0.25mg/kg 6 hourly PO or
    b. **Amlodipine** 0.1mg/kg 4 to 6 hourly PO
2. ACE-Inhibitor
    a. **Enalapril** 0.1mg/kg PO daily or 12 hourly or

b. **Lisinopril** 0.1mg/kg PO daily

3. Beta Blockers
    a. **Propranolol** 0.5-1mg/kg 12 hourly

Complications

- Hypertensive crises
- Hypertensive retinopathy
- Hypertensive nephropathy
- Hypertensive cardiomyopathy

Referral

Refer all children with hypertension for diagnostic work up

2.7.2 HYPERTENSION IN ADULTS

CLINICAL DESCRIPTION

Classification of Adult Hypertension

Type of Hypertension	Systolic Blood Pressure	Diastolic Blood Pressure
Mild	140-159	90-99
Moderate	160-179	100-109
Severe	>180	>110

CLINICAL FEATURES:

SIGNS AND SYMPTOMS

- Usually none
- Occasionally headaches, palpitations, dizziness, easy fatiguability
- high Blood pressure ≥ 140/90 mmHg
- +/-Displaced apex beat
- Signs pointing to a specific cause for secondary hypertension

INVESTIGATIONS

- FBC, Urinalysis, Blood urea, electrolytes, and creatinine, Blood glucose, Serum lipids, Serum uric acid, Chest X-ray, 12-lead ECG
- Ultrasound scan of kidneys and adrenals (in suspected secondary hypertension)
- Echocardiogram

TREATMENT

NON-PHARMACOLOGIC

- Reduce salt intake
- Stop smoking
- Regular monitored exercise
- lose weight
- Avoid excessive alcohol consumption
- Prevent complications (stroke, heart failure, Myocardial infarction, chronic kidney disease etc.
- Explain to the patient that treatment should be regular (every day), closely monitored and generally must be taken for life
- Lifestyle changes mentioned above

PHARMACOLOGICAL

- Use the following stepped treatment approach with the medicines in this order unless there are specific contraindications, co- morbidities, or side- effects

***Note**: Consider medicine treatment for mild hypertension only if the above general measures are unsuccessful*

Stepped anti-hypertensive treatment approach

Step 1:

- Hydrochlorothiazide 25 mg each morning, increasing the dose is not advised. Explain to the patient that treatment must be regular (every day), closely monitored and generally must be taken for life
- Alternatively, give Bendrofluazide 5mg daily or Indapamide 2.5mg daily

***Note**: Avoid in pregnancy feeding and breastfeeding*

Step 2:

- Give **Hydrochlorothiazide** 25mg once daily and Amlodipine 5- 10mg once daily
- Where Amlodipine is not available Nifedipine 10-20mg slow-release tablets once or twice a day can be used.

Step 3:

- Give **Hydrochlorothiazide** 25mg once daily, Amlodipine 5-10 mg once daily and Enalapril 10- 20mg once daily (increase dose slowly)

- Where Enalapril is not available Captopril 12.5-50mg (start with low dose) every 8 hours or lisinopril 10mg od can be used.
- Best to start with a lower dose of Enalapril 5mg and increase to 10mg after observation of the BP response over a few days.
- Avoid Enalapril and Captopril in pregnancy and breast-feeding

Step 4:

- Give **Hydrochlorothiazide** 25mg once daily and Amlodipine 5- 10mg once daily (or Nifedipine 10-20mg), Enalapril 10-20mg once daily and Atenolol 50-100mg once daily
- Where Atenolol is not available Propranolol 40mg - 80mg every 8 hours can be used (start with low dose) or carvedilol 12.5mg bd (and increase to 25mg bd if need be) or Nebilong 5-10mg daily.

Step 5:

- Refer to Medical Specialist

***Note**: Side-effects may outweigh benefits. In patients with severe hypertension or complications {heart failure, renal failure} start medicine treatment immediately.*

- In patients without co-morbidity, aim for a BP of around 140/90 and aim around 130/80 if co-morbidity (Diabetes, chronic kidney disease)
- For patients taking ART, because of the interactions between Calcium Channel Blockers, and NNRTIs, please consider Enalapril or Atenolol before a Calcium Channel Blocker.
- If not tolerating ACE inhibitors give ARBs e.g. Losartan 50-100mg daily or Telmisartan 40-80mg daily

Compelling indications for the choice of antihypertensives

- Left ventricular hypertrophy: ACE-I or ARB, CCB preferably Amlodipine.
- Microalbuminuria: ACE-I or ARB.
- Renal dysfunction: ACE-I or ARB; Caution- if eGFR <15min/ml without renal replacement therapy.
- Previous stroke: Any of the first-line drugs, especially ACE-I.
- Coronary artery disease (Angina/Myocardial infarction): ACE-I or ARB, Beta-blocker, CCB.
- Heart failure: ACE-I or ARB, Cardio-selective B-Blockers- bisoprolol, metoprolol, carvedilol; Loop diuretics, Spironolactone in advanced heart failure.
- Peripheral artery disease: CCB, ACE-I or ARB.
- Diabetes mellitus: ACE-I or ARB.
- Atrial fibrillation: ARB or ACE-I or B-blockers

Compelling Contraindications.

- Gout: Thiazide diuretics.
- Asthma: Beta-blockers.
- AV block (2nd and 3rd degree): Beta blockers and calcium channel blockers.
- Bilateral renal artery stenosis and hyperkalemia: ACE Inhibitor and ARBs

Referral Criteria:

Refer the following categories of hypertensive patients to an appropriate specialist:

Note

- *Those not achieving the target blood pressure (BP) level after several months of treatment*
- *Those on three or more anti-hypertensive drugs yet have poor BP control y Those with worsening of BP over a few weeks or months.*
- *Those with plasma creatinine levels above the upper limit of normal.*
- *Those with multiple risk factors (diabetes, dyslipidemia, obesity, family history of heart disease).*
- *Those not on diuretics but have persistently low potassium on repeated blood tests.*

All children, young adults, and pregnant women with elevated BP

2.7.3 HYPERTENSIVE EMERGENCY IN CHILDREN

CLINICAL DESCRIPTION

Hypertensive emergencies encompass a spectrum of clinical presentations in which uncontrolled blood pressures lead to progressive or impending end-organ dysfunction

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Encephalopathy, convulsions, Posterior reversible encephalopathy syndrome (PRES), Visual disturbances, retinal hemorrhages, blindness.

INVESTIGATIONS

- As per hypertension protocol

TREATMENT

NON-PHARMACOLOGICAL TREATMENT

- Neuroprotective measures
  - Nurse head at 30 degrees
  - Treat seizures
  - Maintain normoglycemia
  - Give oxygen
  - Keep temperatures normal

PHARMACOLOGICAL

- Assess and manage Airway, Breathing, Circulation and Disability
- Reduce BP slowly in order to prevent stroke, retinal and spinal cord infarction
  - One third of the total desired reduction in the first 12 hours
  - The next one third in 12 to 36 hours
  - Last one third between 36 and 72 hours
- hypertensive encephalopathy: Give Hydralazine 0.15 mg/kg slow IV
  - Repeat every 30-90 minutes as required
  - Maximum dose: 1.7-3.6 mg/kg in 24 hours
  - long term management of hypertension would depend on the cause hence these patients need to be referred for proper management.
- Labetalol
  - Loading dose 0.25mg/kg IV
  - Then continuous infusion of 0.25mg-3mg/kg/hour
- Sodium Nitroprusside 0.5-8mcg/kg/min continuous infusion
- If patient has oedema add frusemide 1-5mg/kg IV/PO 6 to 12 hourly

Complications

- Stroke
- Hypertensive crises
- Hypertensive retinopathy
- Hypertensive nephropathy
- Hypertensive cardiomyopathy

Referral

Refer all patients with hypertensive emergency

2.7.4 HYPERTENSIVE EMERGENCY IN ADULTS

CLINICAL DESCRIPTION

A severe and potentially life-threatening increase in blood pressures (BP) which may result in an acute stroke, retinopathy (grade 3-haemorrhage or 4-papilloedema), subarachnoid hemorrhage, seizures (hypertensive encephalopathy), heart attack, acute dissection of the aorta, heart failure, renal damage, or eclampsia (during pregnancy). The underlying cause may be primary hypertension; however, secondary causes of hypertension must be excluded. In adult patients this often occurs with a BP > 180/120 mmHg, while in children this may occur at lower BP levels.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Encephalopathy, convulsions, retinal hemorrhages, or blindness.
- symptoms and signs of heart failure/stroke/heart attack/renal failure/aortic dissection

INVESTIGATIONS

- FBC, Urinalysis, Urea, electrolytes, and creatinine, Cardiac enzymes (CK-MB, AST, CK, LDH, troponin, BNP) for acute coronary syndrome, Chest X-ray, 12-lead ECG, Echocardiogram and kidney Ultrasound, Brain CT scan (for stroke), Chest CT scan with angiography (for suspected aortic dissection)

TREATMENT

- Reduce the blood pressure in a controlled manner to avoid impaired auto-regulation of cerebral blood flow.
- Manage target organ damage accordingly
- Control seizures if present
- Only use parenteral therapy in:
    - Malignant hypertension with heart failure
    - hypertensive encephalopathy
    - eclampsia
    - hypertension and dissecting aneurysm of the aorta

Note: *Intravenous rapid lowering of blood pressure has several risks and should be done under close monitoring only, preferably in a high or intensive care setting. It is only indicated in hypertensive emergencies mentioned above.*

NON-PHARMACOLOGICAL

- appropriate positioning of patient if unconscious (to keep airway patent), raise head of bed if in heart failure

PHARMACOLOGICAL

- Give **Hydralazine** 5-10 mg IM/IV. Repeat up to every 1 hour as necessary.
- Alternatively, Labetalol, IV, Adults 20-50 mg STAT. (over a 2-minute period). Repeat at 10-minute intervals, if necessary, to a max. of 200 mg
- If no IV drugs and patient fully awake give Nifedipine 20mg slow release po
- If heart failure: add Frusemide 40 mg IV stat

Sub-lingual nifedipine (10 mg) **should be avoided** due to the unpredictable response of the blood pressure. If parenteral drugs are unavailable, then slow release nifedipine 20mg orally can be used.

2.8 ISCHEMIC HEART DISEASE

CLINICAL DESCRIPTION

Condition in which there is inadequate blood and oxygen supply to any portion of the myocardium, Can be stable angina, unstable angina, or myocardial infarction (acute coronary syndrome). Risk factors: Hypertension, Diabetes mellitus, smoking, alcohol, old age, hyperlipidemia, family history of ischemic heart disease.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Central crashing chest pain (worse on exertion) +/-radiation to left arm/jaw/neck + nausea/vomiting
- Heaviness feeling on the chest
- Shortness of breath and palpitations
- Sweating
- -/+ signs of pulmonary edema if LVF

***Note**: old and diabetic patients may have silent myocardial infarction (with no chest pain)*

INVESTIGATIONS

- FBC, Cardiac enzymes (CK, CK-MB, Troponin, AST, LDH), U+E+Creatinine, RBS, Lipogram, ECG, CXR, Echocardiogram

TREATMENT

General measures

Minimize risk factors by:

- Weight reduction (if obese)
- Control of hypertension
- Control of diabetes
- Stop smoking

Address other factors such as:

- High blood cholesterol
- Stressful lifestyle
- Excessive alcohol intake
- Encourage monitored regular moderate exercise

2.8.1 STABLE ANGINA (INFREQUENT ATTACKS)

CLINICAL DESCRIPTION

Angina is due to poor blood flow through the blood vessels in the heart (coronary arteries). It is chest pain or discomfort that most often occurs with activity or emotional stress

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Central chest pain {squeezing, heavy discomfort} with radiation to the left arm on exertion or at rest lasting 2-5 minutes, crescendo and decrescendo pattern

INVESTIGATIONS

- As in ischemic heart disease section above

TREATMENT

PHARMACOLOGICAL

- Give Aspirin 150 mg daily

Acute relief of Angina

- Give Glyceryl Trinitrate 0.5 mg sublingually as required.
  - Maximum 3 tablets per 15 minutes
  - Deteriorates on storage: keep tablets in original container for no more than 3 months after opening
- Alternatively use **Isosorbide Dinitrate** 5-10mg sublingually as required instead of Glyceryl Trinitrate

Long term management

- **Atenolol 50 mg** 12 hourly (if not asthmatic)
- **Amlodipine 5-10mg** daily or Nifedipine 10-20 mg daily to replace or be cautiously added to Atenolol
- If pain continues despite the above treatment refer to Medical Specialist

Red flags

- Unstable angina, non-ST segment myocardial infarction
- Central chest pain as above lasting more than 10 minutes and has a crescendo pattern
- Acute myocardial Infarction (ST segment elevation)
- Typical angina pain plus most patients being restless, anxious, pale and with cold extremities

Treatment

- Nitrates and Morphine 2-5mg IV for pain control if there is no hypotension.

Note: *Urgently discuss these patients with medical specialist!*

2.9 ACUTE CORONARY SYNDROME (ACS)

CLINICAL DESCRIPTION

This is a term that describes symptoms resulting from severe acute myocardial ischemia. The ischemia may, or may not, lead to myocardial infarction (heart attack). ACS is classified as ST segment elevation on an electrocardiogram (ST-segment elevation myocardial infarction - STEMI) or a non-ST-segment elevation myocardial infarction (NSTEMI) and

unstable angina (an ACS without elevation of cardiac enzymes). Atherosclerosis or obstruction of coronary blood vessels lead to reduction in blood supply to the heart muscle.

Risk Factors

- The risk factors for ACS are identical to those for, and include previous episodes of, stable angina pectoris.
- Risk factors for this condition include:
  - obesity,
  - diabetes mellitus,
  - hypertension,
  - smoking and
  - hyperlipidemia.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Chest pain (Sudden onset)
- Varying degree but often severe and described as tightness, heaviness or constrictive in nature
- Symptoms persist for more than 30 minutes) and may not be relieved by rest or glyceryl trinitrate.
- Chest pain May radiate to the left arm, the neck or jaw
- Nausea, Vomiting.
- Shortness of breath or fatigue (this may be the only presentation in diabetics and the elderly)
- Loss of consciousness
- Restlessness and apprehension
- Excessive sweating
- Peripheral or central cyanosis
- Pulse may be thready, fast, irregular, slow or normal
- Blood pressure may be high, low, or unrecordable (following extensive damage to heart muscle)
- Bilateral crepitations in the chest (with left ventricular failure)
- Presence of a third or fourth heart sound (suggests heart failure)
- Confusion in the elderly

INVESTIGATIONS:

- Standard 12 lead ECG, cardiac enzymes: CK-MB, CK, AST, LDH, troponins, serum lipid profile, random blood sugar, FBC, Urea, creatinine, and electrolytes, echocardiography and coronary angiography.

TREATMENT

Treatment objectives

- To relieve distress and pain
- To limit infarct size
- To prevent and treat complications
- To reverse cardiac remodeling
- To prevent re-infarction
- To identify and manage modifiable risk factors
- To improve quality of life

NON-PHARMACOLOGICAL

- Admit patient
- Reassure patient and encourage bed rest in the first 48 hours
- Encourage cessation of smoking
- Ensure weight reduction (in overweight and obese individuals) in the long term

PHARMACOLOGICAL

- Oxygen, intranasal, by face mask or nasal cannula
- **Aspirin, oral (chewable**), 300 mg STAT and Clopidogrel, oral, 300 mg STAT.
- **Glyceryl trinitrate, sublingual**, 500 microgram stat.
- **Morphine**, IV, 5-10 mg STAT.
- **Metoclopramide**, IV, 10 mg STAT (to prevent vomiting induced by morphine)

Maintenance treatment following immediately after initial treatment

- Aspirin, oral, 75mg-indefinitely; Clopidogrel, oral, 75 mg daily (patients who receive revascularization therapy will require treatment for up to 12 months)
- Anticoagulation: Enoxaparin, SC, 1 mg/kg 12 hourly
- Prevention of cardiac arrhythmias and reduction of myocardial workload: Atenolol, oral, 25-100 mg daily (avoid only if beta-blockers are contraindicated) or carvedilol 3.125mg bd (escalate dose gradually to maximum dose) or Bisoprolol, oral, 5-20 mg daily Or Metoprolol, oral, 50-100 mg 8-12 hourly

- Prevention of infarcted area remodeling: ACE inhibitor e.g., enalapril 5-10mg or Lisinopril, oral, 2.5-20 mg daily Or ARBs e.g., Losartan, oral, 25-50 mg daily Or Telmisartan 40-80mg daily
- STEMI: Fibrinolytic agents (streptokinase or rTPA) may be given as reperfusion therapy in patients presenting with STEMI under specialist care.
- Manage acute complications such as pulmonary oedema, cardiogenic shock, and cardiac arrhythmias
- Manage hyperglycemia with insulin.
- Change diabetic patients previously on oral hypoglycemic agents to insulin during the acute phase of Myocardial infarction

Long-term treatment (secondary prevention):

- **Aspirin,** oral, 75-150 mg daily indefinitely
- **Atenolol**, oral, 25-100 mg daily (avoid only if beta-blockers are contraindicated)

Or

- **carvedilol 3.125mg bd po or Bisoprolol**, oral, 5-20 mg daily Or Metoprolol, oral, 50-100 mg 8-12 hourly
- To prevent cardiac remodeling and improve survival:
- enalapril 5-20mg daily or Lisinopril, oral, 2.5-20 mg daily

Or

- Losartan, oral, 25-50 mg daily

Or

- Telmisartan 40-80mg daily (Note Avoid ACE inhibitors and Angiotensin receptor blockers in patients with BP < 100 mmHg)
- To stabilize the clot and reduce blood cholesterol levels:
- Atorvastatin, oral, 20-40 mg daily

Or

- **Rosuvastatin**, oral, 10-20 mg daily

Or

- **Simvastatin**, oral, 40-80 mg daily.

Statins are indicated irrespective of lipid levels

To improve coronary dilatation and reduce myocardial workload:

- Isosorbide dinitrate, oral, 10 mg 8-12 hourly
- Control of hypertension and hyperglycemia if present (See appropriate sections)

Referral Criteria

All patients with suspected ACS require an urgent ECG. If ECG is not available or cannot be interpreted, refer immediately to a higher facility.

Patients with confirmed STEMI in any facility should be referred urgently to a Physician Specialist or Cardiologist (after an initial oral dose of 300 mg of aspirin). Other patients with N-STEMI and unstable angina should be referred to a physician specialist or cardiologist after the initial management above.

2.10 PERIPHERAL ARTERIAL DISEASE

CLINICAL DESCRIPTION

If there are poor pulses and delayed capillary refill, or claudication or non-healing wounds.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Muscle cramps (thighs, calf muscles)
- Leg numbness or weakness
- Coldness in lower leg or foot
- Sores: legs or feet or toes
- Hair loss or slower hair growth in legs/feet
- Weak or no pause in legs/feet
- Erectile dysfunction in men
- Shiny skin in legs

INVESTIGATIONS:

- Blood sugar, FBC, lipid profile, HIV

TREATMENT

- consider adding Aspirin and Statin
- Treat risk factors (diabetes, hyperlipidemia, HIV)
- Patients with critical limb Ischemia should be referred to high level of care to avoid death from septic shock

CHAPTER 3: CENTRAL NERVOUS SYSTEM CONDITIONS

3.1 SEIZURES AND EPILEPSY

3.1.1 SEIZURES

CLINICAL DESCRIPTION

A seizure is a clinical manifestation of an abnormal and excessive discharge of a group of neurons in the brain. It can be convulsive or non-convulsive. When neuronal dysfunction involves a specific area within a brain hemisphere, it is termed as a focal seizure. When neuronal dysfunction generates from a specific area within a brain hemisphere and then spreads to involve both brain hemispheres, it is termed as a generalized seizure. Seizure generalization can occur at the onset of the seizure or as the seizure progresses with time.

Causes:

- Febrile convulsion with intercurrent illness e.g., malaria, viral or bacterial infection, (Febrile convulsions usually occur in children 6 months - 6 years, consider other causes in different age groups)
- Cerebral malaria
- Intracranial infections: Meningitis, Cerebral Abscess, Encephalitis
- Hypoxia of any cause
- Hypoglycaemia of any cause
- Other electrolyte or metabolic disturbances
- Cerebrovascular accidents
- Head Injury
- Seizure disorder (Epilepsy)
- Hypertensive encephalopathy
- Poisoning e.g., alcohol, tricyclic antidepressants, OPP poisoning
- Genetic causes

Common causes of convulsions in neonates include:

- Hypoglycemia
- Birth asphyxia
- Intracranial infection
- Intracranial hemorrhage
- Focal ischaemic injury

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Transient altered consciousness
- Patients may experience abnormal body movements (head, limbs or trunk)
- Altered sensation
- Autonomic changes
- Psychic events

INVESTIGATIONS

- Random Blood glucose, FBC, Urea, electrolytes, and creatinine, urine dipstick, microscopy, and culture, blood culture, lumbar puncture, electroencephalogram (EEG), CT or MRI brain

TREATMENT

NON-PHARMACOLOGICAL TREATMENT

- Assess and manage Airway, Breathing and Circulation.
- Assess the patient for any possible causes of seizures or precipitating factors as stated above.
- Patients with underlying risk factors that predispose them to seizure recurrence might require long term antiepileptic therapy.

PHARMACOLOGICAL TREATMENT

Check glucose and treat hypoglycemia

In Adults:

- Give Diazepam 5-10 mg IV slowly. Repeat once after 10 minutes.
- If convulsions continue for another 10 minutes or are repeated more than 3 times without patient gaining consciousness between seizures, treat as status epilepticus.
- Assess the patient for any possible causes of seizures or precipitating factors as stated above
- Patients with underlying risk factors that predispose them to seizure recurrence might require long term If repeated seizures, consider antiepileptic therapy.
- Diazepam IM absorbs slowly and unreliably: IV or rectal routes are preferable

In children and neonates

- See seizure management in chapter 1

Complications

- Aspiration
- Hypoxic brain injury
- Rhabdomyolysis

REFERRAL

- Seizures not responding to treatment

3.1.2 CHILDHOOD EPILEPSY

CLINICAL DESCRIPTION

Recurrent unprovoked seizures. Epilepsy is classified as generalised or focal.

Causes:

- Congenital brain malformation
- Neurologic sequelae of intracranial infections, trauma and hypoxic brain injury
- Idiopathic
- Syndromes: Lennox Gestaut, Sturge weber, beningn familial, myoclonic epilepsy of the infant
- Metabolic

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Tonic-clonic: sudden loss of consciousness (tonic phase) than rhythmic contractions of all four extremities. Afterwards postictal phase with headache, confusion and fatigue. Often tongue bite, enuresis, encopresis
- Absence: Impaired awareness and responsiveness. cannot be interrupted by tactile stimulation, often interrupt conversation or ongoing physical activity such as eating and play, usually occur multiple times during the day and last only a few seconds.
- Atonic: abrupt loss of muscle tone
- Myoclonic: repetitive muscle contractions

INVESTIGATIONS

- Electroencephalogram
- CT or MRI brain where available

TREATMENT

PHARMACOLOGICAL TREATMENT

Generalized seizures

- **Sodium Valproate** 20-40 mg/kg/day in 2 to 3 divided doses (maximum 60mg/kg/day)

Alternatively

- **Phenobarbitone** 5mg/kg nocte

OR

- **Phenytoin** 3- 5mg/kg PO 12 hourly or
- **Carbamazepine** 2.5mg/kg per, dose 12 hourly,
  - Increase the dose weekly by 5mg/kg until 20mg/kg is reached.
- **Levetiracetam** 30mg/kg PO loading dose then 40mg/kg 12 hourly

Focal seizures

- **Carbamazepine** 2.5mg/kg, dose 12 hourly,
- Increase the dose weekly by 5mg/kg until 20mg/kg is reached.

Alternatively

- Give Sodium Valproate 20-40 mg/kg/day in 2 to 3 divided doses (maximum 60mg/kg/day)

Absence seizures

- Never give carbamazepine
- Give **Sodium Valproate** 20-40 mg/kg/day in 2 to 3 divided doses (maximum 60mg/kg/day)
- Give Ethosuximide 15 mg/kg at night as a single dose increased gradually if necessary to 50 mg/kg daily in 2 divided doses

3.1.3 STATUS EPILEPTICUS

CLINICAL DESCRIPTION

Continuous seizure activity or seizures without recovery of consciousness for > 30 minutes. In 2015, the international league against Epilepsy (ILAE) recommended a definition which defines any seizure activity >5 minutes as status epilepticus. This new definition necessitates early vigilance in management of prolonged seizures which may lead to good outcomes. This is an emergency and mortality is high.

TREATMENT

NON-PHARMACOLOGICAL TREATMENT

- Clear the airway, insert IV-line, position patient in recovery position
- Do not insert any object between the teeth

PHARMACOLOGICAL

Adults:

- Give **Diazepam** 5-10 mg IV. Repeat the dose if seizures recur and give loading dose of antiepileptic medications.
    - Give phenytoin 15 -18 mg/kg (600- 1200 mg) IV. Dilute with 100 ml normal saline and give slowly, no more than 50 -100 mg/minute.
    - Or phenobarbitone 10 -15 mg/kg dilute with water for injection 1:10 and give slowly, no more than 100 mg/minute.
- Check blood sugar. Give glucose, if suspicious of hypoglycaemia
- Give **Thiamine** 100mg IV or IM once daily before giving glucose if patient suffers from alcoholism.
- If still no improvement, consider general anaesthesia {in ICU setting preferably}.
- Antiepileptic medications can be prescribed for further control of the seizures.

REFERRAL

If the patient is being managed at a Health Centre level, referral must be done once the patient has been loaded with either phenytoin or phenobarbitone to facility which has anesthetist's care.

3.1.4 EPILEPSY

CLINICAL DESCRIPTION

This is a condition characterized by recurrence of seizures. This can be due to a brain insult which might have resulted from infections, stroke, perinatal causes, tumours, head trauma or genetic causes.

TREATMENT

- Treatable causes should always be ruled out.
- Treatment can be initiated in patients at risk of further seizures as described above.

Antiepileptic medications

- Initiate treatment with one antiepileptic drug at either its recommended dosage (mg/kg) or minimal dose and titrate to recommended dosage.
- If seizures persist at the maximum tolerable dose of the initial drug, then add another antiepileptic drug as described above.
- Treatment resistant forms of epilepsy may require more than 1 antiepileptic medications.
- Some antiepileptic medications are teratogenic. Women of childbearing age should always be encouraged to use family planning methods when on such drugs i.e. Sodium Valproate
- Folic acid must always be given to women on Antiepileptic drugs.
- Some antiepileptic drugs induce hepatic enzymes which may lead to reduction in blood levels of Antiretroviral medications or family planning drugs. Clinicians need to make necessary changes in such patients.
- Treatment should not be stopped because of pregnancy: it is more dangerous for the mother and foetus to have uncontrollable seizures than to continue the anti-epileptic medicine.
- Treatment should never be stopped suddenly due to risk of status epilepticus, but rather tapered- off over weeks or months.

Available AEDs in Malawi

- **Phenobarbitone sodium** 60-180 mg at night

Alternatively

- **Carbamazepine** 100 -200mg 1- 2 times daily. Increase by 100 - 200 mg weekly until dose is 800 mg - 1200mg per day.

OR

- **Sodium Valproate** 600 - 2000mg daily divided in 2 doses.

OR

- **Phenytoin 150** - 300mg daily divided in 1-2 doses. Can be increased to 500mg daily.

***Note**: counselling on safety should always be done to patients.*

3.2 STROKE

CLINICAL DESCRIPTION

WHO describes a stroke as a clinical syndrome typified by rapidly developing clinical signs of focal or global disturbance of cerebral function lasting >24 hours or leading to death, with no apparent cause apart from that of vascular origin. It is a cerebrovascular event which leads to hypoxia and ischemia of the affected part of the brain. It can either be Ischemic or Haemorrhagic.

Causes

- Infections
- Haematological
  - Sickle cell disease, malignancy, haemophilia, thrombocytopenia
  - Protein C, S and factor V leiden deficiency
- Cardiovascular
  - Congenital cyanotic heart disease, infective endocarditis
  - Hypertension
- Autoimmune
  - ITP, antiphospholipid syndrome
- Trauma

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Hemiplegia, Facial nerve palsy, Altered mental status, Seizures, Visual disturbances, Dysarthria, Dysphasia and Bulbar palsy

INVESTIGATIONS

- FBC, Peripheral blood smear, Random blood glucose, HIV status, clotting profile, Urea, electrolytes and creatinine, Liver function test, Sickling test, Hb electrophoresis, Prothrombotic markers, Echocardiography and CT or MRI brain

TREATMENT

Objective

Stabilization and maintenance of vital functions

Acute Treatment

- Assess and manage Airway, Breathing, Circulation and Disability
- Make sure the patient blood pressure and blood glucose are checked and managed appropriately.
- Uncontrasted CT scan of the head
- Ischemic: allow BP to remain moderately elevated for 1-2 weeks
    - {140-180/90-100} then treat to normal.
- Haemorrhagic: reduce the BP faster (<140/90) and avoid aspirin
- All strokes are likely to benefit from statin therapy. Commonly used statins are Simvastatin and atorvastatin.
- The patient can be started on Simvastatin 10-20 mg daily
- Patients with ischaemic stroke can be started on Aspirin: 300mg chewed x1 then 75mg q24h
- Assess safety/ability to swallow without aspirating {NG tube can be inserted if needed}
- Neuroprotective measures
- Supportive care
    - NGT for feeding
    - Catheterization
    - Skin protection
- Refer to Medical Rehabilitation services and social worker for counselling.
- Treat all underlying causes

Chronic Treatment

- Medical Rehabilitation Services
- Treat underlying conditions

Note:

- Conditions that may present like Stroke include Subdural haematoma, brain masses, meningitis, and encephalitis.
- Recurrent stroke when already taking aspirin should be referred to a specialist.
- Remember brain infection as a differential diagnosis of stroke in HIV infected patients
- Risk factors include hypertension, diabetes, smoking, genetic disorders, atherosclerosis, cardiac disease, atrial fibrillation, HIV and high cholesterol.
- look for treatable causes and counsel the patient.
- In adults, give long term Aspirin 75mg once daily.
- In children, 5mg/kg daily if ischaemic stroke.

Note: Aspirin is not advised in intra-cerebral or subarachnoid hemorrhage.

- Give IV fluids to correct any dehydration
- Treat hyperglycaemia
- Treat any fever: look and treat for infections (aspiration pneumonia, urinary tract infection common).

Complications

- Aspiration, Pressure sores, Contractures, Epilepsy, Developmental delay and Learning disability

Referral

All children with stroke for diagnostic work up

3.3 TRAUMATIC BRAIN INJURY (TBI)

CLINICAL DESCRIPTION

Traumatic Brain Injury is divided into mild (GCS 14-15), moderate (GCS 13-9) and severe (GCS 8-3). This includes conditions like concussion, alteration of consciousness (confusion, amnesia +/- LOC) without structural damage because of non-penetrating TBI

TREATMENT

NON-PHARMACOLOGICAL TREATMENT

- ABCD + adequate resuscitation
- Avoid hypoxia, hypotension (SBP >90mmhg)
- Neuro assessment
- If low risk for intracranial injury (ICI)
  - Can go for home observation with instructions
- If moderate risk ICI
  - Do SXR, CT scan if available
  - Can go for home observation
  - If patient does not meet home observation, admit overnight
- If high risk ICI
  - Admit
  - Elevate head of bed
  - Neuro checks 2-4 hrly
  - Keep NPO until alert, then clear liquids and advance as tolerated
  - Isotonic IV fluids, Normal Salani + 20mEq Potassium Chloride/L as maintenance (= 100cc/hr for average adult)
  - Mild analgesia; Paracetamol (and diclofenac IM if necessary)
  - Do not give mannitol unless it is indicated.
  - Do not give anti-seizure prophylaxis unless indicated.

Referral

- Refer all (GCS <13) moderate and severe TBI to tertiary health care facilities.

3.4 SUBARACHNOID HAEMORRHAGE

CLINICAL DESCRIPTION

Bleeding into the subarachnoid space, most commonly due to the rupture of a vascular aneurysm. Diagnosis is confirmed preferably by neurological imaging and, when this is not available, urgently refer this patient as lumbar puncture (which is done to demonstrate xanthochromia) may lead to cerebral herniation.

Causes

- Rupture of saccular aneurysms (80%), AVMs (15%)

Risk Factors

- Smoking, Hypertension, Alcohol, Bleeding diathesis, Mycotic aneurysms, Family history

CLINICAL FEATURES

SYMPTOMS AND SYMPTOMS

- Sudden, severe occipital headache, Collapse, Meningism: neck stiffness, nauseas and vomiting, photophobia, Seizures, Drowsiness → coma

INVESTIGATIONS

- Brain CT
  - Detects >90% of SAH within first 48hrs.
- Lumbar Puncture
  - If CT negative and no contraindications >12h after start of headache
  - Xanthochromia due to breakdown of bilirubin

TREATMENT

NON-PHARMACOLOGICAL TREATMENT

- Frequent neurological observations: pupils, GCS, BP
- Maintain cerebral perfusion pressure (CPP): keep SBP >160mmHg.
- Endovascular coiling (preferable to surgical clipping)

PHARMACOLOGICAL TREATMENT

- Analgesia if level of consciousness is not impaired:
  - **Paracetamol**, oral, 1 g q4-6h when required to a maximum of 4 doses per 24 hours.
  - Avoid NSAIDs.
- If no response:

- **Morphine**, IV, 1-2 mg/minute to a maximum total dose of 10 mg. Dilute 10 mg up to 10 ml in sodium chloride solution 0.9%. This may be repeated q4h

- In patients with grades 1 to 3 impairment of consciousness level while waiting for transfer to neurosurgical facility and in consultation with neurosurgeon:
  - Give Nimodipine, oral, 60 mg q4h for 21 days.

Complications

- Rebleeding: 20%
  - Commonest cause of mortality
- Cerebral Ischemia
  - Due to vasospasm
  - Commonest cause of morbidity
- Hydrocephalus
  - Due to blockage of arachnoid granulations
  - May require ventricular or lumbar drain.

When to refer

- All patients with minimal impairment of consciousness level for possible angiography and appropriate neurosurgical management. Patients initially deemed unsuitable for further investigation, may be referred at a later stage, should their condition improve.
- For neurological imaging: patients in whom the diagnosis must be confirmed radiologically and where a lumbar puncture may be considered hazardous.
- All patients with functional neurological deficits to be referred for Medical Rehabilitation services.

3.5 HEADACHES AND FACIAL PAIN SYNDROMES

3.5.1 MIGRAINE

CLINICAL DESCRIPTION

Episodic headache, usually focal in nature, which may occur with or without an aura. It is usually accompanied by nausea and vomiting. Several variants of migraine also occur.

TREATMENT

General Measures

Reassure patient that this is a benign condition. Attempt to identify any precipitating factors or food allergies from the history {although this is usually unrewarding} and try to diminish patterns of tension.

Acute treatment

- Initiate therapy during the attack or at the onset of the headache.

Analgesics, e.g.:

- Paracetamol, oral, 1 g q4-6h when required to a maximum of 4 doses per 24 hours.

OR

NSAIDs, e.g.:

- Ibuprofen, oral, 800 mg immediately then 8 hourly, if needed.

If severe and not responding to therapy above:

- **Morphine,** IM, 10 mg as a single dose.

For nausea:

- Give **Metoclopramide**, oral/IM, 10 mg 8 hourly.

Prophylaxis

Regular, daily, prophylactic therapy is advised if:

- attacks are frequent, i.e., more than 2-3 per month, or severe, causing a significant amount of disability, or attacks are long lasting.
- Also consider for patients who tolerate therapy for acute attacks poorly.

Give:

- **Amitriptyline**, oral, 10-25 mg at bedtime. Titrate dose up to adequate response. More than 75-150 mg as a single bedtime dose is seldom required.

Or

- **Propranolol**, oral, 20-80 mg 12 hourly. Note: The evidence for using atenolol for this indication is limited.

Or

- **Carbamazepine**, oral. Start with 100 mg q12h. Increase every two weeks up to a maximum of 400 mg q12h.

Note: *Only about half of patients will respond to one of these agents and this response may take 1 to 2 months to occur.*

Referral

- Patients with focal neurological deficits may require further investigations to rule out non benign causes of the headache.
- The investigations must include a CT scan of the brain.
- CT scan can also be requested in patients with Migraine headaches not responding to treatment or in patients with sudden onset severe headache to rule out SAH.

3.5.2 CLUSTER HEADACHE

CLINICAL DESCRIPTION

Repetitive episodes of excruciating headache typically of short duration (up to 2 hours) in clusters for weeks to months at a time. Typically, the headache is of sudden onset, unilateral during the specific cluster, and quickly reaches a climax. Associated redness of the eye with lacrimation and rhinorrhea occurs.

TREATMENT

PHARMACOLOGICAL TREATMENT

Oxygen inhalation may abort some episodes. Analgesics are ineffective in this indication.

To induce rapid remission in patients with episodic cluster headache:

- Prednisone, oral, 40 mg q24h for 5-10 days. Tapering is not necessary when the above duration is used.

Or

- **Verapamil**, oral, 40 to 80 mg 8 hourly

Referral

- When the is inadequate response to treatment.

3.5.3 TRIGEMINAL NEURALGIA

CLINICAL DESCRIPTION

Severe, very short-lived stabs of facial pain in the sensory trigeminal distribution. It is important in the diagnostic workup to exclude intracranial mass lesions, which may impinge on the trigeminal nerve.

TREATMENT

PHARMACOLOGICAL TREATMENT

- **Carbamazepine**, oral, 100 mg q8-12h, initial dose. Increase dose slowly. Doses of up to 1, 200 mg q24h may be required. After exacerbation, reduce to maintenance dose of 400-800 mg q24h.

Referral

For neuroimaging with MRI.

- If there is poor response to single drug therapy.
- Refer to Medical Rehabilitation Services for desensitization.

3.5.4 TENSION HEADACHE

CLINICAL DESCRIPTION

- Headache over the back of the head, but sometimes over the entire head, described as a tight band around the head, usually worse in the afternoon.

General Measures

- Refer to medical rehabilitation Services for muscle relaxation techniques. The importance of this diagnosis is the exclusion of other, more sinister conditions. Exclude analgesia overuse headache.

TREATMENT

PHARMACOLOGICAL TREATMENT

- **Amitriptyline**, oral, 10-75 mg at night.

REFERRAL

- When there is atypical pain, suggestive of alternate diagnosis.
- When there is poor response to therapy.

3.6 INFECTIOUS AND PARASITIC CONDITIONS

3.6.1 MENINGITIS

CLINICAL DESCRIPTION

Clinical syndrome characterized by inflammation of the meninges.

Causes:

- Viruses: Herpes simplex Virus, enteroviruses
- Bacteria: Streptococcus Pneumoniae, Staphylococcus Aureaus, Haemophilus Influenza, Meningococcal TB
- Fungal: Cryptococcus Neoformans

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Headache, Photophobia, Fever, Neck stiffness, Seizures, Altered mental status, Positive Babinski, Positive Kernig's sign

INVESTIGATIONS

- FBC, Blood glucose, HIV status, Lumbar Puncture, Microscopy, chemistry and culture (CSF for gene X-pert if suspect TB meningitis), India ink and Cryptococcal antigen, Blood culture

TREATMENT

PHARMACOLOGICAL TREATMENT

- Assess and manage Airway, Breathing, Circulation and Disability
- Treat seizures as per protocol
- Neuroprotective measures
- Analgesia as per WHO pain ladder
    - ➢ Bacterial meningitis
        - ○ Ceftriaxone 100mg/kg IV q24h (maximum dose 2g) for 10 to 14 days
            - ✓ Adjust treatment as guided by culture results
    - ➢ Viral encephalitis
        - ○ Acyclovir 10mg/Kg IV 8 hourly for 10 days if suspecting Herpes Simplex or Varicella encephalitis
    - ➢ Cryptococcal meningitis

- Induction Phase
  - ✓ Option 1**: Liposomal Amphotericin B + Flucytosine** for 7 days
    - **Amphotericin B** 6mg/kg IV over 6 hours daily
    - **Flucytosine** 100mg/kg/day PO divided into 4 doses
  - ✓ Option 2**: Fluconazole + flucytosine** for 14 days
    - **Fluconazole** 12mg/kg (max 800mg) q24h
    - **Flucytosine** 100mg/kg/day PO divided into 4 doses
  - ✓ Option 3: **Liposomal Amphotericin B + fluconazole** for 14 days
    - **Amphotericin B** 3-4 mg/kg IV over 6 hours daily. Use up to 6 mg/kg for treatment failure or serious disease
    - **Fluconazole** 12mg/kg (max 800mg) q24h
- Consolidation Phase
  - ✓ **Fluconazole** 12mg/kg PO (maximum 800mg) daily for 8 weeks
- Maintenance Phase
  - ✓ **Fluconazole** 6mg/kg PO daily, life long

➢ TB meningitis
- Intensive treatment HRZE for 2 months
- RH for 10 months
- **Prednisolone 2-4mg/**kg/day for 3 weeks, taper dose over 3 weeks
- **Pyridoxine** 25mg daily

NON-PHARMACOLOGICAL TREATMENT

- Hearing assessment
- Refer for Intensive Medical rehabilitation Services.
- Serial head circumference measurement

Complications: Brain abscess, Cranial nerve palsies, Seizures, SIADH, Stroke, Learning disability, Developmental regression, Hearing loss, Hydrocephalus

Referral

- Suspected brain abscess
- Signs of raised intracranial pressure
- Not responding to treatment

3.6.2 HERPES SIMPLEX ENCEPHALITIS

CLINICAL DESCRIPTION

Rare neurological disorder characterized by inflammation of the brain due to herpes simplex virus infection

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Fever, change in behaviour and seizures, which may be either focal or generalized. Evidence of mucocutaneous involvement is usually not present. lumbar puncture shows the above features of viral meningoencephalitis, but in this condition may be additionally hemorrhagic in nature.

INVESTIGATIONS

- Lumbar puncture shows features of a viral meningoencephalitis, but in this condition may be additionally hemorrhagic in nature.
- A positive HSV PCR test on CSF is diagnostic.
- A temporal focus on EEG or neuro-imaging is strongly supportive of the diagnosis.
- A positive HSV PCR test on CSF is diagnostic.

TREATMENT

- **Acyclovir**, IV, 10 mg/kg 8 hourly for 21 days. Start therapy as early as possible, before results are available. If PCR is negative, stop treatment.
- Treat seizures appropriately with available Antiepileptic drugs, Phenytoin or Carbamazepine.
- It is important to initiate therapy and then refer to Centre where neuro- imaging is available.

REFERRAL

- For neuroimaging: patients whose condition deteriorate not responding or worsening in condition, i.e., decrease in level of consciousness or develop and cranial nerve palsies, despite being initiated on appropriate therapy.
- This is especially urgent in patients with tuberculous meningitis, who may develop hydrocephalus and require an urgent shunting procedure.

- Patients with shunts.

3.6.3 BRAIN ABSCESS

CLINICAL DESCRIPTION

Collection of pus in the brain parenchyma

Causes:

- Infection: Streptococcus Pneumoniae. Staphylococcus aureus, Haemophilus Influenza B
- Complication of meningitis, Mastoiditis, and sinusitis
- Pott's puffy tumor
- Cardiac
- Cyanotic congenital heart disease
- Infective endocarditis
-

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Persistent fevers
- Seizures
- Focal neurological signs
- Altered level of consciousness

INVESTIGATIONS

- FBC
- Blood culture
- Urgent CT brain

TREATMENT

PHARMACOLOGICAL

Adults:

- **Ceftriaxone**, IV, 2 g 12 hourly Plus
- **Metronidazole**, oral, 400 mg 8 hourly or IV, 500 mg 8 hourly. Adjust according to antimicrobial sensitivity after surgical drainage.

Children:

- **Ceftriaxone** 100mg/kg IV q24h
- **Metronidazole** 7.5mg/kg IV 8 hourly. Adjust according to antimicrobial sensitivity after surgical drainage.
- Adequate analgesia
- Treat seizures

NON-PHARMACOLOGICAL

- Urgent referral to tertiary facility for imaging and neurosurgical intervention
- Neuro protective measures

Complications

- Raised intracranial pressure
- Seizures
- Syndrome of Inappropriate ADH Secretion
- Stroke

REFERRAL

All patients with suspected brain abscess for imaging and neurosurgical intervention

- All post-op patients for Intensive Medical rehabilitation Services.

3.6.4 NEUROCYSTICERCOSIS

CLINICAL DESCRIPTION

- Parasitic infection caused by larval cysts of the pork tape worm Taenia Solium

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Asymptomatic
- Seizures
- Focal neurological deficits
- Features of raised intracranial pressure

INVESTIGATIONS

- CT or MRI brain

TREATMENT

PHARMACOLOGICAL

- **Albendazole** 7.5mg/kg twice daily for 8 days
- Drug-induced damage to cyst cerci may precipitate an acute inflammatory reaction, the intensity of which is related to the number of viable cysts and may cause cerebral oedema. This reaction is minimized by adding corticosteroids to the anthelminthic treatment,
- Prednisone 1-2mg/kg daily for 8 days.
- Treat seizures according to seizure protocol

NON-PHARMACOLOGICAL

- Neurosurgical intervention if patient has hydrocephalus
- Neuroprotective measures

Complications

- Seizures
- Hydrocephalus
- Developmental regression

Refer all post-op patients for intensive medical rehabilitation Services.

REFERRAL

All patients should be referred for neuroimaging

3.6.5 ACUTE FLACCID PARALYSIS

CLINICAL DESCRIPTION

Acute onset of weakness or paralysis with reduced muscle tone

Causes:

- Inflammatory: Guillain- Barre syndrome, Transverse myelitis
- Trauma
- Infection: e.g., TB spine, schistosomiasis, enteroviruses, polio
- Tumours: primary or secondary spinal tumours e.g. Burkitt's Lymphoma
- Toxins: botulinum toxin

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Rapid onset of weakness, Ascending weakness, Paraplegia, Bulbar weakness, Paresthesia, Stool and urine incontinence, Radicular pain, Autonomic dysfunction

INVESTIGATIONS

- Identify underlying cause, Xray of spine, Stool and urine microscopy, CT or MRI spine

TREATMENT

PHARMACOLOGICAL

Objective

- Prevent respiratory and cardiovascular compromise and restore function of the spinal cord
- Assess and manage airway, Breathing and Circulation
- Refer urgently if ascending paralysis
- Physiotherapy and occupational therapy
- Treat underlying cause

Complications

- Respiratory failure, Spinal shock, Pressure sores, Contractures

REFERRAL

- Refer urgently if ascending paralysis
- Refer all for diagnostic workup

3.7 MOVEMENT DISORDERS

CLINICAL DESCRIPTION

Abnormalities of movement/initiation of movement, divided into those with reduction of movement {hypokinesia or bradykinesia}, or those with excessive movements {hyperkinesia}.

Referral

- To differentiate functional from organic disorders.
- Tardive dyskinesia.
- All complicated cases, i.e. patients with Parkinsonism, not responding to small doses of carbidopa/levodopa.
- Patients with Parkinsonism developing disease-, drug- or autonomic nervous system complications.
- Patients with myoclonus or chorea, not responding to therapy.

3.7.1 PARKISON'S DISEASE

CLINICAL DESCRIPTION

Parkinsonism is a syndrome characterized by tremor, rigidity, bradykinesia and postural disturbances. It may be primary, i.e., Parkinson's disease, or secondary, i.e., drug-induced or due to uncommon disorders that may initially resemble Parkinson's disease.

TREATMENT

General Measures

- Educate the patient on the condition. General supportive therapy and advice about lifestyle modification, physiotherapy, and occupational therapy.

The objective of treatment is to:

- Minimize disabling symptoms,
- promote functional abilities
- prevent complications and avoid serious drug-induced side effects, and
- exclude secondary forms.

Note: Set therapeutic targets so that the patient is functioning as well as possible.

PRIMARY PARKINSONISM

Bradykinesia, rigidity and postural disturbance:

- Carbidopa/levodopa, 25/100 mg, oral, ½ tablet 8 hourly. Increase dose in consultation with a specialist.
- If optimal control has not been achieved, consider an alternative diagnosis or changing to a drug containing a higher dose of levodopa: Carbidopa/levodopa 25/250 mg. Specialist initiated.

DRUG-INDUCED PARKINSONISM

- Anticholinergics have a very small role in this setting and should be used with caution.
- Anticholinergic agent, e.g.: Orphenadrine, oral, 50 mg 8 hourly.

Tremor only:

Consider anticholinergic agent, e.g.:

- Orphenadrine, oral, 50mg 8 hourly. Increase gradually according to clinical response or maximum dose of 400mg daily
- Usual dose: 150-250 mg q24h.

Acute dystonic reaction

- Usually follows administration of dopamine antagonistic drug, e.g., Metoclopramide and Phenothiazines. Anticholinergic agent, e.g., Biperiden, IM/IV, 2 mg. Repeat as necessary.

REFERRAL

- If there is no improvement or poor control with treatment.
- Increasing on/off phenomenon.
- Dyskinesias.

3.7.2 ESSENTIAL TREMOR

CLINICAL DESCRIPTION

Nervous system disorder that causes involuntary rhythmic shaking. Often affects hands though may also affect head, arms, legs and voice. Can be triggered by stress, fatigue, caffeine and temperature extremes.

TREATMENT

General Measures

- Exclude and manage alternate causes, such as drugs, thyrotoxicosis, hyper-adrenergic states and psychiatric disorders.
- Occasionally a patient may present with essential tremor and an additional neurological condition, which may make the diagnosis difficult.

If tremor is severe and interfering with normal daily activities: Give beta-blocker, e.g.:

- Propranolol, oral, 60-320mg q24h in divided doses.

3.7.3 MYOCLONUS

CLINICAL DESCRIPTION

- Irregular, involuntary movements due to muscle jerks, which may be due to myoclonic seizures, but may follow injuries to the brain and are thus not always of an ictal nature.

REFERRAL

- All patients where the diagnosis is unclear.

3.7.4 CHOREA

CLINICAL DESCRIPTION

Involuntary random, irregular movements. Aetiology is classified as:

- Primary - Huntington's chorea, benign hereditary chorea, and others
- Secondary - due to Sydenham's chorea, vascular pathology, metabolic, endocrine, and infective conditions, amongst others.

TREATMENT

- Give **Haloperidol**, oral, 0.5- 5 mg q8-12h.

To be prescribed by a specialist only.

3.7.5 NEUROPATHY

CLINICAL DESCRIPTION

Defective functioning of nerves, which may involve both peripheral, cranial and Autonomic. nerves (peripheral neuropathy} and cranial nerves. Different patterns are noted, i.e., polyneuropathy, mononeuritis multiplex and mononeuropathy, each of which may be caused by axonal degeneration or demyelination or a combination of the above.

CLINICAL FEATURES

May be predominantly of a sensory, sensorimotor, autonomic, or motor nature. Important causes of neuropathy include:

- Alcohol, diabetes, HIV infection,thiamine deficiency, acute inflammatory demyelinating polyradiculoneuropathy{Guillain-Barre}, and chronic inflammatory demyelinating polyradiculoneuropathy {CIDP}.

TREATMENT

General Measures

- Observe rate of progression. If the disease is progressing fairly rapidly, i.e., deterioration noted over 5-7 days, admit patient and monitor ventilatory status carefully with spirometry, as intubation and ventilatory support may be required. Remove the cause where possible, i.e., drug- or alcohol-induced neuropathy, control diabetes mellitus, etc. Specialized nursing care and dedicated physiotherapy and occupational therapy must be indicated. If not referred early for medical rehabilitation services, may develop contractures, weakness affecting gait, develop chronic bedsores and become dependent on the guardians.
- Most cases respond to management of the underlying disease process or removal of the etiological agent.
- *Neuropathic pain* {i.e., pain due to a disease or injury of the central or peripheral nervous system}
    - Give **Amitriptyline**, oral, 25-75 mg q24h.

OR

- Give **Carbamazepine**, oral, 200-1200 mg daily in divided doses.

Isoniazid-induced polyneuropathy

- **Give Pyridoxine**, oral 75 mg daily for 3 weeks. Follow with 25-50mg q24h.

Post-herpes zoster neuropathy {Note: Acyclovir is not beneficial in treating this condition}.

- Give **Amitriptyline**, oral, 25-75 mg q24h.

AND/OR

- Give **Carbamazepine**, oral 200-1200 mg daily dose in divided doses. Beware of possible drug interactions in patients on ART.

BELLS' PALSY NOTE:

Exclude herpes zoster

Start within 4 days of onset of symptoms:

- Give **Prednisone**, oral, 60 mg q24h for 7- 10 days

Referral

- Electrophysiological studies may be needed in the diagnostic assessment, although many common causes do not warrant specialist investigations, e.g., polyneuropathies due to diabetes mellitus, HIV, isoniazid, hydralazine, dapsone, antiretrovirals {stavudine and didanosine}, amiodarone and alcohol. These cases may initially be managed locally, with referral of non-responding or atypical cases.
- Gullain-Barre Syndrome: referral criteria are progressive, extensive paralysis with impending respiratory failure, bulbar palsy and swallowing problems, and aspiration, as well as for diagnostic confirmation.

3.7.6 ACUTE MYELOPATHY

CLINICAL DESCRIPTION

Patients present with a sudden onset of paraparesis, with associated sensory loss, i.e., a sensory level may be found. Incontinence and autonomic instability may be present.

There are numerous causes for this condition, and it is important to exclude neoplastic and infectious conditions, i.e., granulomas and abscesses, causing external compression of the spinal cord. Lesions, such as intervertebral disk prolapse, and mass lesions below the spinal cord may present with cauda equina syndrome. These cases usually have asymmetrical weakness but may have saddle anesthesia and sphincter involvement alone. Incontinence is a marker of severity.

REFERRAL

- All patients require urgent imaging.
- All patients to rehabilitation services before and/or after medical or surgical intervention.

3.7.7 MULTIPLE SCLEROSIS

CLINICAL DESCRIPTION

A demyelinating disease of the central nervous system characterised by episodes of unifocal or multifocal neurological dysfunction. Diagnosis is confirmed when dissemination in space and time is confirmed by imaging and CSF analysis which may show oligoclonal bands and raised lgG index.

Recovery between acute flares of illness is common, although a general stepwise deterioration in function will be noted.

Consult with neurologist/specialist for diagnosis and treatment.

REFERRAL

- All patients.

3.7.8 OEDEMA, CEREBRAL

CLINICAL DESCRIPTION

Swelling of brain parenchymal tissue, due to vasogenic, cytotoxic and osmotic causes. Only the vasogenic causes, such as brain tumours and inflammation, respond to corticosteroids.

TREATMENT

- Consider **mannitol** for brain oedema in traumatic brain injury causing raised intracranial pressure, pending neurosurgical intervention.

3.7.9 BRAIN OEDEMA DUE TO TUMOURS AND INFLAMMATION

General Measures

- Supportive management.
- Rehabilitation intervention

TREATMENT

- Treat the underlying cause. This is especially important with brain oedema associated with systemic conditions, such as electrolyte disturbances and organ failure.
- Patients with primary brain tumours or brain metastases should be considered for specific treatment of the tumor, which includes surgery and/or radiotherapy.
    - Give Dexamethasone, IV, 4 mg 6 hourly initially.

OR

- Give Betamethasone, oral/IV, 4 mg 6 hourly. Discontinue if no response has occurred after 48 hours. Taper dose according to response and duration of therapy.

3.7.10 BRAIN OEDEMA DUE TO TRAUMATIC INJURY

General/ Measures

- Refer patient for neurosurgical opinion, if indicated. Supportive management. Rehabilitation intervention.

Note: DVT prophylaxis with heparin may be contraindicated owing to risk of increased bleeding.

- The following measures should be used in patients with raised intracranial pressure:
  - head elevation and position,
  - airway and ventilation control,
  - sedation and analgesia,
  - control of fever,
  - control of hypertension, and
  - prevention of seizures.
- Currently, no evidence supports the use of hyperventilation in this setting.

TREATMENT

- For raised intracranial pressure, pending neurosurgical procedure only:
  - Give **Mannitol** 15-25%, IV, 0.25-1 g/kg administered over 30-60 minutes. Monitor neurological response and urine output. Do not repeat more than 6-8 hourly.
  - Beware of hypovolaemia and electrolyte disturbances, especially hypokalaemia.

Currently no evidence exists to support the use of hypertonic saline infusion.
Corticosteroids used in this setting have a harmful effect

For prevention of seizures:

- **Phenobarbital** (loading dose 15-20mg/kg [max 1.2g] IV infused at 25 – 100mg/min [beware of respiratory depression at maximum dose]; maintenance dose 1-3mg/kg/day PO/IV in 1 or 2 divided doses).
- **Phenytoin** (loading dose 15 – 20mg/kg [max 2g] IV at 25mg/min slow IV push [Do not exceed 50mg/min]; maintenance 300 – 400mg/day)

3.7.11 SPINAL CORD COMPRESSION/PARAPLEGIA

CLINICAL DESCRIPTION

- Lower limbs weakness

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Deep, local spinal pain
- Stabbing, radicular pain in a dermatomal distribution and LMN weakness at lesion level
- Progressive UMN weakness and sensory loss below lesion
- Bladder hesitancy, frequency → painless retention
- Faecal incontinence or constipation
- Look for motor, reflex and sensory level
- Shooting, radicular pain at level, anaesthesia below
- LMN signs at level, UMN signs below level
- Tone and reflexes are usually reduced in acute cord compression

Causes

Compressive

- Spinal cord tuberculosis (Pott's disease)
- Spinal cord metastases and neoplasms
- Degenerative spinal disease (e.g. slipped disc)
- Schistosomiasis
- Bacterial abscesses

Non-Compressive

- Autoimmune transverse myelitis
- HIV-associated vacuolar myelopathy
- Neuroschistosomiasis
- Neurocysticercosis
- Syphilis (meningomyelitis, meningovascular myelitis, Tabes dorsalis)
- Vitamin B12 deficiency (subacute combined cord degeneration)
- Viral (Herpes, Varicella)

INVESTIGATIONS

- HIV test, VDRL (Syphilis test), FBC, Blood sugar, ESR (erythrocyte sedimentation rate), Ova of Schistosoma in urine and stool; If available, serology
- X-ray: spine (level depending on clinical findings) and chest (signs of TB?)
- Ultrasound abdomen (signs of TB?), Lumbar Puncture
- CT-guided percutaneous vertebral or paravertebral biopsy and aspiration would be the gold standard for spinal TB, Neuroimaging: MRI (level depending on clinical findings)

- MRI is definitive modality
- CXR for primaries

TREATMENT

This is a neurosurgical emergency

3.7.12 TUBERCULOSIS OF THE SPINE

- Tuberculosis treatment
  - up to 9 months (2RHZE 7RH)
  - Corticosteroids not recommended, but consider in severe spinal cord compression to reduce oedematous swelling
- Spinal surgery in case of:
  - extensive extradural compression
  - no improvement/worsening or deficits after conservative treatment
  - unstable spine
  - kyphosis >60°

3.7.13 ACUTE TRANSVERSE MYELITIS

- Inflammation of the spinal cord, acute (hours) – subacute (days) onset
- Back pain, flaccid paraplegia, sensory level on the trunk, urinary incontinence
- CSF: Proteins and lymphocytes increased

Treatment:

High doses of IV corticosteroids (methylprednisolone, dexamethasone) followed by oral prednisolone for 2-3 weeks, Acyclovir (if VZV or HSV myelitis not excluded)

3.7.14 NEUROSCHISTOSOMIASIS

Non-pharmacological treatment and complications

Complication	Prevention and management
Pressure sores	Nursing, training of and counselling of guardians (2-hourly turning)
Urinary retention	Catheterization
Contractures	Physiotherapy, training of guardians for home-based physiotherapy
Pain	NSAID/opiates, Tiyanjane team
Immobilization	Walking aids/wheelchairs
Depression	Spiritual and mental support, occupational team/community projects, pharmacotherapy

- Praziquantel 50mg/kg/day divided in two doses for 5 days.

When to refer

- When a patient meets indications for spinal surgery listed above
- Acute compression with an unidentified cause
- Suspected transverse myelitis where immunosuppressants are unavailable

CHAPTER 4: EAR, NOSE AND THROAT CONDITIONS

4.1 EAR CONDITIONS

4.1.1 MASTOIDITIS

CLINICAL DESCRIPTION

It is a result of an infection that extends to the air cells of the skull behind the ear. Specifically, it is an inflammation of the mucosal lining of the mastoid antrum and mastoid air cell system inside the mastoid processor. The mastoid is the portion of the temporal bone of the skull that is behind the ear. It is usually caused by untreated acute otitis media and used to be a leading cause of child mortality.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Swelling behind or above the ear.
- Fever, Pinna pushed forward, tender
- Ear discharge

INVESTIGATION

- Physical Examination, Blood Test, X-Ray, CT-Scan, MRI, Spinal Tap

TREATMENT:

NON-PHARMACOLOGICAL

- Eat food rich in vitamins like fruits and vegetables and avoid spicy food.
- Seek medical attention should you experience any of the signs and symptoms

PHARMACOLOGICAL

Adults:

- Give **Ceftriaxone**, IV, 2g 12 hourly for 5 – day plus
- Give Analgesics as necessary

Children:

- Give Ceftriaxone 50 mg per kg daily for 5 days

Refer:

- Brain involvement (meningitis or brain abscess).
- For surgical drainage may be necessary (If fluctuant)
- Refer patient to hospital (if no response to drugs)

4.1.2 OTITIS

4.1.2.1 OTITIS EXTERNA

CLINICAL DESCRIPTION:

This is an inflammation of the skin lining the external auditory canal. May be a furuncle or diffuse.

CLINICAL FEATURES

SYMPTOMS AND SIGNS:

- Ear pain
- Itchiness
- Mild Hearing loss

INVESTIGATION

- Ear swab for culture and sensitivity

TREATMENT

NON-PHARMACOLOGICAL

PHARMACOLOGICAL

A. Furuncle

- **Give Amoxicillin** 50 mg/kg in 3 divided doses for 5 days.
- Give Analgesia

Alternatively:

- Give **Flucloxacillin** 500mg 6 hourly for 5 days

- Make a wick of ribbon gauze impregnated with Hydrocortisone or Betamethasone cream and gently insert in the ear for 2 to 3 days.

B. DIFFUSE OTITIS EXTERNA

- Dry Mop Ear
- Give Analgesia when necessary
- Give Ciprofloxacin ear drops 6 hourly for 5 days

4.1.2.2 ACUTE OTITIS MEDIA

CLINICAL DESCRIPTION:

This is an infection of the middle ear, which communicates with the throat. It is important in a febrile child to look for it and treat it. If persists for more than 72 hours, then start antibiotics. If it does not resolve for a further 72 hours, then, refer. Tropical medicine treatment is ineffective and should beavoided.

Acute otitis media is often viral in origin and needs only a simple analgesic for pain

CLINICAL FEATURES

SYMPTOMS AND SIGNS:

- Fever in about 50% of patients, sudden persistent ear pain or pus discharge for < 2 weeks
- Red eardrum
- Occasionally inflamed throat
- Perforated eardrum

INVESTIGATION

- FBC
- Ear swab for culture and sensitivity

TREATMENT

PHARMACOLOGICAL

- Give **Amoxicillin** 15 mg/kg every 8 hourly for 5 days

Alternatively:

- Give **Erythromycin** 6.25 mg/kg every 8 hourly or Azithromycin 10mg/kg stat then 5mg/kg q24h for total maximum 5 days for patients with penicillin allergy
- Give Analgesia as required

4.1.2.3 Chronic superlative otitis media

CLINICAL DESCRIPTION

This is a chronic infection of the middle ear with perforation of the tympanic membrane and pus discharging from the ear for more than 2 weeks.

CLINICAL DESCRIPTION

SYMPTOMS AND SIGNS:

- Persistent pus discharge, hearing loss
- If the eardrum has been ruptured for over 2 weeks, secondary infection with multiple organisms usually occurs.
- Common in immunosuppressed patients
- This makes oral antibiotic therapy much less effective.

INVESTIGATION

- Ear swab for culture and sensitivity

TREATMENT

NON-PHARMACOLOGICAL

- Ensure ear is always dry by dry wicking with cotton wool.

*A chronically draining ear can only heal if it is **dry**. Drying the ear is time consuming for both the health worker and the mother, but it is the only effective measure.*

- The mainstay of treatment is topical therapy with Ciprofloxacin ear drops 6 hourly for 5 days
- Demonstrate/explain carefully to the patient (or guardian in the case of a child) how to dry the ear by wicking (see below)
- Refer for further assessment if no improvement after 3-4 weeks'therapy

Dry the ear by wicking.

1. Roll a piece of clean absorbent cloth or cotton wool into a wick and insert carefully into the patient's ear.
2. Leave for one minute
3. Remove and replace with a clean wick
4. Watch the patient/guardian repeat this until the wick is dry when removed.

5. The patient/guardian should dry the ear by wicking at home at least four times daily until the wick stays dry.
6. If bleeding occurs, temporarily stop drying the ear.
7. Do not leave anything in the ear between treatments
8. Commercially made ear buds should be avoided in cleaning the ear.
9. The patient should avoid swimming or otherwise getting the inside of the ear wet.
10. Re-assess weekly to ensure that the patient/guardian is drying the ear correctly.
11. Check for mastoiditis.

Note: TB is an important cause of a chronically discharging ear in Malawi, condition is common in HIV infected children.

4.1.3 ACUTE VERTIGO

CLINICAL DESCRIPTION

An acute syndrome, consisting of vertigo, nystagmus, nausea, vomiting and postural instability.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Sudden onset and intermittent symptoms, vertigo following head movement, vomiting and nystagmus

INVESTIGATIONS

- Positive Dix-Hall pike test
- Need for neuro imaging to find cause and treat appropriately

TREATMENT

Treatment will depend on the cause

REFERRAL:

- Suspected intracranial mass lesions or cerebellar stroke.
- Suspected vestibular neuritis.
- Patients not responding to therapy for exclusion of alternative etiology.

4.2 NOSE CONDITIONS

4.2.1 EPISTAXIS

CLINICAL DESCRIPTION

Epistaxis also called nosebleed is a common medical emergency, which requires prompt management to avoid morbidity and mortality. Bleeding can be bilateral or unilateral, or posterior and anterior. Causes include trauma, repeated nose pickings, infections such as rhino sinusitis, systemic causes such as hypertension, bleeding disorders, anaemia and leukemia etc.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Nose Bleeding

INVESTIGATIONS

- FBC, sickling test, coagulation screen, liver function test, retroviral screen, if indicated

TREATMENT

NON-PHARMACOLOGICAL

- Pinch the nose 5-10 minutes let the patient lean forward and breathe through the mouth

Alternative:

- Apply cold pack or ice block to the forehead, using ribbon gauze impregnated with Petroleum Jelly or liquid paraffin.

PHARMACOLOGICAL

- Cauterization of bleeding point by touching the bleeding point with sliver nitrate

4.2.2 NASAL VESTIBULITIS

CLINICAL DESCRIPTION

An inflammation of the skin within the nasal vestibule is referred to as nasal Vestibulitis. Diffuse infection of the skin of the anterior nares and may occur due to frequent trauma such as occurs in constant nose picking. Persistent nasal discharge leads to excoriation and infection of the skin of the nasal vestibule

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Swelling
- Pain
- Mucous Drainage Bump at the opening of the nostril

TREATMENT:

PHARMACOLOGICAL

- Give Analgesia
- Give **Amoxicillin** 500mg 8 hourly for 5 days
- Give Liquid Paraffin 2 drops each nose 3 times a day

4.2.3 BACTERIAL SINUSITIS

CLINICAL DESCRIPTION

This is an acute infection of the para-nasal sinuses. It may lead to complications with attendant morbidity and mortality. Early recognition of this clinical condition is mandatory. Swimming in dirty waters, dental infection or dental extraction, fractures involving the sinuses, nasal obstruction from polyps and allergic rhinitis are predisposing factors to developing acute sinusitis.

CLINICAL FEATURES

SYMPTOMS AND SIGNS:

- Purulent nasal discharge, persistent or intermittent, pain and tenderness over one or more sinuses, nasal obstruction, postnasal discharge, occasional fever.

INVESTIGATIONS

- FBC
- X-ray of paranasal sinuses

1. Sinusitis is uncommon in children under five years as sinuses are not fully developed
2. Unilateral foul-smelling nasal discharge is a foreign body until proven otherwise

TREATMENT:

NON-PHARMACOLOGICAL

- Adequate hydration
- Steam inhalation

PHARMACOLOGICAL

Adults:

- Give **Oxymetazoline** 0.05% 2 drops twice a day for not more than one week
- Give **Cetirizine** 10mg daily for 3-5 days
- Give **Amoxycillin** 500mg 8 hourly for 5 days
- Steam inhalations using Menthol are advised

Children:

- Give **Oxymetazoline** 0.025% 2 drops twice a day for not more than one week
- Give **Amoxicillin** 25 mg/kg/dose in exacerbations of chronic sinusitis and HIV positive children who are on Cotrimoxazole prophylaxis.

Alternatively: penicillin hypersensitivity:

- Give **Erythromycin** 12.5 mg/kg/dose 6 hourly or Azithromycin 10mg/kg STAT then 5mg /kg daily for 7 day

If pain or fever:

- Give Analgesic/Antipyretic treatment as required

Referral criteria

- No symptomatic relief after 48-72 hours of antibiotics
- CNS complications of sinusitis

4.2.4 ALLERGIC RHINITIS

CLINICAL DESCRIPTION

Recurrent inflammation of the nasal mucosa due to hypersensitivity to inhaled allergens e.g., pollen, house dust, grasses and animal proteins.

CLINICAL FEATURES

SYMPTOMS/SIGNS:

- Blocked stuffy nose, watery nasal discharge, frequent sneezing often accompanied by nasal itching and irritation, conjunctival itching and watering, edematous pale grey nasal mucosa, mouth breathing, snoring at night.
- Exclude other causes such as infections, vasomotor rhinitis, overuse of decongestants drops, side effects of antihypertensive and antidepressants.

TREATMENT

NON-PHARMACOLOGICAL

- Avoid known triggers/allergens, such as dust (dust mite) where possible
- Avoid smoking
- Provide education on the correct technique of administering topical medicines and monitor from time to time. Incorrect technique is a common cause of treatment failure.
- Allergen avoidance

PHARMACOLOGICAL

- Give **corticosteroid** nasal sprays e.g., Beclomethasone nasal s p r a y s 1 spray of 50 mcg in each nostril 12 hourly.
- Give **Cetirizine** 10mg daily for 3-5 days
- If predominant symptom is blocked nose, then add Oxymetazoline 0.05%, intranasal, administered 8 hourly for a maximum of 5 days.
- If symptoms persist ADD Prednisone, oral, 30 mg daily for 5 days whilst continuing the topical steroid.

4.3 THROAT CONDITIONS

4.3.1 TONSILLITIS

CLINICAL DESCRIPTION

Acute inflammation of the tonsils. The main organism implicated in the causation is beta-hemolytic streptococcal.

CLINICAL FEATURES

SYMPTOMS AND SIGNS:

- Sore throat, difficulty and pain on swallowing, inflamed tonsils, multiple white spots on the tonsillar surface, and sudden onset of fever.

INVESTIGATION

- FBC
- Throat swab for culture and sensitivity

TREATMENT

NON-PHARMACOLOGICAL

- Warm salt gargles

PHARMACOLOGICAL

- Give **Amoxicillin** 500mg 8 hourly for 7 days
- In severe infection, **Amoxicillin** 250/500mg + Clavulanic acid 125mg 8 hourly for 5-7 days

Alternatively:

- Give **Erythromycin** 500mg, every 8 hours in Penicillin allergy
- Give Analgesia see Section 24.1 on pain relief

Refer if

- Peritonsillar abscess
- If symptoms persist or recurring episodes of 4-5 attacks per year

4.3.2 AIRWAY EMERGENCIES

CLINICAL DESCRIPTION

Foreign Body Inhalation

CLINICAL FEATURES

SYMPTOMS AND SIGNS:

- Sudden onset of cough and choking is the frequent initial symptom. Signs of upper airway obstruction such as difficulties in breathing, stridor, use of accessory muscles to breathe.

TREATMENT:

PHARMACOLOGICAL

- Give oxygen
- Refer for Bronchoscopy

4.3.3 LARYNGOPHARYNGEAL REFLUX

CLINICAL DESCRIPTION

LPR is the retrograde (backward) movement of stomach enzymes (Pepsin) and acid into the lower throat region.

CLINICAL FEATURES

SYMPTOMS AND SIGNS

- Excessive throat-clearing
- Persistent dry cough
- Sore throats not associated with a cold
- Hoarseness, or globes pharynges (feeling of a lump in the throat).

TREATMENT

NON-PHARMACOLOGICAL

- Dietary modification

- Avoid Caffeine, alcohol, chocolates, and peppermints, Citrus fruits, pineapples, tomatoes (and other acidic foods), and hot spices.

- Lifestyle changes
  - Smaller and more frequent feedings
  - Stop eating at least three hours before going to bed
  - Avoid wearing tight fitting clothes
  - Lose weight if needed

PHARMACOLOGICAL

- Proton Pump Inhibitors (PPIs) are the most effective medicines for the treatment of LPR. PPIs must be taken on an empty stomach, ½ hour before a meal.

CHAPTER 5: BLOOD AND HAEMATOLOGICAL CONDITIONS

5.1 BLOOD: GUIDELINES FOR APPROPRIATE USE

Refer to the Ministry of Health Guidelines for Safe Blood Transfusion for further details on:

- Donor recruitment and selection
- Blood collection
- Storage procedures and records
- Laboratory testing of donor and recipient's blood
- Refer to Guidelines for the Clinical Use of Blood and Blood Products in Malawi for Clinical aspects of blood transfusions and administration Transfusion reactions
- Blood transfusion, although having undoubted benefits, also carries serious risks including:
    - Possible transmission of infections e.g., HIV and viral hepatitis)
    - Intravascular haemolysis
    - Fluid overload

Blood is an expensive and scarce resource, therefore *only* prescribe blood if the benefits outweigh the risks. It is expensive and uses a scarce human resource, therefore *only* prescribe blood if:

- less hazardous therapy has been or will be ineffective,
- the benefits outweigh the risks involved
- the decision to transfuse blood has been based on careful assessment of the patient which must indicate that it is necessary to save life or prevent major morbidity.
- Except in the most exceptional life-threatening situations, *always* transfuse blood which has been obtained from appropriately screened blood donors and/or appropriately screened for infectious agents.
- Ensure that compatibility testing is carried out on all blood to be transfused. In absolute emergencies, where there is no time for emergency cross-matching, emergency blood (O- negative blood) can be issued but a cross-match should still be done while the transfusion is in progress.
- Observations of the patient's vital signs should be done at the time of starting the transfusion, at 15 minutes, 1 hour, 4 hours and at 24 hours.
- It is encouraged to use blood components when available than whole blood in hospitals where blood components are made available by the national blood transfusion service. Transfuse whole blood if blood components not available.

Precautions:

- Identical ABO group or ABO compatible blood should be used. Rh negative patients should get Rh negative blood especially women in childbearing age group.

Selection of ABO compatible packed red cells

	Donor ABO group			
Recipient's ABO group	1st choice	2nd choice	3rd choice	4th choice
O	O	none	none	none
A	A	O	none	none
B	B	O	none	none
AB	AB	A	B	O

Selection of Rh compatible donor red cells:

- Rh positive patients can be transfused with Rh positive and Rh-negative blood.
- Rh negative males or elderly females with no potential for childbearing can safely receive Rh positive blood in circumstances where Rh negative blood is not available.
- Rh negative female patient in the childbearing age must receive Rh negative blood. In circumstances where a surgery is planned or forthcoming childbirth, the blood bank should be informed at the earliest to make Rh negative blood available as Rh-negative blood may not be routinely stocked at the blood banks.
- In case of emergency when Rh negative blood is not available, it may be necessary to use Rh D positive blood. Following transfusion of >15ml up to 1 unit of blood, it is advisable to give IV anti-D IgG at dose of 50-75 IU/ml of blood. All efforts should be made to make Rh negative blood available at the earliest once urgency is managed.
- Ensure that compatibility testing is carried out on all blood to be transfused. In absolute emergencies, where there is no time for emergency cross-matching, uncross- matched blood can be issued but a cross- match should still be done while the transfusion is in progress.

5.2 INDICATIONS FOR TRANSFUSION OF WHOLE BLOOD OR RED CELL SUSPENSION

5.2.1 SEVERE ANAEMIA

Severe anemia in children is dependent on age

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Pallor
- Tachycardia
- Fatigue
- Respiratory distress

INVESTIGATIONS

- To confirm anaemia
  - Full blood count/ PCV/ Hb
- To Identify cause of anaemia:
  - Peripheral blood film
  - Sickling test/ Hb electrophoresis
  - Malaria parasites (MPs or Rapid diagnostic test (MRDT)

TREATMENT

Blood transfusion

- Transfusion threshold for severe anemia in children is dependent on age

Neonates

Assisted Ventilation			**CPAP/HFNC**		**Low flow oxygen (<3L/min)**	**Room air**
<28 days		≥ 28 days	< 28 days	≥ 28 days	$FiO_2 \geq 0.21$	Well in room air
$FiO_2 \geq 0.21$	$FiO_2 < 0.21$	Hb < 10g/dL	Hb < 10g/dL		Hb < 8g/dL	Hb < 7g/dL
Hb < 12g/dL	Hb < 11g/dL					

RBC Transfusion maybe considered at higher thresholds than the above for neonates requiring acute resuscitation

- In neonates give 20ml/Kg packed cells over 4 hours
  - Frusemide should not be routinely given
  - Withhold feeds for the duration of transfusion due to the possible risk of transfusion associated NEC
  - Additional IV fluids are not required

Children and infants

- If Hb < 4 g/dl or PCV <12
- If Hb < 6 g/dl or PCV <18 with any of the following:
  - Shock or clinically detectable dehydration
  - Impaired consciousness
  - Respiratory acidosis {deep labored breathing}
  - Heart Failure
  - Requiring oxygen for any reason
- Transfuse 20ml/kg of whole blood or 10ml/kg of packed red blood cells over 4 hours.
- In severely malnourished children give 10mls/kg of packed cells over 4 hours. Give Frusemide 1mg/Kg at the beginning of the transfusion.
  - A diuretic is usually not indicated because many of these children are usually hypovolemic with a low blood volume.
  - Check the respiratory rate and pulse rate every 15 minutes and if one of them rises, transfuse more slowly.
  - If there is evidence of fluid overload due to the blood transfusion, give extra Frusemide (1-2mg/kg)
  - If severe respiratory distress, consider oxygen therapy with or without CPAP as appropriate
  - If the Hb remains low following a blood transfusion, repeat the transfusion.

Complications

- Fluid overload, Transfusion reactions and Infections

Referral criteria:

- If no transfusion services are available at health facility
- Recurrent anaemia requiring repeated transfusions
- If anaemia is accompanied by thrombocytopenia, leucopenia, and/or leukocytosis
- Anaemia with bleeding tendencies

5.2.2 NON-SEVERE ANAEMIA

5.2.2.1 MICROCYTIC ANAEMIA

Anaemia Hb less than 9g/dl and mean Corpuscular Volume (MCV) less than 70.

- Causes: Iron deficiency anaemia, Thalassemia, Lead poisoning, Copper deficiency, Sideroblastic anaemia

Children

- Young children (less than 6 years) are anemic if their Hb is less than 9 g/dl. Begin treatment unless the child has severe malnutrition, in which case, refer to nutrition chapter.
  - Give treatment with iron for 14 days
  - Review the child in in 14 days.
  - Continue treatment for 3 months.
  - If the child is ≥1 year and has not received Mebendazole in the previous 6 months, give one dose of Mebendazole 500mg alternatively Albendazole (200mg or 400mg depending on age)
  - Advise the mother about good feeding practice

Pregnancy

- Refer to Reproductive Health (Chapter 12)

Adults

- If Hb less than 7 g/dl
- If Hb less than 8 g/dl and there are clinical complications

Dose

- One unit of whole blood or one unit of red cell suspension will raise a patient's hemoglobin by 1-1.5g/dl

Pre-operative Surgery

- If Hb less than 8 g/dl

Red Flags

- If suboptimal rise or fall in hemoglobin level after transfusion and there are signs of haemolysis (such as jaundice, raised bilirubin level, lactate dehydrogenase), refer the patient for specialist management.

Vitamin B12 deficiency

- Transfusion should be avoided unless the patient has symptomatic anaemia and even then, the minimum possible amount of blood or red cell suspension should be transfused e.g., one pediatric unit for an adult patient.

5.2.3 ACUTE HAEMORRHAGE WITH SHOCK (SEE SECTION 1.5, TABLE 1)

5.2.4 INTRA-OPERATIVE USE (WHERENECESSARY)

Do not use whole blood or red cell suspension transfusion to expand blood volume

5.3 PLATELETS

- A component obtained by centrifugation of fresh blood within 6 to 8 hours.
- One unit of platelet concentrate increases the platelet count by 10,000 to 20,000/ul of blood.
- Must be transfused immediately upon arrival. Platelets should never be stored in a refrigerator or blood bank or in the ward.
    - ➢ Decision to transfuse should be based on a combination of clinical and laboratory findings rather than empirical platelet levels.

5.3.1 INDICATIONS FOR PLATELETS USE

- Bleeding due to thrombocytopenia because of defective platelet production such as aplastic anaemia or leukemia.
- Increased consumption e.g., DIC
- Dilutional effects e.g., in massive transfusion

All patients needing platelets need further investigations, please refer to Central Hospital.

Dose:

- 1 unit per 10kg
- For infants under 10 kg, 5ml/kg
- Cross-matching is not required
- Caution: platelet transfusion not usually indicated in ITP and TTP unless if patient is bleeding or undergoing invasive surgery

Side effects:

- Febrile, non-haemolytic and allergic reactions are common in patients receiving multiple transfusions.

5.4 FRESH FROZEN PLASMA

- Contains all clotting factors
- Comes in volumes of 200-300 m l
- Fresh frozen plasma (FFP) should be thawed before use using water bath at 30- 37 degrees {If water bath is not available, a plastic basin with lukewarm water or cold tap water can be used}. Never use hot water

Do not use whole blood, fresh frozen plasma, or red cell suspension to expand blood volume

- Once thawed, FFP must be used immediately. FFP must never be refrozen.
- The patient needs further investigations; please refer to the central hospital.

5.4.1 INDICATIONS FOR FRESH FROZEN PLASMA

- Replacement of single factor deficiencies (if single factor concentrates are not available)
- Immediate reversal of warfarin effect
- Vitamin K deficiency associated with active bleeding
- Acute disseminated intravascular coagulopathy (DIC)
- Thrombotic thrombocytopenic purpura (TTP)
    - ➢ May be used in massive transfusion or liver disease

Dose:

- 15-20ml/kg

Side effects:

- Acute allergic reactions are common.
- Febrile, non haemolytic reaction
- Viral transmission
- Bacterial contamination – sepsis

No justification for use in hypovolemia, nutritional support in protein losing states or/and plasma exchange except in TTP. FFP transfusion does not require group and crossmatching.

5.5 ACUTE HAEMORRHAGE

- In massive hemorrhage i.e., from trauma it is difficult to estimate how much blood a patient has lost. However, a good estimate can be made by calculating the patient's normal circulating volume versus vital signs and other organ function tests. *See Table 1 below*.
- Restoration of blood volume with suitable replacement fluids is more important than red cell replacement in the management of previously healthy patients who have lost under 30% of their blood volume
- The need for blood transfusion must be determined by:
  - The amount and speed of blood loss
  - The patient's vital signs

Table 1: Assessment of Blood Loss (For a 70 kg adult)

	Stage 1	Stage 2	Stage 3	Stage 4
Blood loss (litres)	<0.75	0.75-1.5	1.5-2	>2
Pulse rate	<100	>100	>120	>140
BP	Normal	Normal	90/60	<70
Respiratory Rate	<20	>20	>30	>40
Capillary Refill	<3 seconds	<3 seconds	>3 seconds	>3 seconds
Mental State	Normal	Anxious	Confused	lethargic
Urine output/ Hour	>30 mls	20-30 mls	<20 mls	<10 mls
Replacement fluid vol (L)	2l	2-4.5l	>5l plus 2 units blood	>6l plus 3 units Blood

- Replacement fluids which may be used are:
  - Haemacel: Replace every 1 ml of blood lost with 1 ml of fluid
  - Sodium lactate compound (Ringer's lactate) IV infusion or Normal saline IV infusion Replace 1 ml of blood lost with 3 mls of fluid.

Do not use dextrose 5% or Darrow's ½ strength in dextrose 5% as replacement fluids

- Maintain the airway and give oxygen by face mask first, especially for patients in stage 3 and 4. Make sure they are breathing adequately.
- Insert 2 large bore cannula (gauge 14 or 16) and collect blood samples for full blood count {FBC}, grouping and cross- matching.
- Give half of the calculated dose of replacement fluid in the first hour and give the other half over 3 hours.
- Always assess the effects of fluid therapy. Remember to give warm fluids and cover patients to avoid hypothermia.

- Aim at improving oxygen carrying capacity first before correcting anaemia. Remember to add maintenance fluids to the replacement fluid plus any on-going losses.

Maintenance fluids can be calculated as follows:

Adults

Body weight x1.5mls

Children

May use the rule of 4.2.1 for children or refer to section on diarrhoea.

- Remember: deficit + maintenance + on- going loss

5.6 ADVERSE REACTIONS TO TRANSFUSION

- Suspect an adverse reaction if any of the following occurs:
  - Severe pain at transfusion site or in the back, loin and/or chest
  - Rise in temperature of 1 Degree Celsius above the baseline
  - Increase in pulse rate of >20/minute above baseline
  - Fall in systolic BP >20 mm Hg
  - Urticaria
  - Rigors
  - Hemoglobinuria
  - Shortness of breath
  - Wheezing
- Treatment depends on the severity of the transfusion reactions.

5.6.1 MILD REACTION

SIGNS AND SYMPTOMS:

- Itchy rash

Possible cause: hypersensitivity (mild)

TREATMENT:

- Stop the transfusion
- Administer antihistamine IM/IV or PO
- **Chlorpheniramine** 0.1 mg/kg IM or IV for children; 10mg IM/IV for adult alternatively Chlorpheniramine 4mg PO or
- Promethazine 6.25-12.5mg for children aged 5-12 yrs and 25mg for adults.
- If no clinical improvement within 30 minutes or if signs and symptoms worsen, treat as Category 2.

5.6.2 MODERATE REACTION

SIGNS AND SYMPTOMS:

- Anxiety, pruritus, palpitations, mild dyspnea, headache, rigors, fever, tachycardia

Possible causes:

- Hypersensitivity {moderate to severe}
- Febrile non-haemolytic transfusion reaction
- Contamination with pyrogens and / or bacteria.

TREATMENT

- Seek help immediately from the anaesthetic, emergency team or whoever is available and skilled to assist
- Stop the transfusion
- Replace the infusion set and keep IV line open with normal saline.
- Administer antihistamine IM/IV or PO
    - **Chlorpheniramine** 0.1 mg/kg IM or IV for children; 10mg IM/IV for adult or Chlorpheniramine 4mg PO.
    - **Promethazine** 6.25-12.5mg for children aged 5-12 years and Promethazine 25mg for adults.
- Give oral or rectal antipyretic (e.g., Paracetamol 10 mg/kg or 0.5g – 1g in adults. DON'T give Aspirin.
- Give IV corticosteroids (e.g., Hydrocortisone 200mg IV stat) and bronchodilators (e.g. salbutamol 5mg nebulization or salbutamol inhaler 2 puffs (if nebule not available) STAT or Aminophylline 100mg STAT} if there are anaphylactoid features (e.g. bronchospasm, stridor).
- If there is clinical improvement, restart transfusion slowly with new blood unit and observe carefully. May need to redo group and crossmatch

- If no clinical improvement within 15 minutes or if signs and symptoms worsen, treat as Category 3.

5.6.3 LIFE-THREATENING REACTION

SIGNS AND SYMPTOMS

- Anxiety, chest pain, pain near infusion site**, r**espiratory distress, loin or back pain**, h**eadache, dyspnea, r**i**gors, fever, **r**estlessness, hypotension, tachycardia, hemoglobinuria, unexplained bleeding

Possible causes:

- Acute intravascular haemolysis
- Bacterial contamination and septic shock
- Fluid overload
- Anaphylaxis
- Transfusion Associated Acute Lung Injury (TRALI)

TREATMENT

- Seek help immediately from the anaesthetist, emergency team or whoever is available and skilled to assist**.**
- Stop the transfusion. Replace the infusion
- Set and keep IV line open with normal saline.
- Infuse normal saline {initially 20- 30 ml/kg} to maintain systolic BP, if hypotensive, give over 5 minutes and elevate patient's legs.
- Maintain airway and give high flow of oxygen by mask.
- Give Adrenaline {as 1:1000 solutions} 0.01 mg/kg body weight by slow intramuscular injection.
- Give IV corticosteroids {Hydrocortisone 200mg IV stat} and bronchodilators {salbutamol nebulization 5mg or salbutamol inhaler 2 puffs (if nebule not available), aminophylline 100mg stat} if there are anaphylactoid features {e.g., bronchospasm, stridor}.
- Give a diuretic: e.g., Frusemide 1 mg/kg IV or equivalent {if there is fluid overload}
- Assess for bleeding from puncture sites or wounds. If there is clinical or laboratory evidence of a DIC treat accordingly.
- Maintain fluid balance accurately.
- If bacteremia is suspected {rigors, fever, collapse, no evidence of a haemolytic reaction}, start broad-spectrum antibiotics IV and send blood product bag to the laboratory for culture of contents.

5.6.3 ALTERNATIVES TO BLOOD TRANSFUSION

- IV Iron and Erythropoietin which can be used as substitutes to blood transfusion in chronic anaemia if available
- Acute anaemia due to bleeding or haemolysis cannot be adequately treated by giving these products.
- When available, cell salvage machines can be used in acute anaemia due to bleeding.

5.7 ANAEMIA

CLINICAL DESCRIPTION

Anaemia is defined as decreased concentration of haemoglobin for the age and sex of the individual (i.e., below 14 g/dL in adult males, 12 g/dL in adult females, 11 g/dL in children, and below 13.5 g/dL in the 1st week of life). Anaemia is not a diagnosis. It has a cause, which must be identified and properly managed.

The cause must be investigated before initiating treatment. In an emergency, blood samples must be taken for investigations before blood transfusion.

Causes

- Nutritional (micronutrient and vitamin deficiency*)* e.g. Iron, folic acid, vitamin B12 defieciency
- Bleeding e.g., Heavy menstruation, haemorrhoids (piles), peptic ulcer, infestations (hookworm, bilharzia), solid organ malignant tumours e.g., colonic cancer, haematological malignancies: e.g., leukaemia
- Haemolysis e.g., Severe malaria, sickle cell disease, G6PD deficiency, hypersplenism, autoimmune, drugs
- Bone Marrow Failure e.g., Disease infiltration e.g., leukaemia, lymphoma, tuberculosis, Aplasia - primary or secondary e.g., due to cytotoxics
- Anaemia of Chronic Diseases
    - Common causes of anaemia of chronic disorder include malignancy,e.g. haematological or solid tumours, autoimmune disorders, e.g., rheumatoid arthritis, acute or chronic infections, e.g. HIV and TB, chronic kidney disease, and chronic rejection of solid-organ transplantation, etc.
- Autoimmune Disease (SLE, Pernicious anaemia)

CLINICAL FEATURES

SIGNS AND SYMPTOMS

General Symptoms

- Easy fatigability, dizziness, shortness of breath on exertion, palpitations

Signs

- Pale mucous membranes and palms, Angular stomatitis, "Spoon shaped" and ridged finger and toe nails (if iron deficiency), Spleen, liver and lymph nodes may be palpable (if infection or hematological malignancy), Signs of heart failure (in severe anaemia), Jaundice (in haemolysis), Petechiae and purpura (bone marrow failure), Hyperpigmentation of palms and soles of feet and Other Specific signs of the underlying disease

INVESTIGATIONS

- Also determined by suspected cause (see specific causes sections)

TREATMENT

The objectives are to treat underlying cause of anaemia and restore haemoglobin levels to normal.

5.7.1. SICKLE CELL DISEASE

CLINICAL DESCRIPTION

It is inherited disease characterized by the possession of two abnormal hemoglobin, at least one of which is hemoglobin S.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Suspect if patient is chronically anaemic and/or received previous blood transfusions and those with family history of siblings/relatives with multiple blood transfusions.
- Suspect in children who have suffered from one or more of the presentations listed below.

Presentation	Age
Vaso-occlusive crisis -– painful hand and/or foot swelling early infancy	0.5 - 2 yr

Stroke/ CNS complications (reduced consciousness, seizures)	5-10yr
Bone Infarct (painful, swollen limbs)	0.5- 10yr
Splenic sequestration (new or worsening splenomegaly, +/- pallor)	<3yr
Acute Chest (difficulty breathing, cough, desaturations)	0.5- 10yr
Bowel infarct /Abdominal crisis (abdominal pain and/or distention, vomiting)	
Priapism- sudden painful onset of penis that fails to relax	6-20yrsr
Kidney infarct (abdominal pain, reduced urine output)	
Skin Ulcers	>10yrs
Eye disorders	>10yrs

- Crises are typically precipitated by: cold weather, dehydration, infection, physical exertion and mental stress.
- For sickle cell test, refer for further investigations and management.
- Investigations
- FBC, Sickling test, Hb electrophoresis, Annual urine dipstick, Annual ophthalmology review, Transcranial Doppler and Other investigations as indicated in table above

TREATMENT

Treatment objectives

- To prevent the development of sickle cell crises
- To relieve pain
- To identify and manage the precipitating cause of crises
- To maintain a good steady state hemoglobin
- To prevent long term complications and organ damage
- To manage sickle cell crises and complications once developed

NON-PHARMACOLOGICAL TREATMENT

- Adequate hydration always by drinking adequate water/fluids
- Avoid of common precipitating causes
- Good nutrition
- Client /parental/guardian education
- Genetic counselling with voluntary family size restriction

PHARMACOLOGICAL TREATMENT

If severe anaemia

- If shocked, consider splenic sequestration {20ml/kg normal saline -see shock protocol}

- Transfuse in acute chest syndrome or stroke
    - Consider BTF program/ Hydroxyurea 15mg/kg q24h then increase by 5mg/kg every 12th week to max 35mg/kg daily.
    - To be managed at a central hospital, discuss patient with referral facility prior to referral.

For painful and vaso-occlusive crises

- All children should be started on oxygen even if saturations are normal.
- Give IV fluids at 1.5 times maintenance.
- Give adequate analgesia according to the analgesic ladder.
- For patients with frequent crises, discuss referral to tertiary facility for hydroxyurea.

Infection and fever

- Patients with sickle cell disease have functional asplenia and therefore are at risk of encapsulated bacteraemia.
    - If concerns of sepsis or meningitis, give IV Ceftriaxone 100mg/Kg q24h for 2 weeks.
    - Salmonella osteomyelitis: **Ceftriaxone** IV 100mg/Kg q24h for 6 weeks) then oral **Ciprofloxacin** (10mg/Kg BD for 2 weeks)
    - Acute chest syndrome, give Ceftriaxone as for sepsis and Erythromycin 25mg/Kg PO 6 hourly for 2 weeks

Others

- Always check for malaria parasites
- Cholelithiasis/Cholecystitis {>10yrs} AXR, needs abdominal ultrasound and surgical referral

Discharge and follow up

- Regular follow up in outpatient clinic
- *Malaria prophylaxis*
    - Monthly Sulphadoxine pyrimethamine (SP)

Weight	Dose
3-6kg	¼ tablet
6-10kg	½ tablet
10-15kg	¾ tablet
15-20kg	1 tablet
20-29kg	1 ½ tablet
9-14yrs	2tab
>14yrs	3 tab

- Alternatively use weekly Chloroquine 5mg/kg
- Folic acid 1-5mg q24h
- Benzathine Penicillin {>6months} monthly IM
- <30KG: 0.6MU
- >30KG: 1.2MU
- Pneumococcal vaccine {2 and 5yrs} if available
- Consider Hydroxyurea for those with frequent painful crises

Do not give ferrous sulphate.

Educate patient and family to ensure early analgesics, and to promptly seek medical attention if

- severe pain
- fast breathing
- looking much more pale than usual
- high temperature
- vomiting and diarrhoea

Referal criteria

- Consider referral to a specialist in case of the following:
    - Bleeding into the eye, priapism, haematuria/renal disease, CNS events including stroke, osteomyelitis, aseptic necrosis of the hip, acute chest syndrome, persistent jaundice, unexplained high white cell/platelet counts (more than 15 and 500 x 109/L respectively), intractable morbid pain, repetitive crises or recurrent severe anaemia interfering with their lives

5.7.2 APLASTIC ANAEMIA

CLINICAL DESCRIPTION

It is an abnormality in at least 2 blood cell lines with hypocellular bone marrow.

Causes

Primary causes: Inherited (e.g., Fanconi anaemia) or idiopathic (acquired and accounts about 67% of aplastic anaemia cases)

Secondary causes: Chemicals (e.g., benzene, toluene, glue sniffing), drugs (e.g., chemotherapeutic drugs, chloramphenicol, gold, penicillamine, phenytoin, carbamazepine, azathioprine), insecticides, ionizing radiation, infections (e.g., HIV, EBV, Viral hepatitis, TB, Parvovirus B19), paroxysmal nocturnal haemoglobinuria and pregnancy.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Easy bruising, bleeding, blood blisters in the mouth
- Pallor
- Petechiae
- Purpura
- Bleeding
- Frequent or severe infections

INVESTIGATIONS

- FBC: Pancytopenia
- PBF: Reduced blood cells and absence of reticulocytes
- Bone marrow aspiration and trephine: hypocellular bone marrow
- *Other investigations:* to exclude secondary causes (e.g., HIV, TB screen, Hepatitis B and C serology)
- *Refer to central hospital for further workup*

TREATMENT

- Treatment is largely supportive
- Treat infections aggressively
- If anaemic and/or bleeding, transfuse whole blood and/or platelets
- If neutropenic and febrile: antibiotics

Referral Criteria

- Discuss all cases of suspected aplastic anaemia with a haematologist/specialist.
- Stabilise the patient, if necessary, with blood products before referral.

5.7.3 ANAEMIA OF CHRONIC DISEASE

CLINICAL DESCRIPTION

Anaemia due to chronic inflammation. It is characteristically a normochromic, normocytic anaemia but can also be microcytic.

- Common causes of anaemia of chronic disorder include:
    - Malignancy (e.g. Haematological or solid tumours),

- Autoimmune disorders (e.g. Rheumatoid arthritis,SLE)
- Acute or chronic infections, e.g. HIV and TB
- Chronic kidney disease

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Pallor and signs of underlying condition

INVESTIGATIONS:

- Full blood count, Specific tests to exclude causes , HIV test, Urea, Electrolytes and Creatinine, ESR, Sputum for GeneXpert, Chest Xray

TREATMENT

- Treat the underlying condition.
- Transfusion is seldom necessary.
- Do not treat with iron, folic acid or vitamin B12 unless there is a documented deficiency.

Referral Criteria

- Patients not responding to treatment
- Patients requiring further work up and treatment at tertiary centre

5.7.4 HAEMOLYTIC ANAEMIA

CLINICAL DESCRIPTION

Anaemia due to increased destruction of red blood **c**ells. Destruction may be due to extravascular or intravascular causes. Cause can be inherited or acquired.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Evidence of haemolysis: anaemia, reticulocytosis, decreased haptoglobin, increased lactate dehydrogenase {IDH} and unconjugated hyperbilirubinaemia.

INVESTIGATIONS

- Coombs' test {direct antiglobulin} is usually positive with autoimmune haemolysis

TREATMENT

Efficacy of transfusion is limited by the shortened red cell survival due to haemolysis.

- Supplement with Folic acid, oral, 5 mg q24h given to all patients
- For Autoimmune haemolytic anaemia, give Prednisolone, oral, 1-2 mg/ kg q24h, When a satisfactory response is obtained with recovery of the haemoglobin and a decrease in LDH serum concentrations, taper dose over a period of 4 weeks to 30mg q24h.
- *Thereafter reduction should be slower to prevent disease recurrence*
- Prednisone treatment can be stopped when the Coombs' reaction becomes negative**.**
- If inadequate response add Azathioprine, oral, 2.5 mg/kg q24h. Titrate to Hb response. May be required for several months. Monitor for neutropenia.
- Patients who fail medicine treatment should be considered for s*plenectomy.*

Complications

- Cholelithiasis
- Iron overload
- Transfusion related infections

Referral criteria

- Suspected haemolytic anaemia
- Patients requiring further work up at tertiary facility
- No response to treatment

5.7.5 IRON DEFICIENCY ANAEMIA

CLINICAL DESCRIPTION

Anaemia due to iron deficiency. Common causes of iron deficiency are chronic blood loss or poor nutritional intake. Other causes are parasitic infestation (worms, schistosomiasis). This is usually hypochromic microcytic anaemia.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Anaemia symptoms and signs
- Nail spooning

INVESTIGATIONS

- Full blood count: microcytic anaemia.
- Iron studies (Iron level, ferritin level).
- Stool microscopy: worms ova, Schistosoma ova.
- Urine microscopy: Schistosoma ova.
- Gastroscopy/colonoscopy if GIT blood loss.
- Assess for a haematological response to Iron therapy.

TREATMENT

Treatment objectives

- Identify and treat the cause
- Dietary adjustment

PHARMACOLOGICAL TREATMENT

1st Line Treatment:

- Ferrous sulphate (dried or anhydrous), oral

Adults:

- 200 mg (65 mg elemental iron) q8h for 3-6 months

Children:

> 10 years;	200 mg q12h for 3-6 months
8-10 years;	200 mg q24h for 3-6 months
5-7 years;	80-120 mg q8-12h for 3-6 months
1-4 years;	45-90 mg q8-12h for 3-6 months
< 1 year;	30-60 mg q8-12h for 3-6 months

Alternatively

- **Ferrous sulphate** 6mg/kg orally, q24h (can be given in 2 divided doses)
- Continue for a minimum of 3 months after anaemia has been corrected to replenish iron stores.
- Repeat Hb in 1 month.
- If there is no response; then consider the following causes: no compliance, wrong dose prescribed, continued blood loss, wrong diagnosis; malabsorption, thalassemia, and concurrent folate or vitamin B12 deficiency or ferrous fumarate, oral,

- Adults: 200 mg (65 mg elemental iron) q8h
- Children: 3-6 mg elemental iron/kg per day for 3-6 months

2nd Line Treatment
Parenteral Iron

- Parenteral iron has no advantage over oral iron preparations
- Parenteral iron indications include:
  - Malabsorption
  - Patients on hemodialysis and erythropoietin.
  - Patients requiring repeated iron therapy
  - Patients who are not tolerating oral iron therapy
- Where a once-off dose is required, give intramuscularly (if iron dextran). Minimum required dose is 250 mg of iron per gram of Hb below normal.
- Use in consultation with a hematologist/specialist.

Adults:

- **Iron sucrose (venofer)**, IV (as a slow bolus injection over 2-5 minutes)
- 200 mg every 3 days for 5 doses

Children:

- Total dose = weight {kg} x [11 g/dl - actual Hb {g/dl}] x 2.4 + 200 mg.
- Maximum daily dose: 200 mg.
- Administer over 30 minutes in 200 ml

Alternatively

Iron dextran, IV (as a slow bolus or IM by deep intramuscular) injection

Adults:

- 25-100 mg q24h as needed

Children: Not recommended

- Repeat every second day until the total dose is given.
- Ensure that the correct formulation is given as some preparations can be given IM, or IV only, or both.
- Resuscitation equipment should be ready to manage anaphylaxis.
- Blood transfusion {see above section 1.2}

Deworming:

- Albendazole STAT dose 200mg if <10kg, 400mg if >10kg

NON-PHARMACOLOGICAL

Dietary advice:

- Increase intake of vitamin C containing foods
- Increase intake of iron rich foods, beans, liver, eggs, lentils, meat

Complications

- Iron overload

Referral Criteria

- No response to iron therapy after ensuring compliance and correct dose.

5.7.6 MEGALOBLASTIC ANAEMIA

CLINICAL DESCRIPTION

- Anaemia characterized by formation of unusually large, abnormal and immature red blood cells, called megaloblasts. It is caused by a deficiency of folate and/or vitamin B12.
- Causes of vitamin B12 deficiency; poor diet intake (e.g., vegan), diseases affecting Vitamin B12 absorption in the gut e.g., pernicious anaemia, fish tapeworm, gastrectomy, ileum resection, Crohn's disease, celiac disease.
- Causes of folic acid deficiency; diet low in fresh fruits/vegetables/fortified cereals, diseases affecting folic acid absorption in the gut (e.g., Crohn's disease, celiac disease, excessive alcohol intake), drugs (phenytoin, cotrimoxazole, methotrexate, sulfasalazine).

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Fatigue, general body weakness, lethargy, dizziness, palpitation, shortness of breath
- Numbness/burning sensation
- Mood changes/psychosis (vitamin B12 deficiency)
- Pallor
- Red beefy tongue, hyperpigmented skin (vitamin B12 deficiency)
- Cerebellar ataxia
- hemiplegia
- Decreased vibration and discriminative touch sensation
- Folate Deficiency

- Glossitis
- Neurotube defects (spina bifida) in neonates

INVESTIGATIONS

- FBC: Elevated MCV {mean corpuscular volume} and MCH {mean corpuscular hemoglobin}.
- Macro-ovalocytes on blood smear; poly-segmentation of neutrophils (hyper segmented neutrophils), thrombocytopenia with giant platelets.
- Decreased serum vitamin B12 or red blood cell folate. Pancytopenia in severe cases.
- Intrinsic factor antibodies and anti-parietal cell antibodies in vitamin B 12 deficiency due to pernicious anaemia.

TREATMENT

Treatment objectives

- Dietary modifications to ensure adequate intake of folate and Vitamin B12.
- Identify and treat the underlying cause, e.g., antibiotics for intestinal overgrowth with bacteria.

NON-PHARMACOLOGICAL TREATMENT

Dietary modification:

- Include foods high in folic acid e.g., green leafy vegetables, broccoli, peas, chickpeas, kidney beans liver, breakfast cereals fortified with folic acid.
- Foods high in Vitamin B12: Meat, Fish, Milk, Cheese, Eggs, fortified breakfast cereals.

PHARMACOLOGICAL TREATMENT

- Start with Folic Acid and Vitamin B12. Take blood samples for RBC, folate and vitamin B12 levels before starting treatment.
- Monitor serum potassium and replace if necessary.
- Give vitamin B12 and folic acid together until the test results are available as giving folic acid alone in patients with a B12 deficiency may precipitate a permanent neurological deficit.
- Adjust management according to results.
- Folic acid deficiency:
    - Folic acid, oral, 5 q24h until hemoglobin returns to normal.
    - Prolonged treatment may be required for malabsorption states.
- Vitamin B12 deficiency:
    - Vitamin B12, IM. 1 mg daily for 7 days, then weekly for a further 4 doses.

- Follow with 1 mg every third month for life in patients with pernicious anaemia, except in patients with clearly modifiable nutritional deficiency.
- The anemia is corrected within 1-2 months. As there is an increase in red blood cell production, short-term iron and folic acid supplementation is also recommended.
- Consider the following if there is failure to respond: co-existing folate and/or iron deficiency, infection, hypothyroidism, myelodysplasia, incorrect diagnosis, and drug-induced, e.g., hydroxyurea and Zidovudine.
    - Prophylaxis. Vitamin B12 is indicated for patients after total gastrectomy or ileal resection. Give vitamin B12, IM, 1 mg every third month for life (4 times a year).
    - Indications for prophylactic folic acid: chronic inherited haemolytic anemia, sickle cell anaemia, thalassemia; myeloproliferative disorders; exfoliative skin disorders; increased demands, e.g. pregnancy, chronic hemodialysis. Give Folic acid, oral, 5mg q24h

CHAPTER 6: ENDOCRINE DISORDERS

6.1 DIABETES MELLITUS

CLINICAL DESCRIPTION

The diagnosis of diabetes is based on 2 abnormal blood sugar measurements (FBS > 7 mmol/L (126 mg/dl) *or* RBS >11.1mmol/L (200 mg/dl) or HbA1C >6.5%} in an asymptomatic patient or 1 abnormal measurement if the patient has symptoms of hyperglycinemia.

Forms of diabetes:

- Type 1 diabetes (can be early onset or late onset)
- Type 2 diabetes (usually late onset but can be early onset (MODY - mature onset diabetes of the young)
- Gestational diabetes
- Secondary diabetes (related to medication use (e.g. steroids), endocrine or pancreatic disease etc.)

Causes:

- Autoimmune disorder (Type 1 diabetes)
- Idiopathic (Type 1 diabetes)
- Genetic factors causing a defect in the action or secretion of insulin (Type 2 diabetes)
- Environmental factors e.g., excessive calorie intake and lack of physical activity (Type 2 diabetes)
- Pregnancy (Gestational diabetes)
- Secondary diabetes: Medication e.g., corticosteroid use or abuse,
- Pancreatic disease or pancreatectomy, Endocrine disorders e.g., Cushing's syndrome, acromegaly etc.

CLINICAL FEATURES

SYMPTOMS AND SIGNS

- Polyuria, Polydipsia, Burning sensation/pins and needles (feet), Blurred vision, Foot ulcers, Family history of diabetes (type 2 diabetes),
- Obesity (some type 2 diabetes patients)
- Erectile dysfunction in men
- Recurrent skin boils
- Recurrent vulvovaginal candidiasis in women
- Big baby (gestational diabetes)

Complications of diabetes

- Retinopathy and nephropathy, Hypertension, Myocardial infarction, heart failure, Stroke, Diabetic foot, peripheral neuropathy, erectile dysfunction, Peripheral vascular disease, Recurrent infections: skin, UTI, candidiasis, Pregnancy and Birth complications

INVESTIGATIONS

- Random or fasting blood sugar, HBA1c, FBC, urea, creatinine, and electrolytes, urine dipstick: assess glucosuria, ketonuria, proteinuria, fasting lipogram, fundoscopy: screening for diabetes retinopathy, HIV test

TREATMENT

Treatment objectives

- Establish treatment aims: some patients require strict glycaemic control with near normal glucose values targeted, for others symptom control and avoiding severe side effects of treatment may be the maximum achievable.
- Check BP regularly and aim for BP <130/80 mmHg
- Advise to stop smoking
- Educate about foot care and screen annually for foot problems (neuropathy or peripheral vascular disease}
- Screen annually for decrease in visual acuities, look for cataracts
- Educate on appropriate dietary measures and manageable exercises according to individual patient

NON-PHARMACOLOGICAL

- Measures mentioned above

PHARMACOLOGICAL TREATMENT

- Give Aspirin 75mg (to 81mg) daily to hypertensive diabetics aged over 50
- If a diabetic is admitted unconscious always consider the possibility of hypoglycaemia- administer 100ml 20% or 50ml 50% Dextrose/Glucose IV even if a blood glucose measurement is not available.

Do not rush to refer the unconscious Diabetic mellitus patient before you consider managing hypoglycemia. Hypoglycaemia is more likely to cause sudden death than hyperglycaemia.

6.1.1 DIABETES TYPE 1

CLINICAL DESCRIPTION

- Insulin production absent because of autoimmune pancreatic beta-cell destruction
- Most children will have type 1 diabetes.
- Children with diabetes should be referred for proper management and treatment.
- Consider hydration while waiting for transport for referral
- These children need to be followed up every 3 months to monitor blood sugars and long-term complications of diabetes.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- As above for section 6.1

INVESTIGATIONS

- As above for section 6.1

Adults with no ketoacidosis or other acute Complication and have type 1 diabetes

TREATMENT:

PHARMACOLOGICAL TREATMENT

- Give **NPH insulin Lente/Protaphane** Insulin 2 doses daily

For proper management of diabetes mellitus refer to Clinical handbooks of QECH College of Medicine and KCH Intern Logbook as well as Pediatric handbook

- To decide the starting dose of Insulin:
  - The total daily number of Insulin units will be approximately half the patients body weight, e.g., for a 60 Kg person give 30 units Insulin/day divided into 2 doses.
  - Then give 2/3 daily dose half an hour before breakfast, give 1/3 daily dose half an hour before evening meal, preferably 12 hours apart.
  - Adjust Insulin dose according to fasting blood sugar (FBS} or 2 hours post-prandial blood sugar; or symptoms of hypo or hyperglycaemia

Insulin requirements can go up when a patient is acutely ill, even if they are not eating. ***NEVER*** *stop Insulin in a type 1 diabetic.*

Diet

- Increase fibre intake
- Reduce refined sugar intake
- Insulin treated patients require 3 meals a day containing complex carbohydrate to avoid risk of hypoglycaemia
- Advise patients to eat more before unaccustomed exercise

REFERRAL CRITERIA FOR SPECIALIST OPINION IF:

- Pregnant diabetic
- Acutely ill diabetic, particularly if vomiting or decreased Glasgow Coma Score (GCS}
- Treatable complications e.g., cataracts

6.1.1.1 CHILDREN WITH DIABETIC KETOACIDOSIS

SIGNS AND SYMPTOMS:

- Vomiting, polyuria, dehydration, ketonuria and acidosis. The blood sugar will be high >15mmol/l

TREATMENT:

- Address airway and breathing
- IV fluids are the most important resuscitation measure
- Give Normal Saline or Ringers Lactate

- Give 10mls/kg bolus and repeat to a maximum of 30mls/kg to correct shock if present
- Ongoing fluid requirement = (Maintenance} plus (Deficit} minus (shock bolus}
- CORRECT OVER 48HRS TO AVOID CEREBRAL OEDEMA

Child is usually approx. 7.5 to 10 % dehydrated. Deficit is calculated as % body weight loss. Maintenance is calculated as per shown below

Maintenance requirements are as follows:

- First 10 kg body weight 100mls /kg /day
- Next 10 kg body weight 50mls/kg/day
- Each kg thereafter 20mls/kg /day.

For example:

- Comatose child weighing 20kg on admission in shock in DKA X 10ml/kg bolus needed to correct shock = 2 X 200 = 400mls
- Maintenance is 1.5L/ day (1000mls +500mls}
- Deficit= 20kg X 7.5% = 1.5L (one litre weighs1kg}
- Requirement over 48 hours
- Maintenance (1.5 +1.5L} +deficit (1.5L} minus bolus (400} 4.1L +/48hours = 85ml/hr
- Add Potassium Chloride to IV fluids when patient urinates, and peripheral circulation has improved.
- Change to oral K+ supplements when patient is able to feed.
- ECG monitoring if potassium is <2.8 or >6mmol/L

Give Insulin

- Should be short acting, soluble
- Start insulin one hour after starting IV fluids
- start with small subcut dose of 0.1u/kg. Recheck blood glucose after an hour.
- If glucose is unchanged or increased, repeat subcut dose of 0.1u/kg. Repeat hourly until blood glucose starts falling.

Sliding Scale:

- Blood glucose (mmol/L}
- >20kg: 0.5u/kg
- 15-19.9kg:0.4u/kg
- 10-14.9kg:0.3u/kg

- 5 - 9.9kg: 0.2u/kg
- 2-4.9kg: 0.1u/kg only if on a glucose drip
- <2: omit Insulin and give Dextrose or food

Ongoing Management:

- Change IV fluid to 1/2 strength Darrow's or 5 % Dextrose if blood glucose <15mmol/L
- IV fluids must be continued until child is drinking well, tolerating oral feeds and has ketone free urine
- Monitor level of consciousness. Deteriorating neurological state may indicate cerebral oedema. Ensure airway is protected
- Consider NGT on free drainage if child is unconscious.
- Check each urine passed for glucose and ketones as a guide to recovery
- Maintenance Insulin requirements
    - Once child is drinking and eating
    - Calculate total daily dose of insulin once the child is stable. This is usually 0.5 to 1u/kg/day but should be based on the Insulin requirement of the previous 24hours.
    - If only short acting Insulin is available:
        - Continue TDS regime prior to meals according to requirement
    - If long acting is available:
        - BD regime, 2/3 of the total dose should be given before breakfast and 1/3 before dinner
        - Proportion for long acting and short acting should be about 2:1 to 3:1
    - Educate patient and family on diet:
        - Importance of regular meals
- Avoid refined sugars e.g., SOBO, bananas, cakes and biscuits
- Encourage complex carbohydrates e.g. cereals and a high fibre diet
- Educate patient and family on Insulin:
    - Keep in a cool place e.g., clay pot if no refrigerator
    - Rotation of injection sites
    - How to give injections

6.1.1.2 HYPOGLYCEMIA IN ADULTS

CLINICAL DESCRIPTION:

Low blood sugar level below 70mg/dl (3.9mmol/L). Severe hypoglycemia (blood sugar < 2.2mmol/l).

Causes/risk factors:

- Overdose of anti-diabetic medications (oral or insulin)
- Anti-diabetic drugs in renal impairment
- Elderly
- Omitted meals or inadequate meals
- Excessive unaccustomed physical activity
- Excessive alcohol intake
- Liver failure

CLINICAL FEATURES

SYMPTOMS AND SIGNS

- Sweating
- Excessive hunger
- Trembling
- Tachycardia
- Drowsiness
- Confusion
- Loss of consciousness, seizures, and irreversible brain damage if severe hypoglycaemia

INVESTIGATIONS

- Random blood sugar (urgently done using glucometer)
- urea and creatinine (exclude renal impairment)
- Liver function test

TREATMENT

Treatment objectives

- Treat hypoglycemia urgently if suspected even without knowing blood sugar level (if glucometer not available)
- Establish causes and treat appropriately
- Re-educate patient on meals and medications dose

NONPHARMACOLOGICAL

- Appropriate advice on medications dosing and meals

PHARMACOLOGICAL TREATMENT

Adults:

- IV dextrose 50% solution 25-50 ml over 1-3 minutes through a large vein Then 5-10% solution 500ml 4 hourly until the patient is able to eat normally.
- Glucose in form of refined sugars in a conscious patient for adults e.g., SOBO, soft drink, sweets.

6.1.1.3 HYPOGLYCAEMIA IN CHILDREN

CLINICAL DESCPRIPTION

Serum glucose level less than 2.5mmol/L (3mmol/L if malnourished).

Causes

- Infection
- Drugs; insulin, metformin, glibenclamide
- Toxins
- Malnutrition
- Liver failure
- Endocrine: hyper-insulinism, growth hormone deficiency, hypothyroidism, hypopituitarism, adrenal insufficiency, Congenital Adrenal hyperplasia
- Inborn errors of metabolism

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Sweating, Seizures, Tachycardia, Drowsiness, Confusion, Poor concentration, Blurred vision, Irritability and Nausea

INVESTIGATIONS

- Serum glucose, Blood gas, Urea, electrolytes and creatinine, Serum ketones, Toxin screen
- Identify underlying cause
- 100

TREATMENT

PHARMACOLOGICAL TREATMENT

- 5ml/kg 10% Dextrose IV if neonate give 2ml/kg or via NGT if there is no IV access.
- Follow up with regular feeds or continuous Intravenous fluid containing dextrose
- Treat underlying cause

Complications

- Seizures
- Neurocognitive impairment

REFERRAL

- Persistent hypoglycaemia

6.1.2 DIABETES TYPE 2

CLINICAL DESCRIPTION

- Type 2 diabetes (usually late onset but can be early onset (MODY-mature onset diabetes of the young)
- Family history of diabetes (genetic predisposition)
- Obesity also a risk factor
- Screen for secondary causes (e.g., endocrine disorders, steroids etc. as described in section 6.1)

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- As in section 6.1

INVESTIGATIONS

- As in section 6.1

TREATMENT

NONPHARMACOLOGICAL TREATMENT

- Adjustment of diet and/or weight reduction (if obese} and increased exercise may control blood glucose without the need for drug therapy.
- Wherever possible (when sugar is mild high) give a 4–6-week trial of diet before introducing oral hypoglycaemic agents. If the above is unsuccessful, then:

PHARMACOLOGICAL TREATMENT:

- Give Metformin 500mg twice daily, increased to a maximum of 2500mg in divided doses.

Metformin is the drug of choice in type 2 diabetes, particularly in obese patients. It is contra-indicated in significant renal insufficiency, and severe respiratory and cardiac disease due to risk of lactic acidosis.

- If glycaemic control still poor, add Glibenclamide 5mg daily, increasing to a maximum of 10 mg q12h.

20% of type 2 diabetics eventually require Insulin treatment - use principles as in type 1 diabetes to initiate treatment. Use Lente/NPH insulin 0.3U/kg bodyweight to start with at breakfast and dinner and titrate over time according to blood glucose levels.

- General follow up plan for diabetic patients:
  - Attend monthly clinics at hospital- blood glucose and/or urine should be checked.
  - Check injection sites
  - Ask about nocturia.
  - HbA1c can be measured
  - Diabetic patients should have the following annually: fundoscopy, urine microalbuminuria and thyroid function tests if available.

6.2 THYROID DISORDERS

6.2.1 HYPERTHYROIDISM IN ADULTS

CLINICAL DESCRIPTION

- Metabolic disorder resulting from excessive circulating thyroid hormones

Causes

- Graves' disease, toxic multinodular goitre, toxic solitary nodule

CLINICAL FEATURES

SIGNS AND SYMPTOMS:

- Fatigue, nervousness or anxiety, weight loss, palpitations, heat intolerance, irregular menses/sub infertility.
- Tachycardia (may be irregular if atrial fibrillation), warm moist hands.
- Goitre (smooth if Grave's disease)–and tremor.
- Diarrhoea, jaundice or heart failure symptoms and signs (if in thyroid storm).
- If Graves' disease: thyroid eye signs: lid retraction, proptosis, lid lag, chemosis, ophthalmoplegia.

INVESTIGATIONS

- Thyroid function tests
- Full blood count
- Thyroid antibodies (TSH-receptor antibody, Thyroperoxidase antibody)
- Thyroid gland ultrasound
- Random blood sugar
- ECG and echocardiogram

TREATMENT

- Treatment objectives are to reduce thyroid hormone levels in the blood to normal, reduce symptoms associated with thyrotoxicosis, and prevent or treat complications e.g., heart failure, atrial fibrillation and ophthalmopathy.

PHARMACOLOGICAL TREATMENT

- Management should be supervised by a doctor

- Refer to tertiary level

Treatment:

- Give **Propranolol** 40-120mg q8h to control symptoms, especially tachycardia
- Give Carbimazole 40mg od or in divided doses for approximately 2 months then reduce dose according to symptoms improvement and improved thyroid function tests. Monitor side effects of carbimazole (neutropenia with infection, hepatitis)
- In Graves' disease continue for 12 to 18 months then stop and monitor TSH every 3 months for a year, then once a year (In large percentage, hyperthyroidism will be resolved)
- If patient pregnant or breast-feeding, use Propylthiouracil instead of carbimazole
- For persistent hyperthyroidism on treatment in Grave's disease, and relapsed hyperthyroidism after remission following treatment, consider total thyroidectomy (or radioactive iodine once it becomes available in the country)
- In other causes continue Carbimazole and refer for surgery or radioactive iodine once it becomes available in the country which might be soon; these patients should be considered for radioiodine first before surgery unless it not suitable in their case)

6.2.2 HYPERTHYROIDISM IN CHILDREN

Metabolic disorder resulting from excessive circulating thyroid hormones

Causes:

- Diffuse toxic goitre/ Graves' disease
- Thyroiditis
- TSH induced
    - TSH producing tumour
    - Inappropriate secretion of TSH

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Weight loss, Sweating, Palpitations, Tremor, Muscle weakness and Hypertension

INVESTIGATIONS

- Thyroid function test
- Thyroid antibodies
- Radionuclide thyroid scan

TREATMENT

- The aim is to Induce remission and Improve symptoms of thyrotoxicosis.
-

PHARMACOLOGICAL

- Carbimazole 0.5-1mg/kg/day in 3 divided doses (maximum dose not to exceed 30mg/day)
- Propranolol 0.5 – 1 mg PO 2 -3 times a day
- If unresponsive consider radioactive iodine

Complications

- Thyroid crisis
- High output cardiac failure

REFERRAL

- All patients with suspected hyperthyroidism

If a patient develops a fever or sore throat while taking Carbimazole, neutropenia should be urgently excluded. If present, then stop Carbimazole and treat with antibiotics.

6.2.3 HYPOTHYROIDISM (MYXOEDEMA)

CLINICAL DESCRIPTION

Hypothyroidism is a condition associated with reduction in thyroid hormone production. Thyroid hormone is required for normal metabolism and growth. Its deficiency has major consequences on fetal development as well as intellectual and physical development in infants and children (cause of cretinism). In adults, it may be the cause of several problems.

Causes:

- Antibody-related thyroid gland destruction (Hashimoto thyroiditis)
- Subtotal thyroidectomy
- Pituitary surgery or lesions
- Congenital
- Severe iodine deficiency
- Drug induced (e.g., radioiodine therapy, amiodarone etc.)

CLINICAL FEATURES:

SIGNS AND SYMPTOMS

- Cretinism in infants: Poor growth, development, and poor school performance in children
- Signs Neonate: Prolonged neonatal jaundice, Excessive sleep, Feeding problems
- Cretinism in Children: mental sub-normality, short stature, large tongue, dry skin, sparse hair, protuberant abdomen, umbilical hernia, abnormal facies)
- Adults: menstrual irregularity and infertility, mental health conditions and dementia.
- General fatigue, constipation, cold intolerance, dry and coarse skin, hoarse voice, weight gain, bradycardia (slow heart rate, slow relaxing reflexes, hyperlipidaemia, goitre (+/-), dementia, pallor, puffy face, hair loss and eyebrow loss

INVESTIGATIONS

- Thyroid function tests T3, T4, TSH.
- Fasting blood lipids (for elevated cholesterol level)
- Full blood count

TREATMENT

- Treatment objectives are to correct blood level of thyroid hormones and to maintain lifelong normal levels of thyroid hormones

PHARMACOLOGICAL TREATMENT

- Start treatment with a low dose of Levothyroxine, especially in the elderly, those with heart disease and Children (e.g., 25-50 microgram), and adjust dose as appropriate every 2-8 weeks until TSH levels are within normal reference range. Treatment is often life-long.

Adults

- 25-200 microgram daily (can start with dose 25 to 100mcg daily)

Children

- > 12 years; 25 micrograms daily (max. 200 micrograms)
- 2-12 years; 25 micrograms daily (max. 100 micrograms)
- < 2 years; 25-75 micrograms daily.

Monitor thyroid function tests where possible to avoid over or under treating.

REFERRAL CRITERIA

- All cases need to be managed by a doctor/specialist

6.2.3.1 CONGENITAL HYPOTHYROIDISM

CLINICAL DESCRIPTION

Congenital hypothyroidism is one of the common treatable causes of preventable mental retardation in children. Congenital hypothyroidism must be treated as early as possible to avoid intellectual impairment.

CLINICAL FEATURES

SIGNS AND SYMPTOMS:

- Prolonged jaundice, feeding difficulties, hypotonia, wide open fontanelles, oedema, constipation, enlarged tongue, dry skin, bradycardia, lethargy etc.

INVESTIGATIONS

- Thyroid function test

TREATMENT:

- Give Levothyroxine 10-15 mcg/kg od orally for neonates and infants and 100 mcg/kg od
- Requires urgent referral for confirmation of diagnosis.

6.2.3 IODINE DEFICIENCY DISORDERS {ENDEMIC GOITRE)

CLINICAL DESCRIPTION

- More common in highland areas
- Much less likely since the introduction of iodized salt
- Only consult surgeons for treatment if large goitre causing obstructive problems or cosmetically unacceptable.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Goitre, Fatigue, If hypothyroid: Constipation and cold intolerance

INVESTIGATIONS

- Thyroid function test
- Thyroid gland ultrasound

TREATMENT

Prevention

- Use of Iodised Salt

Prophylaxis:

- Give Aqueous Iodine Oral Solution 130mg/ml single dose
- Repeat every 2years.

CHAPTER 7: GATRO-INTESTINAL CONDITIONS

7.1 AMOEBIASIS

CLINICAL DESCRIPTION

An infection caused by protozoan *Entamoeba histolytica* transmitted through food and drink contaminated with human faeces.

- Clinical manifestations
  - Intestinal: amoebic dysentery
  - Hepatic: amoebic liver abscess

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Diarrhoea (dysentery) +/- fever
- Abdominal pain
- Right upper quadrant abdominal pain and jaundice in amoebic liver abscess

INVESTIGATIONS

- Full blood count
- Fresh wet stool analysis
- Liver function test
- Abdominal Ultrasound (if amoebic liver abscess suspected)

TREATMENT

NON-PHARMACOLOGICAL

- Health education on fecal disposal, hand washing and food hygiene.

PHARMACOLOGICAL

Intestinal Amoebiasis

Adults:

- Metronidazole 800mg 8 hourly for 5 days' preferably after food.

Children:

- Metronidazole 7.5 mg/kg 8 hourly for 5 days

7.2 AMOEBIC LIVER ABSCESS

CLINICAL DESCRIPTION

Amoebic liver abscess is a collection of typically brownish coloured fluid in the liver, occurring often as a single mass in the right lobe and a complication of intestinal infection with Entamoeba histolytica. Lung, heart and brain infections are uncommon sequelae. Occasionally, pyogenic abscesses may have a similar clinical presentation.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Large tender liver.
- Tenderness and/or bulging at right intercostal spaces.
- Jaundice, dullness to percussion on the right lower chest zones with basal crepitation's amoebic empyema following extension into the chest cavity.
- Peritonitis (uncommon)

INVESTIGATIONS

- Abdominal ultrasound
- Chest X-ray
- FBC
- ESR
- Stool examination
- Abdominal CT scan
- Serology (amoebic antibodies)

TREATMENT

- Give Metronidazole 800mg 8 hourly for 10 days
- Give oral (preferably after food} or IV (depending on the condition of the patient}
- If necessary, repeat treatment course after 2 weeks

REFERAL CRITERIA

- In cases of large abscesses or superficial abscesses, to the tertiary facility for aspiration under ultrasound guidance.

7.3 BACILLARY DYSENTERY

CLINICAL DESCRIPTION

- Bloody and mucoid diarrhoea caused by *Shigella* species
- Alternative names: dysentery, shigellosis

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Bloody and mucoid diarrhea
- Abdominal pain

INVESTIGATIONS

- FBC
- Stool microscopy

TREATMENT

NON-PHARMACOLOGICAL

- Health education on handwashing with soap, food hygiene, appropriate disposal of faeces
- Isolate the patient
- Hygiene precautions by all in contact with the patient
- Investigate source of contamination and inform environmental health authorities

PHARMACOLOGICAL

Use antibiotics only if the patient is systemically unwell, septic or immunosuppressed

Adults

- Ciprofloxacin 500mg PO 12 hourly for 5 days

Children

- Ciprofloxacin 10mg/kg PO 12 hourly for 5 days

7.4 CHOLERA

CLINICAL DESCRIPTION

- Bacterial infection caused by Vibrio cholerae
- Causes severe watery, “rice water” diarrhoea and may lead to death

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Severe watery diarrhea (usually painless, rice water like)
- Vomiting

INVESTIGATIONS

- Usually clinical diagnosis
- Cholera Ag rapid test (stool sample)

TREATMENT

NON-PHARMACOLOGICAL

- Isolate the patient
- Ensure hygienic precautions by all in contact with patient
- Investigate source of contamination, inform environmental health authorities
- Trace close contacts and give antibiotics as below

PHARMACOLOGICAL

- Rehydration is mainstay of treatment
- Type of resuscitation fluid is less important than quantity of fluid replaced may need 1L/hour initially
    - if available, IV Ringer’s Lactate is the preferred fluid of choice
    - maintenance fluids after resuscitation: IV fluids and oral rehydration solution (ORS)

Antibiotics can shorten duration of diarrhoea

Adults:

- Doxycycline 300 mg STAT OR Azithromycin 1g STAT

7.4 CONSTIPATION

CLINICAL DESCRIPTION

- Absent or reduced frequency of passage of stools; when passed, stool is harder than usual. Commonly related to inadequate dietary fiber intake and/or psychological factors. Investigate and treat the underlying cause

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Hard stools or no passage of stools/flatus

INVESTIGATIONS

- Digital rectal examination
- Abdominal erect and supine x-rays

TREATMENT

NON-PHARMACOLOGICAL

- High residue diet e.g. papaya seeds and increased fluid intake
- Do not use oral laxatives in children. **Glycerine** infant and paediatric suppositories can be used in the short term.
- If increased fiber and oral fluids are insufficient to cure constipation and a laxative is considered necessary

In the event of an acute constipation that is not responding to fluids and oral laxatives, consider a soap enema.

PHARMACOLOGICAL

Adults:

- liquid paraffin 5 -10 mls every day for 5 days OR
- bisacodyl 5-10mg nocte for 5 days
- Reserve medication for severe cases only confirmed by examination.

Alternatively

- glycerol suppositories prn

Constipation in the neonate is usually due to a significant underlying problem such as bowel atresia or Hirschsprung's disease.

If a neonate has not passed stools in the first 48 hours of life: Refer urgently for surgical and/or paediatric assessment especially if there is abdominal distension and/or vomiting

Refer all infants with constipation for specialist assessment.

- In the event of chronic constipation that is not responding to fluids and laxatives, please refer to a specialist for further investigations.

7.5 DIARRHOEA

7.5.1 ACUTE DIARRHOEA

CLINICAL DESCRIPTION

Passage of 3 or more watery stools per day for less than 14 days.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Watery diarrhea +/- abdominal pain

INVESTIGATIONS

- Full Blood Count
- Stool analysis
- Urea, Electrolytes +creatinine

TREATMENT

NON-PHARMACOLOGICAL

- Hygiene; washing hands regularly
- Avoid taking foods that seem spoiled/contaminated

- Take a lot water when passing loose stool to rehydrate
- Seek medical intervention when passing loose stool more than three times a day as well as when passing blood stool
- Take a solution of sugar and salt to retain lost minerals salts (more especially for children)
- Eat heated foods
- Drink boiled or chlorine treated water

PHARMACOLOGICAL

- Doxycycline 300mg PO STAT
- Mild dehydration/not vomiting: Give ORS
- Moderate/severe dehydration/ vomiting/hypovolaemia: IV fluids
  - preferably Ringer's Lactate
  - use Normal Saline if Ringer's Lactate unavailable
- Dysentery (fever/bloody stools/systemically unwell): Ciprofloxacin 500mg 12 hourly PO x 5 days

7.5.2 CHRONIC DIARRHOEA

CLINICAL DESCRIPTION

Passage of loose stools > 3 times/day for > 4 weeks. Common presentation in HIV/AIDS patients.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Diarrhea +/- abdominal pain

INVESTIGATIONS

- Full blood count
- Stool analysis
- HIV test
- Urea, creatinine and electrolytes

TREATMENT

NON-PHARMACOLOGICAL

please refer to the acute diarrhoea section

Adults:

- Replace fluids and electrolytes
  - oral rehydration solution
- If severe dehydration/hypovolaemia: IV fluids, preferably Ringer's Lactate treat underlying cause.
- if HIV positive
  - ensure patient is on effective ART
  - empiric treatment
  - Cotrimoxazole 1920mg PO 12 hourly for 14 days (to treat *Isospora*)
    - If no improvement on Cotrimoxazole, Metronidazole 2g po 24 hourly for 5 days (to treat Giardia).
    - if no improvement on Metronidazole, Albendazole 400mg every 12 hourly PO for 14 days (to treat *Microsporidia*)
  - Anti-motility agents
    - Loperamide 4mg initially then 2mg after each loose stool (maximum 16mg per day)
    - alternative: Codeine Phosphate 30mg 8 hourly PO for 5 days

Avoid anti-motility agents in colitis/bloody diarrhoea – may precipitate toxic mega colon

7.5.3 ACUTE GASTROENTERITIS IN CHILDREN

CLINICAL DESCRIPTION

- Passage of more than 3 loose stools in a day.

Causes

- Infection: majority are caused by viruses, bacteria, parasites, Toxins, Drugs Malabsorption: e.g. lactose intolerance and Food Protein Induced Entero-Colitis Syndrome (FPIES).

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Shock
- Vomiting

- Diarrhoea
- Failure to thrive
- Abdominal pain

INVESTIGATIONS

- Stool microscopy and culture
- Random blood glucose
- Blood gas
- Urea, electrolytes, and Creatinine
- FBC

TREATMENT

- Assess nutritional status. If malnourished, refer to malnutrition protocol
- Assess dehydration and treat accordingly

Classification	Signs and Symptoms	Treatment
Severe Dehydration	Two or more of the following signs: Lethargy/unconsciousness Sunken Eyes Unable to drink/drinks poorly Skin pinch goes back very slowly (≥2seconds)	PLAN C
Some Dehydration	Two or more of the following signs: Restlessness/irritability Sunken eyes Drinks eagerly/thirsty Skin pinch goes back slowly	PLAN B
No Dehydration	Not enough signs to classify as some or severe dehydration	PLAN A

- Plan C: see severe dehydration protocol
- Plan B: give 75ml/kg ORS over 4 hours
- Plan A give ORS 5ml/kg after each loose stool.
- Continue breastfeeding or give extra fluid.
- Correct electrolyte imbalances.
- Zinc 10mg PO 24 hourly < 6 months and 20mg if > 6months old for 10 days.
- ONLY give antibiotics if bloody diarrhoea or if child is toxic.
- Ciprofloxacin 10mg/kg PO 12 hourly for 5-7 days or Ceftriaxone 25 mg -50mg/kg IV 24 hourly for 5 days if not tolerating orally.

DO NOT give antiemetic's or anti-motility drugs in children.

Complications

- Acute Kidney injury
- Electrolyte imbalance
- Haemolytic Uraemic Syndrome (HUS)

REFERRAL

Persistent diarrhea not responding to treatment

7.5.4 DYSPEPSIA

CLINICAL DESCRIPTION

Meal related non-specific abdominal discomfort and pain.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Heart burn or epigastric burning pain

INVESTIGATIONS

- only refer for gastroscopy if not improving on anti-acid treatment

TREATMENT

NON-PHARMACOLOGICAL TREATMENT

- Advise patient to avoid hot spices, alcohol, smoking, tobacco, carbonated drinks, NSAIDs and Aspirin
- Eating foods rich in proteins to promote healing
- encourage patient to take regular meal
- Do not eat something heavy after staying long time without eating something

PHARMACOLOGIC

- Chew 2 magnesium trisilicate tablets 6 hourly or more frequently as required for 7 days.

Alternatively:

Omeprazole 20mg at night for 4 weeks

or

Ranitidine 300mg at night or 150mg 12 hourly for 4 weeks

or

Cimetidine 400mg 12 hourly or 800mg at night for 4 weeks

7.6 PEPTIC ULCER DISEASE/GASTRITIS

Commonly caused by Helicobacter pylori.

Other risk factors: NSAIDs chronic use, alcohol, smoking

TREATMENT

NON-PHARMACOLOGICAL

- Avoid spicy foods
- Avoid alcohol and tobacco intake
- Avoid foods that aggravate pain
- Avoid or reduce on fizzy drinks

PHARMACOLOGICAL

Treatment {Triple Therapy):

- **Omeprazole** 40mg 24 hourly for 2 weeks
- **Metronidazole** 400mg 8 hourly for 2 weeks
- **Give Amoxycillin** 1g 12 hourly for 2 weeks

Alternatively:

- **Omeprazole** 20 mg 12 hourly for 2weeks
- Metronidazole 400mg 8 hourly for 2 weeks
- Give Clarithromycin 500mg 12 hourly for 2 weeks

Red Flag:

- Refer for endoscopy and further management if ongoing pain and alarm symptoms
  - weight loss, haematemesis, melaena, anaemia, dysphagia, recent progressive symptoms, age > 16 years.

Aspirin and other non-steroidal anti- inflammatory drugs (NSAIDS) e.g. Indomethacin, Ibuprofen, diclofenac are contraindicated in patients with a history of peptic ulcer disease.

7.7 PEPTIC ULCER DISEASE/GASTRITIS

- look for underlying cause and treat accordingly
- Do not give symptomatic treatment without knowing the cause
- exclude mechanical obstruction
    - Recognize that bilious or faeculent vomiting is a sign of mechanical obstruction
    - These patients must be managed at a tertiary facility.
- correct dehydration a s necessary

TREATMENT

- Give **Metoclopramide** 10 mg IV/IM or PO (if patient can keep food down)

Patients less than 20 years require special caution – they are at higher risk of developing extrapyramidal side effects from metoclopramide. Use alternative anti-emetic if available.

Children:

- All children with profuse vomiting must be admitted for hydration, observation and investigation. When a guardian comes back with a child who is still vomiting, admit or refer the child. Do not send them home.
- All children with bilious vomiting should be referred

7.8. PAEDIATRIC SURGICAL EMERGENCIES

7.8.1 GASTROSCHISIS

CLINICAL DESCRIPTION:

- This is a birth defect in the abdominal wall where the baby's intestines are found outside the baby's body exiting through a hole beside the umbilicus.
- This differs from Omphalocele where the defect is paraumbilical and has associated intestinal abnormalities. They are more often noted in syndromic babies or noted to have other associated system abnormalities.

TREATMENT

- In the case of a gastroschisis, these babies have to be referred to a tertiary hospital at the earliest convenience. But before referral, the baby needs to be stabilized in the following way

NON-PHARMACOLOGICAL

- Keep baby warm and check the random blood sugar
- Cover bowels with a plastic. Do not cover with wet gauze as this makes the babies prone to hypothermia from the evaporation of the fluid
- Insert an Orogastric Tube for decompression

PHARMACOLOGICAL

- Establish IV access and give maintenance fluids (see paediatric section of fluid management).
- Give Benzylpenicillin 50,000 iu/kg/dose STAT
- Give Gentamycin 3.5mg/kg (preterm neonate) or 5mg/kg (term neonate) STAT
- Give Vitamin K 0.5mg-1mg STAT

Referral with health personnel

7.8.2 HIRSCHSPRUNGS DISEASE

CLINICAL DESCRIPTION

A congenital condition in which the rectum and part of the colon fail to develop a normal system of nerves, leading to an accumulation of faeces in the colon following birth.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

This may be suspected in

- Delayed passage of stools/meconium in a neonate
- Chronic constipation since birth
- Some present later with signs of bowel obstruction (bilious vomiting, abdominal distension), poor feeding and failure to thrive

INVESTIGATIONS

- FBC
- AXR

TREATMENT

NON-PHARMACOLOGICAL

- This condition has a life-threatening complication of enterocolitis which may present with sepsis and shock from bacterial overgrowth
- These patients need to be referred to a tertiary hospital.

PHARMACOLOGICAL

A rectal washout and antibiotics (Ceftriaxone 50mg/kg/dose and Metronidazole 7.5mg/kg/day) may be considered before referral in the event of:

- Abdominal distension
- Vomiting
- Fever
- Gush of stools on DRE.

*These are signs of an enterocolitis

7.8.3 INTUSSUSCEPTION

CLINICAL DESCRIPTION

It is a process in which a segment of intestine invaginates into the adjoining intestinal lumen causing bowel obstruction.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Vomiting (can be primarily non bilious and progress to bilious as the obstruction occurs)
- Abdominal pain
- Passage of blood and mucus PR (currant jelly stools)
- Lethargy
- Palpable abdominal mass

INVESTIGATIONS

- FBC
- AXR
- Abdominal USS.

Refer to the nearest tertiary hospital after resuscitation

7.9 ANORECTAL CONDITIONS

7.9.1 ANAL FISSURES

CLINICAL DESCRIPTION

Painful small cracks just inside the anal margin, sometimes may be present with a linear ulcer. It is often seen with a sentinel pile or external haemorrhoids.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- May cause spasm of the anal sphincter, and maybe associated with bleeding on defaecation.

TREATMENT

NON-PHARMACOLOGY

- Dietary advice to promote soft stools

PHARMACOLOGY

Children

- Lactulose oral 0.5ml/kg/dose daily
    - ➢ If no response increase frequency to twice daily.

Adults

- lactulose, oral, 10-20ml once daily
    - ➢ If poor response increase frequency to twice daily
- Bismuth subgallate compound, ointment, topical, applied 2-4 times daily

Or

- Lidocaine 2% cream applied before and after each bowel action.

REFERRAL:

- severe pain
- recurrent episodes
- Poor response to symptomatic treatment
- Persistent anal bleeding

7.9.2. HAEMORRHOIDS

CLINICAL DESCRIPTION

- Varicose veins of the anorectal area. Usually accompanied by a history of constipation. In older patients consider a diagnosis of an underlying carcinoma.

TREATMENT

NON-PHARMACOLOGY

- Management
- High fiber diet
- Counsel against chronic use of laxatives
- Avoid straining with defecation

PHARMACOLOGY

- (Hydrocortisone acetate, Allantoin, Zinc oxide, Lidocaine) combination suppositories once daily for 2 weeks
- If no response increase frequency to 2-3 for 2 weeks

REFERRAL:

- Haemorrhoids cannot be reduced
- Thrombosed
- poor response to symptomatic treatment
- Children
- If Persistent bleeding

7.9.3 PERIANAL ABSCESSES

CLINICAL DESCRIPTION

An abscess adjacent to the anus. Present as an indurated or tender area adjacent to the anus.

TREATMENT

This is by surgical drainage

7.10. ACUTE ABDOMEN

- This refers to sudden, severe abdominal pain.
- It is in many cases a medical emergency, requiring urgent and specific diagnosis.
- Several causes need immediate surgical treatment

7.11 PERITONITIS

- Refers to inflammation of the peritoneum.
- Possible Causes: appendicitis, pancreatitis, acute cholecystitis, bowel obstruction or perforated peptic ulcer.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Rebound tenderness, guarding, rigidity of the abdominal wall. The patients may also present in septic shock if there is a bowel perforation, appendiceal rupture or cholangitis.

INVESTIGATIONS

- Full blood count
- Group and save
- Amylase and lipase (if pancreatitis suspected)
- Abdominal x-ray (supine and erect) if obstructive causes suspected
- Abdominal ultrasound – if pancreatitis, appendicitis, cholecystitis suspected

TREATMENT

- Intravenous fluids, analgesia**,** NPO and insert nasogastric tube
- IV antibiotics: Only indicated for appendicitis, cholecystitis and bowel obstruction with perforation.

- Do not prescribe antibiotics for pancreatitis or bowel obstruction without perforation.
- IV Ceftriaxone 2g 24 hourly for 5-7 days
- IV Metronidazole 500mg 8 hourly for 5 – 7 days

Surgery:

- Indicated in all patients with peritonitis, large bowel obstruction, adhesions and small bowel obstruction after failed conservative management, appendicitis (with or without rupture) and perforated peptic ulcers.
- Indicated for all bowel obstruction due to adhesions or other causes if full blood count shows a leucocytosis.

REFERRAL:

- if there is no expertise available.
- If the patient is operated and develops complications and requires ICU or re – operation.
- For cholecystitis if no improvement after course of antibiotics.

CHAPTER 8: HEPATIC DISORDERS

8.1 ACUTE LIVER FAILURE

CLINICAL DESCRIPTION

Acute liver failure (ALF) manifests with rapid deterioration in the synthetic and excretory liver functions with impaired coagulation (INR >1.5) and signs of encephalopathy in adults and pediatrics. ALF may lead to the following complications: Hypoglycemia, electrolyte abnormalities, acidosis, renal impairment, ascites, sepsis.

Acute Liver failure can be caused by the following:

- Infection (acute viral hepatitis, herpes simplex virus, CMV, HIV, TORCH)
- Autoimmune hepatitis
- Alcoholic hepatitis
- Drugs and Toxins (Paracetamol, ART, TB drugs especially isoniazid, NSAIDS, statins, antibiotics (amoxicillin, sulfonamides, tetracyclines), amanita mushroom)
- Metabolic diseases
- Pregnancy: fatty liver, HELLP syndrome

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Jaundice
- Fever
- Malaise
- Altered level of consciousness
- Right upper quadrant pain
- hepatomegaly
- Bleeding tendencies

INVESTIGATIONS:

- Random blood glucose
- Liver function test
- Hepatitis serology
- Viral serology
- HIV test
- Urea, electrolytes and Creatinine

- Clotting profile
- Drug levels
- Ferritin
- Serum copper
- serum iron

TREATMENT:

NON-PHARMACOLOGICAL

- Stop offending drugs or alcohol.
- Acute: ABCD approach
- Treat hypoglycemia according to protocol
- Restrict dietary protein.
- Monitor urine output.
- Counsel parents

PHARMACOLOGICAL

Coagulotherapy

Adults:

- Vitamin K 10mg IV for 3 days, consider giving FFP 3 units if bleeding actively.

Paediatrics:

- Vitamin K 5-10mg/kg IV daily (DO NOT GIVE IM)
- Fresh frozen plasma 10ml/kg IV
- Cryoprecipitate, platelets or factor VII concentrate

Cerebral oedema in acute liver failure

Adults:

- *Neuroprotective measures*
- Mannitol 0.5-2g /kg IV over 1 hour (repeated every 6 to 8 hours for maximum 48 hours) Don't repeat if no response.

Paediatrics:

- Two thirds of maintenance fluids
- Neuroprotective measures

- Mannitol 0.5-2g /kg IV over 1 hour (repeated every 6 to 8 hours for maximum 48 hours) Don't repeat if no response.

Hepatic Encephalopathy

Adults:

- Give Lactulose 30mg po every 4hrs – aim for 2-4 bowel movements/day OR Neomycin 1g every 6hrs for 7 days

In Pediatrics:

- Give oral Neomycin 1g/m2 4-6hourly or Kanamycin IV STAT dose
  - Neonate <1-week 15mg/kg
  - 1 week – 10 years 25mg/kg
  - >10 years 20mg/kg
- Oral Lactulose 1ml/kg hourly until child has diarrhoea then 6 to 8 hourly.

Sepsis in liver failure

Adults:

- Give Ceftriaxone 1g every day IV for 5 days

Hypoglycemia in liver failure

Adults:

- 50mls **50% Dextrose** IV push, maintenance with 10% Dextrose 1 litre/12 hours

Paediatrics:

- Manage hypoglycemia according to protocol. Avoid sedatives

8.1 CHRONIC VIRAL HEPATITIS

There are five types of Viral Hepatitis: A, B, C, D and E. Chronic Viral Hepatitis is usually caused by Hepatitis B, C and D. These three types are acquired either vertically through mother to child transmission perinatally, horizontally or parenterally.

The most common type is Hepatitis B and carries the highest disease burden globally.

Chronicity is defined as persistence of Hepatitis B surface antigen for 6 months or more. It manifests either asymptomatically, with mild symptoms or with signs of severe liver damage.

CLINICAL FEATURES

Clinical features of Chronic liver damage from Hepatitis B depend on severity of liver damage and are the following:

SIGNS AND SYMPTOMS

Caput Medusae
Ascites
Hepatic encephalopathy
Spider nevi
Hematemesis

INVESTIGATIONS

Hepatitis B surface antigen test :
HIV test
Full Blood Count
Liver Function Test
Abdominal Ultrasound
Abdominal Fibroscan

TREATMENT:

Patients with a positive Hepatitis B surface antigen test need to be eligible for treatment prior to commencement.

Eligibility for **ADULTS** is calculated using **ONE** or more of the following:

- Clinical assessment showing any signs and symptoms of chronic hepatitis B.
- A calculated Aspartate Amino Transferase to Platelet Ratio Index (APRI) score of greater than **0.65**

$$\text{APRI} = \frac{\dfrac{\text{AST Level}}{\text{AST (Upper Limit of Normal)}}}{\text{Platelet Count } (10^9/\text{L})} \times 100$$

- Abdominal Ultrasound signs suggestive of cirrhosis
- Abdominal Fibroscan findings suggestive of fibrosis or cirrhosis
- Persistently raised ALT over two consecutive visits (3 months apart)
- Persistent positive Hepatitis B surface antigen tests (6 months apart)
- Family history of Hepatocellular carcinoma or cirrhosis with extrahepatic manifestations

Eligibility for **CHILDREN** follows a conservative approach. However, any **ONE** of the following is an indication for treatment:

- Persistently elevated ALT on 3 or more consecutive visits over a 12-month period.
- Necro inflammatory changes on a liver biopsy
- HBV DNA PCR result of greater than 20,000IU/mL

Adults 30kg and above (without Renal complications)

- Tenofovir(300mg) and Lamivudine (300mg) OD

Adults (with any Renal complications)

- Entecavir 0.5mg OD

Paediatrics

- Entecavir

Entecavir 0.5mg (SDF)	Preferred for children less than 30kg Alternative/second line for patients with renal disease						
				Recommended once daily dose for children			
				Kg		mg	
				10-11		0.15	
				>11-14		0.2	

				>14-17		0.25	
				>17-20		0.3	
				>20-23		0.35	
				>23-26		0.4	
				>26-30		0.45	
				>30		0.5	

CHAPTER 9: INFECTIOUS DISEASES

9.1 HIV/AIDS

People infected with HIV may develop HIV-related illnesses, the most common of which are TB and cryptococcal meningitis. PLWHIV may develop diabetes and hypertension as well as depression, which affect adherence and retention and must be screened and referred to appropriate clinics

TREATMENT

ART for all HIV infected people is the most effective HIV prevention and Treatment method available: Successful ART leads to very low levels of virus in the blood and in body fluids (viral suppression). Viral suppression greatly reduces the risk of sexual or mother-to-child transmission.

- All HIV infected people should start ART as soon as possible for their own health and to prevent on ward transmission of the virus.
- Rapid ART initiation should be offered on the same day to people who are ready to start.

For more details, refer to the following MoH guidelines:

- 2021 Clinical Management of HIV in Children and Adults (5th edition, 2021)

- 2021 Malawi Integrated HIV, Viral Hepatitis and Syphilis Testing Services Guidelines
- Clinical Guidance for Hepatitis B and C Provision in Malawi (1st edition, 2021)
- National Tuberculosis Control Program Manual (8th edition, 2018)

CARE AND SUPPORT

General supportive care:

- Proper nutrition is important.

Psychological support:

- Inform patients of any HIV support groups in their community.
- Refer adolescents living with HIV to teen clubs in their area
- Link patients identified with mental health disorders, particularly depression to mental health clinics for continued care

9.1.1 ELIMINATION OF MOTHER TO CHILD TRANSMISSION (EMTCT)

- Test all pregnant women and their sexual partners for hepatitis B at first antenatal visit. Link all hepatitis B positives for treatment eligibility screening
- In districts with high HIV incidence: Give an HIV self-test at discharge from maternity for sexual partners who don't come for professional testing to the facility
- Re-test all breastfeeding women not known to be HIV positive at family planning/ MNCH/ EPI clinics between 6 to 9 months after delivery
- Give 6 weeks of AZT/3TC/NVP (2P) prophylaxis to high-risk HIV exposed infants; low risk infants receive 6 weeks nevirapine syrup as infant prophylaxis

9.1.2 POST EXPOSURE PROPHYLAXIS (PEP)

- PEP involves giving ARV's following possible exposure to HIV to prevent infection. PEP should be given as soon as possible and within 72hrs of high-risk exposure. For more information, *refer to 2021 Clinical Management of HIV in Children and Adults (5th edition, 2021)*

Weight	Standard			Alternative
3.0-19.9kg	15PP: ABC 120mg / 3TC 60mg +DTG 10mg			AZT 60mg / 3TC 30mg
20-24.9kg	15PA: ABC 120mg / 3TC 60mg	+ DTG 50mg		AZT 60mg / 3TC 30mg

25-29.9kg	15A:	ABC 600mg / 3TC 300mg +DTG 50mg		AZT 300mg / 3TC 150mg
≥ 30.0kg	13A:	TDF 300mg / 3TC 300mg / DTG 50mg		AZT 300mg / 3TC 150mg

9.1.3 PRE-EXPOSURE PROPHYLAXIS (PREP)

- PrEP is being rolled out as a public health intervention for HIV prevention in Malawi.
- Offer PrEP as an additional primary prevention method for HIV negative persons who are at substantial risk of acquiring HIV
- Emphasize the need for combination with other HIV prevention methods such as consistent condom use, VMMC etc.
- For screening and Eligibility for PrEP refer to 2021 Clinical Management of HIV in Children and *Adults (5th edition, 2021)*

9.1.4 COTRIMOXAZOLE PREVENTIVE THERAPY (CPT)

- CPT prevents Pneumocystis pneumonia (PJP), diarrhoea, malaria, toxoplasmosis, and other HIV-related diseases and prolongs survival.
- Start all the following on CPT:
  - HIV exposed children from age 6 weeks
  - HIV infected children from age 6 weeks
  - HIV infected adults
- Stop CPT in HIV exposed children when confirmed negative when discharged from exposed infant follow-up (following a negative HIV diagnostic test 6 weeks after stopping of breastfeeding)

Adults

- Give Cotrimoxazole 960mg once daily to any HIV infected person who is 30kg and above, including HIV + pregnant women.
- Do not combine CPT with SP – HIV positive pregnant women only take CPT (and ART).

Children

- Give Cotrimoxazole 120mg dispersible tablets 6-8mg/kg once daily to all HIV exposed children under 14kg until HIV infection has been ruled out, and to all HIV infected children.

Document all serious side effects on the yellow pharmacovigilance forms and submit to PMRA or report using the MEDSAFE-360 USSD platform.

9.1.5 TUBERCULOSIS PREVENTIVE THERAPY(TPT)

- A single course of TPT can prevent active TB in people who are at high risk. Give TPT to:
  - HIV infected children, adolescents and adults
  - Children under 5 years – regardless of HIV status – who are household contacts of clients with bacteriologically confirmed TB (microscopy, gene X-pert or LF TB LAM): give IPT – 6H.
- HIV patients who have completed 6 months of IPT in the past do not need another course of TPT.
- Do not give TPT to a patient who has any signs suggestive of active TB: such patients need full investigation for TB and may require full TB treatment to avoid TB drug resistance.
- New patients: Start TPT together with ART and CPT.
- Two alternative TPT options are similarly effective:
  - 3HP: 3-month course of weekly doses of Isoniazid + Rifapentine
    - Preferred regimen for patients newly initiating ART
  - 6H: 6-month course of daily dose of Isoniazid – do not give to women in first trimester
    - Use as an alternative regimen for those with contraindications to 3HP
    - Suitable for children and can be combined with all ART regimens
- Both 3HP and 6H should not be routinely given in pregnancy and 3 months postpartum due to increased risk of hepatotoxicity and potential adverse birth outcomes (low birth weight and preterm delivery).
- Document all serious side effects on the yellow pharmacovigilance forms and submit to PMRA or report using the MEDSAFE-360 USSD platform.
- DO NOT RESTART TPT if any significant side effect is experienced.
- For more information, Refer to Malawi TB control guidelines/Manual (2018).

9.2 LEPROSY

CLINICAL DESCRIPTION

Leprosy is a chronic infection usually caused by the acid-fast bacilli mycobacterium leprae which has a unique tropism for peripheral nerves, skin and mucus membranes of the upper respiratory tract. Leprosy is classified into Paucibacillary (tuberculoid) and Multibacillary (lepromatous).

CLINICAL FEATURES

Paucibacillary (PB) Leprosy is characterized by:

- 5 lesions or less
- lesions that are asymmetrically distributed
- Definite loss of sensation on the lesions
- Only ONE nerve trunk is enlarged and Negative Slit Skin Smear (SSS).

Multibacillary (MB) is characterized by

- More than 5 lesions
- Symmetrically distributed lesion
- Some degree of loss of sensation on the lesions
- Many nerve trunks are enlarged and Positive Slit Skin Smear.

TREATMENT

TREATMENT OBJECTIVES

- To cure the patient (using multi drug therapy)
- To render patient non-infectious and thus control the spread of leprosy
- To prevent the development of multi drug resistant leprosy

Drugs used in leprosy as recommended by WHO are a combination of rifampicin, clofazimine and dapsone (MDT). The duration of treatment for PB leprosy is 6 months and 12 months for MB leprosy.

Recommended leprosy treatment regimens

Age group	Medicine	Dosage and frequency	Duration (Months)	
			MB	PB
Adult	Rifampicin	600mg once a month	12	6
	Clofazamine	300 mg once a month and 50 mg daily		
	Dapsone	100 mg daily		
Children 10 to 14 Years	Rifampicin	450 mg once a month	12	6
	Clofazamine	150 mg once a month and 50 mg daily		
	Dapsone	50 mg daily		

Children <10 years old or <40kg	Rifampicin	10 mg/kg once month	12	6
	Clofazamine	100 mg once a month, 50 mg twice weekly		
	Dapsone	2 mg/kg daily		

Treatment for drug-resistant leprosy

- Leprosy patients with rifampicin resistance are treated using at least two of the following second-line drugs: clarithromycin, minocycline, or a quinolone (oxfloxacin, levofloxacin or moxifloxacin), plus clofazimine daily for 6 months, followed by clofazimine plus one of the second-line drugs daily for an additional 18 months. In case of rifampicin plus oxfloxacin resistance, a quinolone should not be chosen; therefore, the recommended regimen is clarithromycin, minocycline and clofazimine for 6 months followed by clarithromycin or minocycline plus clofazimine for an additional 18 months.

Recommended Drug Resistant Leprosy regimens

Resistance Type	**Treatment**	
	First 6 months (daily)	**Next 18 months (daily)**
Rifampicin Resistance	Oxfloxacin 400 mg* + minocycline 100 mg + clofazimine 50 mg	Oxfloxacin 400 mg OR minocycline 100 mg + clofazimine 50 mg
	Oxfloxacin 400 mg* + clarithromycin 500 mg + clofazimine 50 mg	Oxfloxacin 400 mg* + clofazimine 50 mg
Rifampicin and oxfloxacin resistance	Clarithromycin 500 mg + minocycline 100 mg + clofazimine 50 mg	Clarithromycin 500 mg OR minocycline 100 mg + clofazimine 50 mg

Treatment of reactions

The term reaction is used to describe the appearance of signs and symptoms of acute inflammation in the lesions of a patient with leprosy.

Treatment for mild reactions

- Continue anti-leprosy treatment, do not lower the dosage.
- Give an analgesic (e.g Aspirin).

- If there is nerve tenderness, rest the affected limb (sling or splint the arm)
- See the patient again after 1-2 weeks and tell him to return at once should the reaction become more severe.

Treatment of severe Reaction

- Continue anti-leprosy treatment.
- Start treatment with steroids (prednisolone)- no other drugs are effective. 40mg daily for 2 weeks, 30mg daily for 2 weeks, 20mg daily for 2 weeks, 15mg daily for 2 weeks, 10mg daily for 2 weeks, 5mg daily for 2 weeks.

Acute Dapsone Allergic Reaction

Symptoms/Signs:

- Itching, rash, exfoliative dermatitis or Stevens- Johnson syndrome
- Refer urgently to Leprosy Control Assistant
- Stop Dapsone
- Then observe

Treatment

- Give Antihistamines, steroids or hospitalize depending on severity.

9.3 MENINGITIS

CLINICAL DESCRIPTION

Infection of the brain meninges. Microorganisms reach the meninges through the bloodstream or by direct extension from the ears, nasopharynx, cranial injury and congenital meningeal defects. Immunocompromised patients are at risk of infection with unusual organisms.

- Causes can be infective or non-infective (malignant meningitis, intrathecal drugs and blood following subarachnoid hemorrhage).
- Can be acute or chronic

Infective Causes

- Bacterial: *Streptococcus pneumoniae, Neisseria meningitidis, Haemophilus influenza, Staphylococcus aureus, Escherichia coli (neonates), Mycobacterium tuberculosis*
- Viral: Herpes simplex virus, Epstein Barr virus, Mumps

- Fungi: *Cryptococcus neoformans, rarely – Candida albicans, Histoplasma capsulatum, Coccidioides immitis*

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Triad of headache, neck stiffness and fever
- Photophobia
- Vomiting
- Petechial or nonspecific blotchy, red rash (meningococcal)
- Positive Kernig's sign
- Reduced level of consciousness, lateralizing signs, cranial nerve palsies
- Less severe cases e.g., viral meningitis may have less symptoms and signs

Complications of Meningitis

- Brain abscess
- Seizures
- Hydrocephalus
- Cranial nerve palsies
- Syndrome of inappropriate ADH secretion (SIADH)

INVESTIGATIONS

- FBC, malaria tests, urea, electrolytes and creatinine
- Random blood glucose
- HIV test (+/-CD4, urine TB LAM and serum CRAG, Focused Abdominal Sonographer in HIV (FASH) if HIV positive
- lumbar puncture (under aseptic technique)
- CXR where indicated (if bacterial or TB suspected)

Typical CSF Changes in Normal, Viral, Bacterial, Cryptococcal and Tuberculous Meningitis

	Normal	Viral	Bacterial	Cryptococcal	TBM
Appearance	crystal clear	clear/turbid	turbid/slash	clear (high opening pressure)	clear/cloudy
Lymphocytes	<5/mm^3	10 - 100/mm^3	< 50/mm^3	10 - 100/mm^3	0 - 300/mm^3
Polymorphs	Nil	nil	200 – 300/ mm^3	nil - <50/ mm^3	0 -200/ mm^3

Protein	0.2 – 0.4 g/L	0.4 – 0.8 g/L	0.5 – 2.0 g/L	0.4 – 1 g/L	0.5 – 3 g/L
Glucose	2/3 – ½ blood glucose	>½ blood glucose (low/normal)	< ½ blood glucose	low/normal	< ½ blood glucose (low)
Cryptoccal antigen test (CRAG)	negative	negative	negative	positive	negative
India Ink	negative	negative	negative	positive	negative

Cell count may be low in severely immunocompromised patients

Bacterial meningitis

- CSF is predominantly neutrophils (polymorphs)
- in partially treated bacterial meningitis, cell count may be lower or predominantly lymphocytes
- Gram stain can be used to identify some organisms
    - *Streptococcus pneumoniae* as gram positive diplococci
    - *Neisseria meningitidis* as gram negative diplococci
    - gram negative bacilli eg *Haemophilus influenzae*, Non typhoidal salmonella
    - gram positive bacilli – *Listeria monocytogenes*

TB meningitis

- neutrophils may predominate in early TB meningitis
- AFBs are rarely seen in CSF hence their absence does not exclude the diagnosis of TB meningitis
- *Gene XPert /Xpert RIF* can be done on CSF

Cryptococcal meningitis

- India ink sensitivity is 60% hence negative result does not exclude cryptococcal meningitis
- CSF CRAG and culture are more sensitive and specific

TREATMENT

TREATMENT OBJECTIVES

- Identify and treat the causative organisms
- Prevent complications
- Prevent spread to contacts

- Maintain good nutrition

NON-PHARMACOLOGICAL TREATMENT

- Secure the airway
- Nasogastric tube feeding if applicable

PHARMACOLOGICAL TREATMENT

Bacterial Meningitis

Adult:

- Ceftriaxone 2g IV 12 hourly for 10 - 14 days

Alternatively

- Benzylpenicillin 4MU 6 hourly + Chloramphenicol 1g 6 hourly for 10 – 14 days
- Adjust antibiotic treatment as per CSF results.
- TB meningitis - treat as per Malawi TB Treatment guidelines
- Cryptococcal meningitis – refer to Cryptococcal Meningitis management in 2021 Clinical Management of HIV in Children and Adults (5th edition, 2021)

Viral Meningitis

- Herpes Simplex Virus
- Acyclovir 10mg/kg IV 8 hourly for 14 – 21 days

REFERRAL CRITERIA

Refer all patients not responding to treatment within the first 48 hours for specialist care.

Neonates

- Give Benzyl Penicillin and Gentamycin IM or IV
- When a lumber puncture cannot be done prior to referral, this should be done as soon as possible after admission

9.3.1 BACTERIAL MENINGITIS

- Before starting treatment make sure to take a CSF sample for Gram staining, CSF analysis, culture, and sensitivity. Adjust the antibiotic management based on the laboratory report.
- In hospital, start an IV infusion for antibiotics using Dextrose 5% (not more than 50 mL/kg per day for an infant) and continue until oral medication can be tolerated
- sometimes corticosteroids may be of help

- Give antibiotics for at least 14 days, if there is a good response in meningococcal disease stop at 7 days
- Do a repeat CSF

TREATMENT

Adults (empirical treatment pending test results)

- Give Ceftriaxone 2g IV 12 hourly

Alternatively

- Give Chloromphenical 1g IV 6 hourly
- Give Benzyl penicillin 5MU IV 6 hourly

Use the alternative regime only when ceftriaxone is not available and evidence of culture and sensitivity of the invading organism to Chloramphenicol.

Children

- Give Ceftriaxone 100mg/kg IM or IV 24 hourly for 7 days

Alternatively

- Chloramphenicol 25mg /kg IV 8 hourly

plus

- Benzylpenicillin 100,000 IU/kg 6 hourly IV/IM

Meningitis in Neonates

- Usually caused by gram (-) organisms and requires treatment for 21 days.
- Careful observation is essential while awaiting culture and sensitivity results.

or if they are not available:

- Give Benzylpenicillin 100,000 units/kg q6h, initially slow IV or IM *plus* Gentamycin 2.5 mg/kg IM or IV q8h or Gentamycin 5mg/kg IM q24h if 1 week old neonate. Or Gentamycin 7.5 mg/kg q24h if over a week-old neonate.

Alternatively

- Give Ampicillin 50 mg/kg 6 hourly initially IV then later IM as an alternative to Benzylpenicillin

If still febrile after 48 hours:

- Add Cefotaxime

9.3.2 CRYPTOCOCCAL MENINGITIS

- Reference: Refer to 2021 Clinical Management of HIV in Children and Adults (5th edition, 2021)

DIAGNOSIS / INVESTIGATIONS

- Lumbar puncture (LP) feasible / not contraindicated
- Cryptococcal antigen (CrAg) rapid test or India Ink stain on CSF.

LP not feasible

- CrAg rapid test on serum, plasma or full blood.

TREATMENT

Primary management

Admit

- Daily therapeutic spinal tap if high intracranial pressure, severe headache or vomiting is present (up to 30 ml per puncture).
- If HIV positive, not already on ART, start ART only 5 weeks after antifungal treatment initiation.

Induction phase

- Do not give adjunctive corticosteroids during induction treatment.
- Before giving Liposomal Amphotericin B: Pre-hydrate and supplement electrolytes: 1000ml NS (weight-based for children) + Potassium 2 tabs 12-hourly + Magnesium trisilicate 1 tabs 24-hourly in the evening.

Option 1:

- Liposomal Amphotericin B[1] + Flucytosine for 7 days, followed by fluconazole tabs for 7 days
- Preferred option if both meds are available

Liposomal Amphotericin B[1]

Adult

- 3-4 mg/kg IV over 6 hours, 24-hourly. Use up to 6 mg/kg for treatment failure or serious disease.

Child

- 6mg/kg IV over 6 hours, 24-hourly.

Flucytosine tabs

- 100mg/kg/day divided into 4 doses (6-hourly)

Fluconazole tabs

Adult

- 1200mg 24-hourly

Child

- 12mg/kg (max 800mg) 24-hourly

Option 2:

Fluconazole + Flucytosine for 14 days

- This option requires FBC monitoring: at baseline and 2-3 times in the second week of treatment.

Fluconazole tabs

Adult

- 1200mg 24-hourly

Child

- 12mg/kg (max 800mg) 24-hourly

Flucytosine tabs

- 100mg/kg/day divided into 4 doses (6-hourly)

Option 3:

Liposomal Amphotericin B**Error! Bookmark not defined.** + Fluconazole for 14 days

- This option requires FBC, Creatinine and K+ monitoring: at baseline and 2-3 times in the second week of treatment.

Liposomal Amphotericin B**Error! Bookmark not defined.**

- 3-4 mg/kg IV over 6 hours 24-hourly
- Use up to 6 mg/kg for treatment failure or serious disease.

Fluconazole tabs

Adult

- 1200mg 24-hourly

Child

- 12mg/kg (max 800mg) 24-hourly

Consolidation phase

Fluconazole tabs for 8 weeks

Adult

- 800mg 24-hourly

Child

- 12mg/kg (max 800mg) 24-hourly

Maintenance phase

Fluconazole tabs, lifelong

Adult

- 200mg 24-hourly

Child

- 6mg/kg 24-hourly

9.3.3 MENINGOCOCCAL MENINGITIS (PROPHYLAXIS)

Recommended for selected groups living in very crowded conditions and for close household contacts

Adults

- Give Ciprofloxacin 500mg STAT.

Alternatively

- Give Doxycycline 300mg STAT

Children

- Give Doxycycline 6 mg/kg

9.4 TETANUS

CLINICAL DESCRIPTION

Tetanus is a nervous system disorder characterized by muscle spasms. caused by the toxin-producing anaerobe *Clostridium tetani.* Immunization has significantly reduced occurrence of Tetanus cases and deaths.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Stiff neck
- Opisthotonus
- Risus sardonicus (sardonic smile)
- A board-like rigid abdomen
- Periods of apnea and/or upper airway obstruction due to vise-like contraction of the thoracic muscles and/or glottal or pharyngeal muscle contraction, respectively
- Dysphagia

TREATMENT

Adult Tetanus

- Good nursing care of the heavily sedated patient is essential

- Give active immunization against tetanus after recovery

General measures

- Nurse the patient in a dark quiet area
- Maintain adequate hydration and nutrition
- Prevent aspiration of fluid into the lungs
- Clean and debride necrotic wounds thoroughly
- Change from parenteral to oral medication as soon as possible
- Avoid provoking spasms
- Encourage active exercise after patient has recovered

Treatment

- Medical rehabilitation plays an important role in prescribing appropriate exercises.
- Give Diazepam 20 mg IM or IV Chlorpromazine 50mg IM or IV given alternately 3 hourly.

Alternatively

Give Diazepam infusion 40 mg in one liter of IV dextrose or normal saline 6-8 hourly

- Take care: respiratory depression may occur
- Dose sizes or frequencies of the above medicines can be increased if necessary to control spasms
    - Give Anti-tetanus serum 20,000 units IV STAT
    - Give this after a test dose of 1,500 units s/c
    - Benzyl penicillin 2 MU IV 6 hourly every for 7 days
    - Give Metronidazole 500 mg IV 8 hourly or 400 mg 8 hourly
    - for 7 days
    - Give Tetanus toxoid vaccination: give the full course

9.5 NEONATAL TETANUS

CLINICAL DESCRIPTION

Neonatal tetanus occurs as a result of the failure to use aseptic techniques in managing the umbilical stump in offspring of mothers who are poorly immunized.

TREATMENT

PHARMACOLOGICAL TREATMENT

Antibiotics

- Metronidazole 30 mg/kg/day (maximum, 4 g/day) divided into 4 doses PO or IV for 10 - 14 days

Alternatively

- Benzyl penicillin 100,000 units/kg IV 6 hourly for 10 - 14 days

Neutralization of unbound toxin

- Human tetanus immunoglobulin (TIG) 500 units IM or IV.

Active immunization

- All patients should complete a series of immunizations with tetanus toxoid, beginning at presentation. See immunization protocol

Sedation
Diazepam of 0.1-0.2 mg/kg 2-6 hourly , titrating upward as needed. If not controlling the spasms, discuss with a senior for Phenobarbital children: 5 mg/kg STAT, then 2.5 mg/kg 12 hourly .

Neonates

- 10mg/kg STAT, then 2,5 mg/kg 12 hourly.

Monitor for respiratory arrest.

Consider ventilatory support (Indications for intubation: apnoea, hypoxaemia, uncontrolled spasms).
Adequate analgesia)

NON-PHARMACOLOGICAL TREATMENT

- Nurse in a quiet and dark room
- Minimal handling
- Avoid IM injections where possible
- Maintain hydration
- Maintain nutrition (use NGT feeds)

Complications

- Respiratory failure
- Rhabdomyolysis
- Fractures

TETANUS PREVENTION

- Promote Tetanus Diptheria Vaccination (Td) in pregnant women and all women of child bearing age (see Section 12.3)
- Ensure adequate surgical toilet plus passive (ATS 1,500 units IM }
- and active (Td} immunization after wounds, bites and burns
- Vaccinate all unvaccinated Childbearing age women in a locality with a confirmed case of Tetanus.

TETANUS TOXOID VACCINATION (TTV)

Fully immunized but last booster >10 years ago:

Give one booster dose of 0.5 mL IM

Fully immunized patients who have had a booster within the last 10 years do not need treatment with tetanus antitoxin (ATS} or tetanus toxoid vaccination (TTV)

9.6 TUBERCULOSIS

CLINICAL DESCRIPTION

General principles

The goals of TB treatment are to cure the patient and restore their quality of life, to prevent death from TB, to reduce transmission of TB in the community and to prevent the development and spread of drug-resistance.

Directly observed treatment (DOT)

The treatment supervisor watches the patient swallow the tablets throughout the whole course to treatment. DOT ensures that the TB patient takes the right drugs, in the right doses at the right times. Supervisors or “treatment supporters,” can be health workers, volunteers, trained members of the community or guardians. A patient-centered approach with proper communication between the patient and treatment supporter promotes patient education, good adherence and early identification of challenges with treatment (including side-effects and clinical worsening). All treatment supporters should be chosen together with and should be acceptable to the patient. The need for good adherence and follow-up should always be reinforced. Patients should be reminded about the duration of treatment and common side effects.

TREATMENT OF SUSCEPTIBLE TB

- Susceptible TB is treated with first-line drugs: Rifampicin (R), Isoniazid (H), Ethambutol (E), Pyrazinamide (Z). The four oral drugs (RHZE) come as an FDC tablet.
- Patients should not be admitted in the ward or hospital for administration of TB drugs except where they are very sick or unable to walk.
- TB drugs should be provided on ambulatory basis in all facilities.

Dosages of FDC formulations of first line anti-TB drugs for adults

Body weight	Initiation phase (2 months)	Continuation phase (4 months)
	RHZE] [R150/H75/Z400/E275] Number of tablets	[RH] [R150/H75] Number of tablets
30-37	2	2
38-54	3	3
55-74	4	4
75 and over	5	5

Dosages of FDC formulations of first line anti-TB drugs for children

Body weight	Intensive phase (2 months)		Continuation phase
	RHZ 75/50/150 number of tablets	**Ethambutol 100mg number of tablets**	**RH 75/50 number of tablets**
4-7kg	1	1	1
8-11kg	2	2	2
12-15kg	3	3	3
16-24kg	4	4	4
25 +kg	Takes Adult Formulation		

TB PREVENTIVE THERAPY (TPT)

TB preventive Therapy (TPT) remains one of the main stay of TB prevention. The following group of patients are targeted for latent TB treatment using isoniazid or Rifapentine in combination with Isoniazid

Household contact

- Under-five children who are household contact of pulmonary TB cases and who are found not to have active TB on an appropriate clinical evaluation
- HIV negative adult contacts of pulmonary TB cases

PLHIV

- Children living with HIV who are >12 months of age who screen negative for TB using the ICF tool.
- Children living with HIV who are <12 months of age, who have contact with a PTB and screen negative for TB using the ICF tool.
- All adult PLHIV above who screen negative for TB using the ICF tool.

Overview of the TPT Regimens

Regimen	Description	Target population	Frequency	Duration of treatment	Precautions/ Recommendations
Isoniazid preventive Therapy	A single dose formulation of Isoniazid (INH)	Children of all ages	Once daily	6 Months 180 doses	Preferred Regimen for HIV-infected children taking lopinavir-ritonavir, nevirapine, or dolutegravir,
3HP	A short-course TPT regimen that combines Isoniazid and Rifapentine	Adults and children ≥2 years old	Once weekly	12 weeks 12 doses	Safe to give with dolutegravir-based ART in Adults Reduces lopinavir-ritonavir and nevirapine levels. Do not use or use with dose adjustment for HIV-infected children taking lopinavir-ritonavir, nevirapine, or dolutegravir
3RH	A short-course TPT regimen that combines	Children of all ages	Once daily	12 Weeks 90 doses	Reduces lopinavir-ritonavir and nevirapine levels. Do not use or use with dose

	Isoniazid (INH)and Rifampicin (R)				adjustment for HIV-infected children taking lopinavir-ritonavir, nevirapine, or dolutegravir

It is important to note that RIF and RPT are potent inducers of the cytochrome P450 oxidase system. Their administration may affect the pharmacokinetics of other drugs including some antiretrovirals (ARVs). For people living with HIV/AIDS, both 3HP and 3RH are safe to give with efavirenz-based ART without any dosing adjustments. In adults, 3HP is safe to give with dolutegravir-based ART without any dosing adjustment. Both 3HP and 3RH reduce lopinavir-ritonavir and nevirapine levels. Thus, dosing adjustments are needed. So, neither can be used together with lopinavir-ritonavir or nevirapine. As a consequence, for HIV-infected children taking lopinavir-ritonavir, nevirapine, or dolutegravir, the preferred TPT regimen is represented by 6H (preferably with the dispersible formulation), which does not require dose adjustment.

TB PREVENTIVE THERAPY AMONGST ADULTS

3HP Regimen

- The table below summarizes the weight banded dosing for 3HP amongst individuals above 14 years (classified as adults).

3HP dosage by weight band for Adults (>14 years)

Age >14 years					
Medicine formulation	**30-35kg**	**36-45kg**	**46-55kg**	**56-70kg**	**>70kg**
FDC Rifapentine /Isoniazid (300/300mg)	3	3	3	3	3

TB PREVENTIVE THERAPY AMONGST CHILDREN

- The section below summarizes weight banded dosing for TB Preventive Therapy regimens amongst children.

Isoniazid preventive Therapy dosage for children under 5

- For all under 5 children who are contacts of pulmonary TB patients, the recommended dosing of Isoniazid Preventive Therapy (IPT) is 10 mg/kg once daily for 6 months

3HP dosage by weight band for children (2-14 years)

Age 2-14years					
Medicine formulation	**10-15kg**	**16-23kg**	**24-30kg**	**31-34kg**	**>34kg**
Isoniazid 100mg	3	5	6	7	7
Rifapentine 150mg	2	3	4	5	5

*3HP is an option for TPT amongst children but not a preferred regimen because there are no child friendly formulations yet on the market. The use of 3HP amongst children will be considered as optimized formulations become available on the market.

3RH dosage by weight band for children (same with the dosages for treatment)

Body weight	**RH 75/50 number of tablets**
4-7kg	1
8-11kg	2
12-15kg	3
16-24kg	4
25 +kg	

DRUG RESISTANT TUBERCULOSIS

In 2018 WHO regrouped medicines into three categories (A, B and C) and ranked based on the latest evidence about the balance of effectiveness to safety. Injectables are no longer recommended for DR-TB treatment and have been phased out in Malawi

Group A: levofloxacin/moxifloxacin, bedaquiline and linezolid. These are medicines that must be prioritized for the standardized DR-TB regimen

Group B: clofazimine, cycloserine/terizidone. These are the medicines to be added next for the standardized DR-TB regimen

Group C: ethambutol, delamanid, pyrazinamide, imipenem-cilastatin, meropenem, amikacin (streptomycin), ethionamide/prothionamide, p-aminosalicylic acid. These are the medicines to be included to complete the regimens and when agents from Groups A and B cannot be used.

Imipenem-cilastatin and meropenem not recommended in Malawi due to cost and complexities of administration. p-aminosalicylic acid and amikacin (streptomycin) not recommended in Malawi due to relative ineffectiveness and risk of toxicity. Ethambutol, delamanid and pyrazinamide can be used under specified conditions (see below)

For DR-TB patients without Fluoroquinolone (FQ) resistance for both adults and children

- All oral, longer treatment regimen (LTR) for 18-20 months, containing at least 4 active medications from Group A, B, and C
- The regimen for Malawi comprises six months of Bedaquiline (Bdq), Levofloxacin (Lfx), Linezolid (Lzd), Clofazimine (Cfz) and Cycloserine (Cs) followed by 12-14 months of Levofloxacin, Linezolid, Clofazimine and Cycloserine
- Standardized regimen for DR-TB patients without Fluoroquinolone (FQ) resistance for both adults and children: **6 Bdq-Lfx-Lzd-Cfz-Cs/12-14 Lfx-Lzd-Cfz-Cs**. Delamanid to be used in place of Bedaquiline in children under six years.

For MDR/RR-TB patients with FQ resistance (Pre-XDR-TB) or resistance to second-line medications, the following regimen could be applied for both adults and children.

- This is an individualized regimen that must be designed based on the resistance pattern of the TB strain, tolerance to the available medicines and treatment history
- Examples of medicines that can be considered include Bedaquiline (Bdq), Delamanid (Dlm), Ethionamide (Eto), Moxifloxacin (Mfx) and Prazinamide (Z)
- The regimen must be for a total duration of 18-20 months long. If Bedaquiline is considered, it must be restricted to the first 6 months .

Group	Medicine	Weight-based daily dose	Formulation	Weight bands in patients older than 14 years Weight bands for patients older than 14 years 30-35 kg	36-45 kg	46-55 kg	56-70 kg	>70 kg	Usual upper daily dose	Comments
A	Levofloxacin		250 mg tab	3	3	4	4	4	1.5 g	
			500 mg tab	1.5	1.5	2	2	2		
			750 mg tab	1	1	1.5	1.5	1.5		
	Moxifloxacin	standard dose	400 mg tab	1	1	1	1	1	400 mg	
		high dose	400 mg tab	1 or 1.5	1.5	1.5 or 2	2	2	800 mg	as used in the standardized shorter MDR-TB regimen
	Bedaquiline		100 mg tab	**4 tabs od for first 2 weeks; then 2 tabs on 3 times a week for 22 weeks**					400 mg	
	Linezolid		600 mg tab	(<15 y)	(<15 y)	1	1	1	1.2 g	
B	Clofazimine		50 mg cap or tab	2	2	2	2	2	100 mg	
			100 mg cap or tab	1	1	1	1	1	100 mg	
	Cycloserine	10-15 mg/kg	250 mg cap	2	2	3	3	3	1 g	
C	Ethambutol	15-25 mg/kg	400 mg tab	2	2	3	3	3	-	
	Delamanid		50 mg tab	2 bd	2 bd	2 bd	2 bd	2 bd	200 mg	
	Pyrazinamide	20-30 mg/kg	400 mg tab	3	4	4	4	5	-	
			500 mg tab	2	3	3	3	4		

DOSING GUIDELINES FOR CHILDREN

Medicine	Recommended dosing
Levofloxacin 100mg scored, dispersible tablets	15-20mg/kg/day
Cycloserine 125mg capsules	15-20mg/kg/day
Clofazimine 50mg tablet	2-5mg/kg/day
Linezolid 150mg, scored, dispersible tablets	10-12mg/kg once daily for children < 12 years who weigh 16kg or more; 15mg/kg once daily in children < 12 years who weigh less than 16kg; 10mg/kg once daily in children 12 years and above
***Bedaquiline 20mg tablet (Children ages six and above)**	For children who weigh more than 30kg, the standard adult dose of 400mg daily for 14 days followed by 200mg three times a week for an additional 22 weeks is given. For children who weigh 16-30kg, the recommended dosing is 200mg daily for 14 days followed by 100mg three times a week for an additional 22 weeks.
****Delamanid 25mg dispersible tablet (Children ages three years and above)**	For children who weigh more than 35kg, the standard adult dose of 100mg twice daily is given (for a total daily dose of 200mg). For children who weigh 24-34kg, the recommended dosing is 50mg twice daily (for a total daily dose of 100mg). A practical dosing table for children based on weight is below.

**Bedaquiline is a drug that is recommended for children ages six years and above. Currently, there are not weight-based dosing recommendations for children being treated with bedaquiline. Rather, children who weigh more than 30kg, the standard adult dose of 400mg daily for 14 days followed by 200mg three times a week for an additional 22 weeks is given. For children who weigh 16-30kg, the recommended dosing is 200mg daily for 14 days followed by 100mg three times a week for an additional 22 weeks*

*** Delamanid is a drug that is recommended by the World Health Organization for individuals with rifampicin-resistant tuberculosis (RR-TB), and for children ages three years and above. Currently, there are not weight-based dosing recommendations for children being treated with Delamanid. Rather, children who weigh more than 35kg, the standard adult dose of 100mg twice daily is given (for a total daily dose of 200mg). For children who weigh 24-34kg, the recommended dosing is 50mg twice daily (for a total daily dose of 100mg).*

Notes on DR-TB treatment regimens

- Scientific and programmatic evidence on the composition, effectiveness, safety, dosages and duration of treatment for DR-TB regimens is evolving. Please refer to the latest guidelines from the National TB and Leprosy Control Program during the course of implementation of these STGs
- For DR-TB patients without Fluoroquinolone (FQ) resistance, an all oral, shorter treatment regimen for 9-12 months, containing at least 4 active medications from Group A, B, and C
- can be used for both adults and children at programmatic level under Operational Research (OR) ground. Under this regimen, Linezolid is only used for the first two months.
- The Standardized shorter regimen for DR-TB patients without Fluoroquinolone (FQ) resistance for both adults and children: **2 Bdq-Lfx-Lzd-Cfz-Cs/4 Bdq -Lfx-Cfz-Cs /3-6 Lfx-Cfz-Cs.** Delamanid to be used in place of Bedaquiline in children under six years.

9.7 TYPHOID IN CHILDREN

CLINICAL DESCRIPTION

Bacterial disease caused by salmonella typhi and spread through contaminated food, water or close contact.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Fever, skin rash (rose spots)
- Abdominal pain
- Cough
- Vomiting
- Diarrhea or constipation

INVESTIGATIONS

- Full blood count
- Blood culture
- Urea, electrolytes and creatinine
- Erect abdominal Xray if suspect bowel perforation

TREATMENT

PHARMACOLOGICAL TREATMENT

- Ciprofloxacin 10mg/kg PO 12 hourly for 14 days. If not tolerating orals give Ceftriaxone 50mg/kg IV 24 hourly. Change to ciprofloxacin once child can take orally to complete 14 days.

NON-PHARMACOLOGICAL TREATMENT

- Surgical referral if bowel perforation is suspected or GIT bleeding
- Ensure good hand hygiene and proper stool disposal
- Maintain good nutrition
- Counsel guardians on good sanitation and hygiene

Complications

- Bowel perforation
- GIT bleeding
- Psychosis

REFERAL CRITERIA

Suspected bowel perforation or GIT bleeding

9.8 SEPSIS

CLINICAL DESCRIPTION

Bacteremia: the presence of bacteria in the bloodstream. *Sepsis:* a life-threatening organ dysfunction triggered by infection.

CLINICAL FEATURES

The qSOFA (quick Sepsis Related Organ Failure Assessment) score may identify patients with suspected infection with poor outcome; the score ranges from 0-3 with 1 point is assigned for each of the following:

- Tachypnoea (respiratory rate ≥ 22 per minute)
- Shock (systolic blood pressure ≤ 100 mmHg)
- Altered mentation (Glasgow coma scale < 15)

The presence of a qSOFA of 2 or more is associated with increased risk of death.

Organ dysfunction: defined as a SOFA score of 2 or more

Septic shock: sepsis + vasopressor requirement to maintain a mean arterial blood pressure of > 65 mm Hg and a serum lactate > 2 mmol / L in the absence of hypovolemia

People at increased risk

- HIV+
- The elderly
- patients with comorbidities (e.g. malignancy, heart failure, chronic liver/renal failure)
- pregnancy
- patients receiving steroids or other immunosuppressive drugs
- indwelling devices (IV cannulas or indwelling urinary catheters)

Important causes of sepsis in Malawi

- Bacterial
    - non-typhoidal Salmonellae – Salmonella typhimurium, Salmonella enteritidis
    - Salmonella typhi
    - Streptococcus pneumoniae
        - E. coli
        - Klebsiella pneumoniae
- Disseminated TB
- Malaria

<u>Complications of Sepsis</u>

- Septic shock
- Acute kidney injury
- Disseminated intravascular coagulation
- Adrenal insufficiency
- Acute respiratory distress syndrome
- Ischaemic hepatitis
- Multi-organ failure
    - a condition in which an infection (usually bacteria) causes a systemic inflammatory response resulting in severe illness.
    - identify cause and treat; accordingly, where possible blood culture should be done before starting treatment

- it is common in HIV infected patients and is mainly caused by Pneumococcus and non- typhoidal Salmonella

INVESTIGATIONS

- FBC, MRDT, blood culture (take sample before starting antibiotics), urea, electrolytes, and creatinine, random blood sugar, serum lactate, HIV test
- Urine analysis/echocardiogram/chest X-ray/Urine TB LAM/ sputum for Gene Xpert/Focused Abdominal Sonography in HIV (FASH)/LP where indicated

TREATMENT

Treatment Objectives

- Early diagnosis and treatment of sepsis
- Identify causative agent and treat accordingly
- Prevent complications

NON-PHARMACOLOGICAL

- ABCDE assessment

PHARMACOLOGICAL

- Fluid resuscitation as necessary
  - if in shock, 30mls/kg bolus of Ringer's Lactate or Normal Saline
  - watch for signs of pulmonary oedema
- Correct hypoxia and hypoglycaemia if appropriate
- Transfuse if Hb < 6 mg / dL
- If persistent hypotension or respiratory failure manage on HDU / discuss with ICU
- Antipyretic if high temperature (Paracetamol 1g 6 hourly orally)
- Observe urine output and vital signs during treatment
- Always refer to hospital for treatment. In severely ill patients, before referral give:

At the health center

Adults

- Give **Chloramphenicol** 1g IV or IM STAT *plus*
- **Gentamycin** 240 mg slow IV or IM STAT *plus*
- **Quinine** 1200mg IV in 5% dextrose over 4 hours

***Hospital treatment*:**

Adults:

- **Ceftriaxone** 2g IV 24 hourly for 7 - 10 days

Alternatively

- **Ciprofloxacin** 400 mg IV every 12 hoursly or 500 mg orally 12 hourly *plus* **Benzylpenicillin** 2MU IV 6 hourly
- Switch to oral **Ciprofloxacin** 500 mg 12 hourly plus **Amoxycillin** 500 mg 8 hourly, or oral **Co-amoxiclav** 625 mg 8 hourly, when improved
- Antibiotics should be given for a minimum of 5 days

Note:

- Adjust treatment as per blood culture and sensitivity result.
- If patient not improving, think of tuberculosis or resistant organisms eg *Klebsiella pneumoniae, Pseudomonas aeruginosa, Escherichia coli* and treat accordingly.
- *If intra-abdominal source suspected:*
    - Add **Metronidazole** 500 mg IV or 400 mg orally 8 hourly. *If still febrile after 72 hours reassess the patient*

9.8.1 SEPSIS IN CHILDREN

- Bacteremia with two or more of the following:
- Temperature >38°C or <36°C
- Tachycardia
- Tachypnoea
- White blood cell count >12000/mm3 or <4000/mm3 or >10% immature bands

Causes:

- Streptococcus pneumonia, staphylococcus aureus, Salmonella species, haemophilus Influenza b

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Fever, Malaise, Headache, Poor appetite, Myalgia, Tachycardia, tachypnea, Seizures, Shock

INVESTIGATIONS

- FBC, Urine dipstick, microscopy and culture, Blood culture, Serum glucose, Lumbar puncture (if indicated), Inflammatory markers: ESR, CRP, Chest Xray.

TREATMENT

PHARMACOLOGICAL

- **Benzyl Penicillin** 50,000 units/kg IV or IM 6 hourly for 5-7 days plus
- **Gentamycin** 7.5 mg/kg slow IV or IM 24 hourly for 5 -7 days
- Adjust antibiotics as guided by microbiology results

If still febrile after 72 hours:

- Repeat blood culture
- Look for source of infection
- Change to Ceftriaxone 50mg/kg IV
- once daily antipyretics
- NEVER USE ASPIRIN IN CHILDREN
- **Paracetamol** 15mg/kg PO 6 hourly

Complications

- Multiorgan dysfunction
- Septic shock

Disseminated intravascular coagulopathy (DIC)

REFERAL CRITERIA

Persistent fevers while on second line antibiotics and signs of multiorgan dysfunction

9.8.2 COVID-19 INFECTION

- Please refer to Malawi National Management COVID-19 guidelines (for prevention, diagnosis, and treatment guidelines). Also refer on vaccination section for COVID-19 vaccine.

CHAPTER 10: ONCOLOGY

CANCER DIAGNOSIS AND REGISTRATION

- Cancer is unregulated cell division with metastatic potential.
- In general, there are two broad groups of cancers: solid and haematological malignancies.
- Solid malignancies include carcinomas, Melanomas, and sarcomas, which can affect any part of the body. Haematological malignancies include lymphomas, leukemia, and Multiple Myeloma.
- The etiology for cancer is multifactorial: environmental and intrinsic.
- Risk factors include infections, tobacco smoking, age, chemicals, toxins, genetic predisposition, and radiation exposure.
- General cancer prevention strategies need to target risk factors. Cancer screening includes Cervical cancer screening using VIA or pap-smear, Mammography, fecal occult blood with supporting colonoscopy, upper gastro-intestinal endoscopy in high-risk cases for instance those with reflux disease, screening and treatment of premalignant skin lesions in those at risk (e.g. people with Albinism).
- Malawi National Cancer Registry pools data from hospital-based cancer registries, KCH, Zomba and Mzuzu Central Hospitals for epidemiology and surveillance. There is also a population-based cancer registry at QECH.

GENERAL CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Initial presentation depends on the system involved and may include a mass which may or may not be painful and ulcerated.
- GIT tumours may cause difficulties and pain when swallowing, change in bowel habit, abdominal distension.
- Genitourinary tumours: abnormal vaginal discharge and bleeding (spotting, heavy, contact), hematuria.
- Cutaneous malignancies: pigmented skin lesions, limb edema
- Metastatic tumours: back or bone pain, paralysis, fractured limb, headache and seizures.
- Cachexia, recurrent fevers, unexplained weight loss and night sweats may occur with advanced disease or leukemia.
- Cancers involving skin: ulcer with irregular edges, easily bleeds, necrotic.
- For a cancerous mass; it could mobile or fixed, pigmented, exophytic or endophytic with contact bleeding.

- Lymphadenopathy
- Intraabdominal spread may cause palpable mass, ascites, bowel obstruction, jaundice, nodular/irregular hard prostate on DRE.
- Limb involvement causing woody hard edema with or without ulceration, limb swelling due to lymphatic obstruction.

GENERAL INVESTIGATIONS

Laboratory tests

- Full blood count – persistently elevated or decreased parameters in any of the blood cell lines should raise suspicion of a malignancy.
- Bcr-Abl detected on PCR if Leukaemia suspected.
- Tumour markers -elevated titers of beta-HCG, CEA, AFP, CA-125, PSA, CA 19-9, CA 15-3 and LDH may suggest a particular cancer. Tumour markers may also be used to monitor response to cancer treatment. Caution when interpreting as many are non-specific; need to correlate with the clinical picture and assays used.
- Fecal occult blood.

Radiological tests:

- Mammography and Ultrasound for breast cancer.
- X-rays (Chest/Bone) for detection of primary cancer or metastases.
- Scanning (Ultrasound scan/Computed Tomography/Magnetic Resonance Imaging/Bone Scan/PET-CT) investigating particular sites for cancer involvement and the extent.

Haematology, Cytology, Histology:

- Peripheral blood smear in haematological cancers
- Cytology to assess cancer cells: this examines fluids suspected to be involved with cancer or needle aspirates from cancer masses
- Histology for solid tumors: core biopsy, incision, excision, surgical specimen
- Bone marrow aspirate and trephine biopsy
- Immunohistochemistry: various stains available depending on cancer suspected.

Tests to undertake when specific tumours are suspected:

- Cervical cancer: punch biopsy for histology.
- Prostate cancer: Transrectal ultrasound guided prostate biopsy (12 core biopsy is the standard; 6 from each lobe) and PSA. Fusion biopsies are not routinely done in the country at the moment.

- HIV test; HIV-related cancers (KS, cervical cancer, lymphoma) are suspected or diagnosed
- Barium swallow, gastroscopy and tissue biopsy for oesophagus or gastric cancer
- Breast cancer: Breast USS, Mammography, biopsy including immunohistochemistry
- Colon cancer: Fecal occult blood, colonoscopy and biopsy
- Lung cancer: Sputum cytology, bronchoscopic, mediastinal or CT-guided biopsy
- Bladder cancer: Cystoscopy, Urine cytology and Trans-urethral resection of bladder tumour with detrusor muscle biopsy represented in the specimen
- Hepatocellular carcinoma: Baseline INR, CT abdomen +/- biopsy, AFP, Hepatitis B and C tests

GENERAL TREATMENT MEASURES

GENERAL MEASURES

- Treatment for cancers involves a multidisciplinary approach with multiple modalities.
- These include surgery, radiation, laser therapy, systemic therapies (such as chemotherapy, hormonal therapy, immunotherapy and targeted therapy) and palliative care.
- Most of the advanced cancers require all the treatment modalities.
- There is evidence to support better outcomes if cancer cases are managed in specialized centres.

Treatment options depend on:

- Stage of disease at presentation
- Histological type of cancer
- Age of the patient

Factors to consider before each treatment

- Patient's preference
- Availability and cost of treatment as well as expertise on the ground
- Co-morbid conditions (hypertension, DM, COPD, cardiovascular, renal and liver conditions)
- Performance status (general condition of the patient) assessed using WHO, ECOG, Karnofsky scores.
- Age of patient
- Organ function (haematological, liver, renal, cardiorespiratory)

10.1 KAPOSI'S SARCOMA

CLINICAL DESCRIPTION

Kaposi sarcoma (KS) is an indolent angio-proliferative spindle-cell tumour derived from endothelial and immune cells infected with human herpes virus type 8 (HHV-8); also known as Kaposi sarcoma herpes virus (KSHV)). KS is currently the most common cancer in Malawi.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- KS presents as mucocutaneous and visceral lesions.
- Mucocutaneous lesions usually manifest as dark, red, purple, or brown papules, plaques, nodules, cauliflower lesions, with or without edema on the skin or mucous membranes. The lesions may ulcerate and form a whitish creamy layer of necrotic tissue.
- Visceral disease occurs in organs such as lungs or GIT and may cause effusions in serous body cavities.
- KS can co-exist with other Human Herpes Virus 8 associated conditions such as Castleman's disease and Primary Effusion Lymphomas.

INVESTIGATIONS

- HIV test if unknown. If positive and on treatment, do CD4, Viral Load to rule out HAART failure.
- CXR to rule out lung involvement, Gastroscopy and Colonoscopy if GIT related symptoms.
- Clinical diagnosis in HIV positive patients only without histology.
- Do a biopsy for histology if clinical picture not typical of KS at presentation or in HIV negative patients.
- HHV8 immunohistochemistry may be a useful addition

TREATMENT

- Treatment depends on the extent of disease; early stage can be controlled with ART alone.
- All patients with HIV associated KS should receive ART.
- Visceral and T1 disease should be considered for rapid initiation of treatment.
- Local therapies: intralesional treatment, radiation and surgery are local therapies applied to KS lesions in general. Radiation therapy is reserved for disease that is limited but causing severe pain, bleeding, distress or is chemo-refractory. Surgery

is reserved for aggressive local KS which is causing severe disfigurement, organ malfunction and overwhelming sepsis. In this case organ amputation is necessary, followed by systemic chemotherapy.

- Systemic therapy: several cytotoxic chemotherapy agents are effective in providing rapid improvement in the majority of patients with locally aggressive and disseminated KS.

PHARMACOLOGICAL THERAPY

First line treatment:

- **Paclitaxel** 100 mg/m2 2 weekly IV 6 - 8 cycles.
- Always premedicate with **Dexamethasone** 8-16 mg IV/PO, **Cimetidine** 400 mg PO, **Ondansetron** 8 mg IV/PO and **Promethazine** 12.5 mg IV 30 minutes before to reduce the risk of hypersensitivity reactions.
- If not effective after 4 - 6 cycles, refer to a specialist for further evaluation.

Note: The initial assessment and first line therapy should be done at a health care facility with competent staff in handling cytotoxic drugs and safe drug handling equipment/tools to protect staff have been introduced. The FBC machine should have proper QC/QA to ensure correct counts are used.

CERVICAL CANCER

CLINICAL DESCRIPTION

- Cervical cancer is the third most common malignancy in women worldwide, and it remains a leading cause of cancer-related death for women in developing countries including Malawi. Human papillomavirus (HPV) infection must be present for cervical cancer to occur.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Physical symptoms of cervical cancer may include the following:
  - Asymptomatic (diagnosed during routine screening)
  - Symptomatic (advanced disease)
  - Abnormal vaginal bleeding (In between menstrual cycle, post-menopausal)
  - Vaginal discomfort
  - Malodorous discharge
  - Dysuria

- Early Disease: erosion of cervix or changes of chronic cervicitis
- Late/advanced disease: Ulcerative or fungating cervical lesion on speculum examination

INVESTIGATIONS

- Punch biopsy for histology
- Screening for any woman of reproductive age group above 25 years using VIA, Pap smear or HPV DNA (in research setting for now).
- HIV positive patients are advised to be screened once they reach reproductive age.
- Speculum and cervical punch biopsy for histological analysis.
- Speculum examination before any antibiotic course for women presenting with abnormal vaginal bleeding or foul-smelling discharge.

TREATMENT

Immunization

- Vaccination with HPV vaccine is recommended in girls between 9 to 14 years.

Surgery

- Fertility sparing (Trachelectomy in stage I cancer).
- Forms of radical hysterectomy with lymph node dissection:
  - Wertheim-Meigs
  - Wertheim-modification
  - Total mesometrial resection.
  - Exenteration (for locally advanced disease or pelvic recurrences)

Radiotherapy

- If no LND was done, to be considered for Radiotherapy.
- Radio-chemotherapy plus brachytherapy.
- Palliative radiotherapy if advanced disease.

PHARMACOLOGICAL TREATMENT

- Chemotherapy regimens to be given at TERTIARY hospitals. Neoadjuvant chemotherapy where access to radiotherapy is limited.
- Combination is better than monotherapy
  - **Paclitaxel, Cisplatin, Fluorouracil, Carboplatin, Bevacizumab** are drugs of choice
- Palliative care is critical in providing pain control with morphine (see section on pain control), controlling bleeding, and providing end of life care.

- Consider discussing with Oncology team for palliative chemotherapy in the following patients:
    - PV bleeding
    - Intractable pain on optimal analgesia
    - Symptomatic metastatic disease

Note: Assessment needs to be done at a tertiary institution with close discussions between Gynae-oncologists, Urologists, Pathologists, Radiologists, Oncologists and Palliative care team to jointly stage and decide on treatment.

BREAST CANCER

CLINICAL DESCRIPTION

- Breast cancer is the common term for a set of breast tumor subtypes with distinct molecular and cellular origins and clinical behaviour. The most common histology is Ductal Carcinoma. Sarcomas and lymphomas may also affect the breast. Breast cancer can also occur in men.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

Early breast cancers may be asymptomatic, and pain and discomfort are typically not present. If a lump is discovered, the following may indicate the possible presence of breast cancer:

- Change in breast size or shape
- Skin dimpling or skin changes
- Recent nipple inversion or skin change, or nipple abnormalities
- Single-duct discharge, particularly if blood-stained
- Axillary lump

INVESTIGATIONS

- It is advisable for women above age 20 years to do Self Breast Examination (SBE) monthly for potential masses.
- Mammography and breast USS is recommended for women between 50 – 75 years.
- Definitive diagnosis is through histology of the breast mass and ipsilateral axillary lymph nodes. This is more superior to cytology which should be understood as a preliminary diagnostic test.

- Cytology should be considered for suspicious lymph nodes.

TREATMENT

- Treatment for breast cancer is multimodality.

NON-PHARMACOLOGICAL

Surgery

- Modified radical mastectomy and axillary lymph node clearance of level I and II nodes.

Note: Lumpectomy or breast conserving surgery in state hospitals should be reserved until radiotherapy facilities are available.

PHARMACOLOGICAL

Chemotherapy

- This may be given as neo- adjuvant (before surgery) or adjuvant (after surgery). The first option has advantage of down-staging to make difficult to operate tumors resectable. Protocols include:
  - **TAC, AC +/-Taxane, TC, CMF, FEC-75**
  - **HER 2** +: Add **Trastuzumab**
- Patients on **Doxorubicin** or **Epirubicin** should have cardiac assessments (ECHO) before and during treatment
- For Metastatic disease consideration of chemotherapy for younger patients or Tamoxifen in elderly patients who may not tolerate chemotherapy.

Hormonal treatment:

- If ER/PR positive, **Tamoxifen** 20mg PO daily +/- **Goserelin** 3.6mg SC every 28 days or Ovarian Ablation if premenopausal.
- If postmenopausal, consider **Anastrazole** 1 mg daily PO or **Letrozole** 2.5 mg PO.

Radiotherapy

- Adjuvant post-surgery to minimize recurrence and improves survival from breast cancer
- Palliation to breast or chest wall for pain, bleeding as well as in brain metastases and bone metastases with or without spinal cord compression

- Bone Disease: Palliation should include **Denosumab** 60 mg sc 6 monthly or **Zoledronic Acid** 3.3 to 4 mg 1 to 3 monthly. Pathological fractures should be discussed with Orthopedic team.

OESOPHAGUS CANCER

CLINICAL DESCRIPTION

- This is a malignant tumor of the esophagus. The risk of cancer of the esophagus is increased by long-term irritation of the esophagus, such as from smoking, heavy alcohol intake, and barrett esophagitis. The most common histological subtype in Malawi is squamous cell carcinoma.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Unexplained dysphagia or odynophagia
- Weight loss

INVESTIGATIONS

TREATMENT

Note: All patients who are not fit for above curative options and or have metastatic disease should be considered for:

- Endoscopic stent placement
- Feeding tube
- Palliative chemotherapy
- Palliative Radiotherapy

PHARMACOLOGIC

- **Cisplatin, Fluorouracil, Carboplatin, Paclitaxel, Gemcitabine, Capecitabine** are options to choose from +/- Radiotherapy.

PROSTATE CANCER

CLINICAL DESCRIPTION

- Cancer that occurs in Prostrate. One of the most common Cancer in Men
- Many prostrate cancers grow slowly and are confined to the prostrate gland, where they may not cause serious harm. However, while some types of prostrate cancer grow slowly and may need minimal or even no treatment, other types are aggressive and can spread quickly.
- Prostrate cancers that's detected earlier, when its still confined to the prostrate gland has the best chance for successful treatment.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Prostate Cancer may cause no signs and symptoms in its early stages.
- Prostate cancer that is more advanced may cause signs and symptoms such as
    - Trouble Urinating
    - Decreased force in the stream of urine
    - Blood in the urine
    - Blood in semen
    - Bone pain
    - Weight loss
    - Erectile dysfunction

INVESTIGATIONS

- Transrectal ultrasound guided prostate biopsy (12 core biopsy is the standard; 6 from each lobe) and PSA.
- Fusion biopsies are not routinely done in the country now.
- Patients presenting with 'BPH' should have a routine prostate biopsy to rule out co-existing malignancy

TREATMENT

PHARMACOLOGICAL

Treatment Options

Localized prostate cancer

Low risk

- PSA <10, GS 6, cT1c, Life expectancy > 10y
- Active surveillance: 6 monthly PSA, DRE every 6 to12 months, Prostate biopsy every 1 to 3 years.
- Radical prostatectomy
- External beam radiation therapy (EBRT)
- Brachytherapy

Intermediate risk

- PSA 10 - 20, GS 7, cT2a/T2c, Life expectancy > 10yrs
- Active surveillance (low-tier IR GS 3+4)
- Radical prostatectomy
- External beam radiation therapy + Androgen deprivation therapy (ADT) 4-6 months
- Brachytherapy

High risk:

- PSA >20, GS 8-10, cT3/T4
- Neoadjuvant ADT + EBRT + Adjuvant ADT
- Radical prostatectomy + pelvic lymph nodes dissection

Metastatic Disease

- Castrate – naïve
  - First treatment is castration:
  - bilateral orchidectomy or Goserelin
  - **Docetaxel + Prednisolone +/- Abiraterone** for high volume disease
  - **Abiraterone**
  - **Enzalutamide**
  - **Ketoconazole**
  - **Bicalutamide**
- Castrate Resistant
  - **Abiraterone**
  - **Docetaxel**
  - **Enzalutamide**
  - **Cabazitaxel**

Bone disease: Palliative radiotherapy, Zoledronic acid, Denosumab, Analgesia. Pathological fractures should be jointly assessed and managed with Orthopaedic team for possible stabilization.

HEAD AND NECK CANCER

CLINICAL DESCRIPTION

These involve the following malignancies:

- Oral cavity cancers: Buccal, gingival, retro-molar trigone, hard palate, oral tongue and floor of mouth
- Oropharynx: Tonsil, soft palate, Base of Tongue
- Nasopharynx
- Hypopharynx
- Larynx
- Salivary gland: Parotid, submandibular, submental

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Depends on specific location of the cancer.
- Non healing ulcers in the mouth, which easily bleed
- Associated difficulties in mastication and progressive dysphagia
- Neck mass/lymphadenopathy
- Otalgia
- Nasal blockage and bleeding
- Trismus
- Persistent cough
- Stridor
- Hoarseness of voice in advanced cases.

INVESTIGATIONS

- Done in conjunction with ENT surgeons and pathologists.
- Clinic: Complete upper airway assessment using Indirect Laryngoscopy +/- Flexible Nasal Endoscopy
- Radiological imaging forms part of work up e.g. Panorex, CT Scan Base of skull to upper chest
- Biopsy: primary mass or suspicious lymph nodes

TREATMENT

NON-PHARMACOLOGICAL

- Depends on the extent of disease.
- Local therapies: Early-stage disease (T1/T2) can use single modality i.e. surgery or radiotherapy
- Advanced cases T3/T4: chemo- radiation is preferred to surgery for cosmesis and organ preservation. If recurrence, then surgery is treatment of choice.

PHARMACOLOGICAL

Drugs of choice: Cisplatin, Paclitaxel, Docetaxel, Gemcitabine, 5FU, Methotrexate, Cetuximab, Doxorubicin

- Follow up with routine clinical examinations and CT scans at scheduled visits.

HEMATOLOGICAL MALIGNANCIES

CLINICAL DESCRIPTION

- Currently lymphoma is the commonest hematological malignancy in Malawi. Aggressive Non-Hodgkin's Lymphomas such as HIV associated diffuse large cell lymphoma (DLCL) and Burkitt-like Leukemia/lymphoma (BL/L) and Hodgkin Lymphoma. Other hematological malignancies include Leukemias and Multiple Myeloma.
- Patients with hematological malignancies may present with cytopenias (reduced blood cell counts) or cytoses (increased blood cell counts), lymphadenopathy, splenomegaly and/or hepatomegaly. These may result in constitutional symptoms, infections, severe anemia and/or bleeding.
    - Many other common conditions such as infections (e.g. TB) and solid malignancies will present with these features.
    - Commonly patients with haematological malignancies are put on antibiotics for bacterial infections or on TB treatment which fail to resolve their clinical problems and, unless corrected in time, may delay appropriate treatment beyond "curative" stages.

All abnormal FBC results need peripheral blood film (PBF) examination

Bone Marrow Investigations

- Although we are only able to do morphological examination of bone marrow aspirates and biopsies in Malawi, bone marrow examination contributes significantly to the diagnosis of hematological conditions in our environment.

- Lymphoma, although not a primary problem of the bone marrow, may involve both the bone and marrow.
- Other malignancies may also spread to the bone marrow.

Histopathology

- The diagnosis of lymphomas also commonly requires biopsy of other tissues such as lymph nodes.

Flow cytometry

- Flow cytometers are used for CD4 and CD8 enumeration in the care of HIV infected patients in the country.
- Used to diagnose leukemia's from peripheral blood or bone marrow aspirates.

Tumor Lysis Syndrome

Rapid cell turnover/breakdown occurring spontaneously or following treatment may result in this metabolic syndrome characterized by hyperkalaemia, hyperuricaemia, hyperphosphataemia, hypocalcaemia +/-renal dysfunction.

- • Prophylaxis to include: **Allopurinol** 100 -300 mg o.d p.o., aggressive fluid resuscitation
- • Monitor the above biochemical parameters especially in patients with high grade and or bulky disease.

10.7.1 LYMPHOMA

- Refer patient to an Oncology Centre after diagnosis is made.
- If available, refer the patient with current FBC, U +Es and LFT results.
- Basic staging investigations include CXR and abdominal USS

TREATMENT

PHARMACOLOGICAL

Chemotherapy

- Aggressive lymphomas have a reasonably good response to a combination of chemotherapeutic agents:
- **Cyclophosphamide, Doxorubicin, Vincristine** and **Prednisolone** given once every three weeks (**CHOP 21**) +/- **Rituximab** (**R-CHOP**) for Diffuse Large B-Cell Lymphoma.
- Before starting patients on Doxorubicin, a cardiac ultrasound is required as Doxorubicin is cardiotoxic.
- Intrathecal chemotherapy may be required depending on patient presentation

- **Doxorubicin (Adriamycin), Bleomycin, Vinblastine, Dacarbazine** (**ABVD**) for Hodgkin's Lymphoma

10.7.2 ACUTE LEUKEMIAS

CLINICAL DESCRIPTION

- Acute leukemias are among the most aggressive hematological conditions.

INVESTIGATIONS

- PBF examination facilitates morphological diagnosis which may or may not be sufficient to reach a definitive diagnosis in terms of subtypes of acute leukemia's.

TREATMENT

PHARMACOLOGICAL

Treatment depends on subtypes.

- Acute leukemias typically require four months of hospital admission in self-contained patient rooms. For acute lymphoblastic leukemias, induction, intensification and maintenance treatment cycles last for a total of 2 years.
- Medications to choose from include: Cyclophosphamide, prednisolone, methotrexate, Cytarabine, L-Asparaginase, Mercaptopurine, vincristine, Doxorubicin, Daunorubicin
- Intrathecal treatment: Cytarabine, Methotrexate and Dexamethasone

10.7.3 CHRONIC LEUKEMIAS

CLINICAL DESCRIPTION

- Chronic lymphocytic leukemia (CLL) and chronic myeloid leukemia (CML) are manageable to some extent even in Malawi. Both can be diagnosed with reasonable certainty based on clinical presentation, PBF and bone marrow examination.

TREATMENT:

Treatment options include: Fludarabine, Cyclophosphamide, Rituximab, Chlorambucil for CLL

- For CML: **Hydroxyurea** can be used for patients before BCR-ABL confirmation
- Imatinib and Nilotinib are available in Malawi through a patient assistance program called Glivec® International Patient Assistance Program (GIPAP).

- GeneXpert provide means of performing molecular testing in Malawi for CML using BCR-ABL cartilages.

10.7.4 MULTIPLE MYELOMA

CLINICAL DESCRIPTION

- Multiple myeloma (MM) appears to be relatively rare in Malawi, perhaps due to younger population age structure than resource-rich countries and low index of suspicion.

INVESTIGATIONS

- Diagnosis of MM relies on a combination of clinical presentation such as bone pain, morphological examination of bone marrow and basic investigations for the CRAB (calcium, renal disease, anemia and bone disease) criteria for MM by way of determination of calcium levels, renal function, full blood count and X-rays.
- Monoclonal gammopathy should also be demonstrated. Currently, there are no facilities for protein electrophoresis, immunoglobulin quantitation and immunofixation in Malawi.

TREATMENT

- In terms of MM treatment, prednisone and oral dexamethasone.
- **Vincristine, Doxorubicin** (infusion) and **Dexamethasone** (VAD regimen) or a combination of **Cyclophosphamide** with **Prednisone** can be given.
- Ideal options include: **Lenalidomide**, **Pomalidomide**, **Bortezomib**, **Melphalan** if available.

10.8 ONCOLOGICAL EMERGENCIES AND CANCER RELATED COMPLICATIONS

10.8.1 SUPERIOR VENA CAVA OBSTRUCTION

CLINICAL DESCRIPTION

Extrinsic or Intrinsic blockage of the Superior Vena Cava resulting in upper body swelling, upper airway compromise, CNS signs, venous distension and collaterals in the neck and chest. Caused by benign (e.g. TB, thrombus) and malignant causes. It becomes an emergency once tracheal compression and airway compromise established. Malignant causes include primary lung or mediastinal tumours e.g. Lung cancer, Lymphoma, Thymoma/Thymic carcinoma, metastatic disease to mediastinum e.g. breast cancer and germ cell tumours.

INVESTIGATIONS

- History and physical examination
- CXR: Apical/Mediastinal widening (unilateral: on the right and or bilateral)
- Contrasted CT Neck and Chest
- Biopsy: Bronchoscopy or CT guided if no obvious masses externally

TREATMENT

- Grade 3 and 4 (severe to life threatening symptoms): refer to surgery for SVC stenting + anticoagulation
- Surgery for chemotherapy or radiotherapy resistant tumours e.g. thymomas
- Chemotherapy +/- steroids after biopsy for chemo sensitive malignancies: Small cell lung cancer, Lymphoma, Germ Cell Tumours
- Radiotherapy: Chemotherapy resistant tumours or where surgery not possible

10.8.2 SPINAL CORD COMPRESSION (SCC)

CLINICAL DESCRIPTION

- This is the initial presentation of cancer in 20-30% of SCC. Common cancers to present with SCC are lung, Cancer of unknown primary, Breast, Prostate, NHL, Multiple myeloma. Mostly in the thoracic spine (60-80%), Lumbar spine (15 – 30%), Cervical spine (4-13%).

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Back pain (95%)
- Weakness (60-80%)
- Sensory deficits (40-90%)
- Autonomic dysfunction (50%)
- Ataxia (5%)

INVESTIGATIONS

High index of suspicion in cancer patient with new back pain or change in character of preexisting back pain

- Immediate imaging and consultation with oncologist and a neurosurgeon
- Careful documentation of neurology
- NOMS criteria to decide treatment

- MRI- whole spine (contrast-enhanced) is the gold standard
- CT scan is useful in assessing the degree of bone destruction, and differentiating bone vs. tumor

TREATMENT

Supportive

- Pain is mostly resistant to standard analgesics, therefore opioids are indicated
- Steroids lessen pain, reduce vasogenic cord oedema and avoid radiation induced spinal oedema
- High dose if establishes paraparesis or paraplegia vs. low dose steroids if pain with minimal fallout

Dexamethasone 40-96 mg loading dose then 16-24 mg over next 3 days. Decrease dose and increase time (taper) discontinue after 10days.

Radiotherapy

- Preferred treatment for metastatic SCC
- First-line therapy if surgery is contraindicated
- Radiosensitive tumors are lymphoma, multiple myeloma, breast, prostate and lung

Surgery

- Spinal instability, paraplegia at diagnosis
- No tissue diagnosis hence decompression & biopsy
- Retropulsion of bones within the vertebral canal
- Radio-resistant tumors
- Deterioration during RT
- Prior radiation in the same areas

Chemotherapy

- Chemo-sensitive tumors e.g., Lymphoma

10.8.3 UNCONTROLLED TUMOUR HAEMORRHAGE

CLINICAL DESCRIPTION

- Occurs following tumour erosion into a blood vessel or any trauma to tumours in any part of the body.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Presence of known malignancy
- History of bleeding or persistent obvious bleeding
- Symptomatic anaemia
- Hypovolaemic Shock

TREATMENT

Volume support

- Secure IV access
- IV Fluids (isotonic vs. colloids vs. blood products) depending on presentation

Control bleeding

- IV **Tranexamic acid** 500 – 1000 mg 8 hourly
- Adrenaline pack or simple pressure pack; including vaginal pack for cervical cancer
- Suture or cauterize an obviously bleeding blood vessel
- For internal tumours: consider surgical referral or interventional radiology referral for vessel embolization
- Definitive or Palliative treatment: Chemotherapy, Radiotherapy, Targeted therapy according to tumor histology and stage of disease

CHAPTER 11: MUSCULOSKELETAL DISORDERS

11.1 ARTHRITIS (NON-INFECTIVE)

- Make specific diagnosis whenever possible and treat accordingly
- An acute mono-arthritis should always be infective until evidence to the contrary is obtained

11.2 NON-SPECIFIC INFLAMMATORY ARTHRITIS AND RHEUMATOID ARTHRITIS

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Pain and swelling in joint
- Fever (especially in children)
- For rheumatoid arthritis key symptoms are: Chronic pain, joint swelling, and deformity (see RA section below)

INVESTIGATIONS

- FBC
- X-ray joint
- ESR

TREATMENT

Treatment Adults:

NSAIDS

- Give **Ibuprofen** 1.2-1.8g daily in 8 hourly after food

Alternatively:

- Give **Aspirin** 300-900 mg after food every 4 hours. Maximum of 4g daily in divided doses in acute conditions

- Review after 7 days
  - ➢ *If not responding* change to an alternative non-steroidal anti-inflammatory drug (NSAID):
    - Give **Indomethacin** 25 – 50mg 8 hourly after food for another 7 days

    or
    - Give **Diclofenac Sodium** 25-50mg 8 hourly after food or **SR** 75mg bd for another 7 days

Consider referral for specialist opinion in patients with arthritis not responding to NSAIDs for further investigations and treatment

- Intra-articular steroid injection with **Depo Medrol** or **Triamcinolone**
- Disease Modifying anti-rheumatic agents (see RA section below)

Children:

- Always refer to hospital
- Prior to referral, give **Aspirin** 20 mg/kg after food 6 hourly or **Paracetamol** 15mg/kg 8 hourly

11.3 ARTHRITIS (SEPTIC)

CLINICAL FEATURES

SYMPTOMS AND SIGNS

- Fever
- Swollen, painful, warm joint
- Severe local tenderness
- Pain on joint motion

INVESTIGATIONS

- Joint aspiration for diagnostic and therapeutic purposes
  - ➢ ↑↑ WCC (e.g. >50,000/mm3): mostly PMN
- ↑ESR/CRP, ↑WCC, Blood cultures
- X-ray
- FBC,
- VDRL

TREATMENT

PHARMACOLOGICAL

Treatment Adults:

- Give **Flucloxacillin** 1g IV 6 hourly for at least 14 days *plus* **Ciprofloxacin** 500mg 12 hourly PO or **Doxycycline** 100mg 12 hourly PO.
- A further 2-4 weeks of oral antibiotics (**Flucloxacillin** and **Ciprofloxacin**) may be required

Alternatively, if penicillin allergic:

- Give **Clindamycin** 450mg 12 hourly or, if not available use **Ceftriaxone** 2g IV daily for 2 weeks followed by oral **Erythromycin** 500mg 6 hourly and **Ciprofloxacin** 500mg 12 hourly for a duration of 2-4 weeks

Note : If Pus present, always refer early for anthrotomy

Children:

- Give **Ceftriaxone** 50mg/kg daily for 14 days

Or alternatively when staphylococcal infection is suspected:

- Give **Flucloxacillin** 25 mg/kg IV q6h for 14 days

Or if above drugs not available

- Give **Chloramphenicol** 12.5 mg/kg every 6hrs for at least 14 days, or 4 weeks if there is associated osteomyelitis, clinically evident by bone swelling or proven by X-rays after the initial 14 day course

NON-PHARMACOLOGICAL

- Consider joint washout under GA
- Splint joint
- Physiotherapy after infection resolved

Complications

- Osteomyelitis
- Arthritis
- Ankylosis: fusion

Note: Surgical drainage may be indicated

TB septic arthritis is treated as for other forms of extra-pulmonary TB

When to refer a septic arthritis patient

- If pus present, always refer early for arthrotomy.
- Suspicion of joint destruction
- No response to the available antibiotics

RED FLAG: Always refer early to hospital for systemic treatment and arthrotomy

11.4 GOUT

CLINICAL DESCRIPTION

Most common form of inflammatory arthritis. Characterized by intermittent painful inflammatory joint attacks in response to crystals formed because of excessive levels of uric acid occurring mostly in a context of decreased renal excretion of uric acid or increased production of uric acid.

Risk Factors

- Age, male gender, menopausal status in females, impairment of renal function, hypertension
- Diets high in red meat or seafood
- Increased consumption of beer, spirits and fructose or sugar sweetened soft drinks
- Drugs: thiazides, furosemide, pyrazinamide, low dose aspirin
- Secondary hyperuricemia can also result from increased cell turnover and destruction

11.4.1 ACUTE GOUTY ARTHRITIS

CLINICAL DESCRIPTION

Acute painful joint in patient with Gout arthritis

CLINICAL FEATURES

SYMPTOMS AND SIGNS

- Affected joint is painful, tender, warm, swollen and red. Attacks usually last 7 days
- Typically, monoarticular and occurs in men in most cases. The first metatarsophalangeal (MTP) joint of great toe commonly involved

INVESTIGATIONS

- Full blood count
- Serum uric acid
- Serum urea and creatinine
- Joint fluid microscopy
- ESR and CRP

TREATMENT

General measures

- Encourage Rest
- Ensure abundant fluid intake

The main objective of treatment is to decrease pain and swelling, reduce serum uric acid levels

- Give **Ibuprofen** 800mg 12 hourly preferably after food in established cases until attack subsides

Alternatively:

- Give **Indomethacin** 50-75mg 8 hourly with food or
- Give **Diclofenac Sodium** 25-50mg 8 hourly preferably after food and preferably suppositories
- Give **Colchicine** 1.0mg followed by 0.5mg no more frequently than 4 hourly until pain is relieved or diarrhoea or vomiting starts. Maximum of 6mg per course; course should not be repeated within 3 days
- Give **Prednisolone** 30 – 50mg daily for 5 -7 days

Prevention of Attacks

- Encourage physical exercise
- Encourage reduction in dietary protein (if intake is high)
- Avoid alcohol <14 units/week
- encourage to drink >2 litres of water daily
- Only indicated in recurrent gout attacks.
- **Allopurinol** 100 mg daily after food is the first line Urate lowering therapy
- *Maintenance dose*: Up to 200 -600mg daily; dosage >300 mg to be given in divided doses; may be required life long
- Gradually increase over 1-3 weeks to 300 mg daily, according to plasma or urinary uric acid concentration
- Do not start this treatment until an acute attack has completely subsided

COMPLICATIONS

Chronic recurrent gout

- Frequent polyarticular arthritic attacks with bony deformities

Tophaceous Gout

- Solid, chalky white masses of uric acid commonly around joints and soft tissues
- Predilection - extensor surfaces of elbows, distal Achilles tendon, finger proximal interphalangeal (PIP), cartilaginous portion of ears

Renal impairment (due to hyperuricemia and NSAIDS chronic use)

REFERRAL CRITERIA

- Not responding to first line ULT (Allopurinol)
- Presence of comorbid conditions

11.5 MUSCULOSKELETAL PAIN AND TRAUMA

CLINICAL DESCRIPTION

- A break in the continuity of a bone.
- Bleeding in open fracture

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Presents as pain, swelling, deformity and pseudo paralysis

INVESTIGATIONS

- Examination: ATLS protocol and treat life threatening injuries first, examine the limbs and adjacent joints

TREATMENT

General Management

- Recognize; examination, 2 orthogonal radiographs showing joints above and below
- Reduce under sedation

- Relieve pain with appropriate analgesia and immobilization.
- Retain by splinting/casting, surgical fixation
- Rehabilitation
- Follow up-Period of immobilization
- Complications: Compartment syndrome, Neurovascular injury, Malunion, Non-union, Infections, stiffness and Contractures
- Referral criteria: Open fractures, Intraarticular fractures, Multiple fractures, polytrauma, Segmental fractures, Special fractures e.g. scaphoid, neck of femur, talus; Displaced and comminuted diaphyseal fractures, Complications above

OPEN FRACTURE MANAGEMENT

Malawi Orthopedic Association Guidelines

- Primary (A,B,C assessment) and secondary survey, according to ATLS/PTC, should precede the treatment of open fractures.
- IV prophylactic antibiotics should be administered as soon as possible and at least within 1 hour of presentation to the health facility:
    - IV **Ceftriaxone** (at appropriate doses for age and weight)
    - Alternatively, oral **Doxycline** & IV **Gentamicin** (if no Ceftriaxone is available)
    - For grossly contaminated wounds, in addition, administer IV **Metronidazole**
    - If non available, give the most appropriate available antibiotics
- The examination of the injured limb should include assessment and documentation of the vascular and neurological status. This should be repeated systematically, particularly after reduction manoeuvres and/or the application of splints or casts.
- Grade III C fractures with an ischaemic limb should be discussed immediately with the central hospital by telephone with a view to immediate referral when appropriate.
- The limb must be re-aligned and splinted or casted before transfer to the ward or another health facility
- Prior to formal debridement the wound should be exposed only to remove gross contamination and to allow photography, then dressed with a sterile saline-soaked gauze.
- Washouts outside the operating theatre environment are not indicated and patients should be prepared for debridement under spinal or general anaesthetic.
- Debridement should be performed, under general or spinal anaesthetic, using fasciotomy lines for wound extension where possible:
    - Immediately for highly contaminated wounds (agricultural, aquatic, sewage) or when there is an associated vascular compromise (compartment syndrome or arterial disruption producing ischaemia).
    - Within 12 hours of presentation to hospital for grade II & III fractures.

- Within 24 hours of presentation to hospital for grade I fractures.

- Immediately for highly contaminated wounds (agricultural, aquatic, sewage) or when there is an associated vascular compromise (compartment syndrome or arterial disruption producing ischaemia).
- Within 12 hours of presentation to hospital for grade II & III fractures.
- Within 24 hours of presentation to hospital for grade I fractures.
- Once debridement is complete any further procedures (e.g. external fixation) carried out at that same sitting should be regarded as clean surgery; i.e. there should be fresh instruments and a re-prep and draping of the limb before proceeding.
    - Clean grade I fractures should be closed primarily
    - Grade II fractures should be left open and closed within 72 hours
    - Grade III A & B fractures should be left open and referred to the nearest central hospital within 24 hours to enable wound closure or flap within 72 hours. This should include a letter and before & after debridement photographs to the receiving surgeon
- Long bone Grade III A & B fractures should be stabilized with an external fixator at the time of debridement. In some cases, an orthopedic surgeon may use internal fixation.
- Definitive internal stabilization should only be carried out when it can be immediately followed with definitive soft tissue cover. Approximation sutures over exposed bone should not be done.
- Long bone Grade III A & B fractures should be stabilised with an external fixator at the time of debridement. In some cases, an orthopaedic surgeon may use internal fixation.
- Definitive internal stabilization should only be carried out when it can be immediately followed with definitive soft tissue cover. Approximation sutures over exposed bone should not be done.

11.6 COMPARTMENT SYNDROME

CLINICAL DESCRIPTION

Condition where the Osseo fascial compartment pressure rises to a level that decreases perfusion to the limb and may lead to irreversible muscle and neurovascular damage. Diagnosis is made with the presence of severe and progressive limb pain that worsens with passive motion. Compartment syndrome may occur anywhere that skeletal muscle is surrounded by fascia.

Causes

- High energy trauma, burns
- Tight casts, dressings, or external wrappings

- Extravasation of IV infusion
- Post-ischemic swelling
- Bleeding disorders and arterial injury

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Pain out of proportion to the clinical situation is usually the first symptom

INVESTIGATIONS

On Physical examination

- pain on passive stretch of the compartment
- paresthesia and hypoesthesia
- paralysis*
- palpable swelling*
- peripheral pulses absent*

Late signs

- Clinical diagnosis but imaging required to rule out fracture

TREATMENT

Non operative

- Obervation and limb elevation
- bivalving the cast and loosening circumferential dressings

Operative

- Emergent fasciotomy of all limb compartments

11.7 JOINT AND TENDON INJURIES

CLINICAL DESCRIPTION

- Usually due to sports injuries, road accidents, assault and occupational hazards
- Classification
  - Dislocations\Fracture-dislocations\subluxations
  - Haemarthrosis: as a complication of severe injury or spontaneously in haemophilia

- Ligamentous and tendon injuries: occur following twisting, traction or bending forces

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Pain, swelling, loss of function, deformity, crepitus (if there is an associated fracture) and neurovascular complications.
- Commonly shoulder, hip, elbow and ankle.

INVESTIGATIONS

- Diagnosis is made after clinical examination and radiology.
- Always look for neurovascular complications.

TREATMENT

- Treatment of dislocation should be urgent because of irreversible damage to cartilage and neurovascular structures; and to relive pain.
- Urgent reduction and immobilization.
- Check X−ray and refer if reduction is not congruent.
- In children suspect epiphyseal/growth plate injuries and refer to surgeons
- Period of immobilization is dependent on joint stability and associated injuries

11.8 OSTEOMYELITIS

11.8.1 ACUTE OSTEOMYELITIS

CLINICAL DESCRIPTION

Hematogenous spread of bacteria from a primary source. The commonest causative agent is staphylococcus aureus. Other organisms, which may be responsible, include streptococcus, pneumococcus, Haemophilus and sometimes salmonella in sickle cell disease. Commonly involved bones are proximal tibia, distal femur and distal humerus.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Pain is the major presenting symptom with progressive severity with time.
- Commonly accompanying fever, and the patient becomes toxic.
- Main physical signs are swelling, localized tenderness and pseudoparalysis

- A high index of suspicion and proper history is important

INVESTIGATIONS

- FBC: A leucocytosis will be demonstrated.
- X−ray of affected limb may not show any changes in the early stages − periosteal elevation is a late feature (2−3 weeks).
- Blood cultures and sensitivity, ESR, CRP

Adults and Children:

- Refer to the hospital
- Admit to hospital for rest
- Splint the affected limb as required
- Give analgesics- refer to acute pain management

If pain is severe:

- Give **Pethidine** 1mg/kg IM (Refer to acute pain management)
- Repeat every 6 hours for a maximum 4 doses
- Drain pus surgically from the bone and send for culture and sensitivitytesting
- Do not await culture results before starting antibiotic treatment

Children Over 2 years:

- Give **Flucloxacillin** 50 mg/kg up to a maximum of 500 mg 6 hourly, initially IV, then orally from 48 hours after fever has settled

Alternatively:

- Give **Cloxacillin** 50-100mg/kg 6 hourly X 6weeks, initially IV, then orally from 48 hours after fever has settled
- **Clindamycin** 15-40mgs/kg (4 divided doses)

Children Under 2 years:

- Give **Ceftriaxone** 50mg/kg once a day or (Especially if *staphylococcal infection is very likely)*
- Give **Flucloxacillin** 50 mg/kg every 6hrs, initially IV, then orally from 48 hours after fever has settled

Note: Antibiotic treatment should be continued for 4 weeks under hospital supervision.

11.8.2 CHRONIC OSTEOMYELITIS

CLINICAL DESCRIPTION

These are usually from inadequately treated acute episodes, which include acute osteomyelitis and acute-on-chronic osteomyelitis. Some may arise from the onset as a chronic infection due to mycobacteria or fungi. The patient is usually not ill-looking unless there is an acute exacerbation.

Causes

- Acute bacterial infections of bone and joints
- Mycobacterium tuberculosis and fungal infections
- Infected orthopedic implants
- Iatrogenic

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Infection may remain quiescent, with acute or sub−acute exacerbations which manifest as discharging sinuses.
- X−ray features: periosteal reaction, new bone formation(involucrum), dead bone (sequestrum), bone abscesses, rarefaction of bone.

INVESTIGATIONS

- As per acute osteomyelitis

TREATMENT

- Surgical treatment by sequestrectomy when an adequate involucrum has formed
- Antibiotic treatment for febrile flare-ups of infection as for acute osteomyelitis.

PHARMACOLOGICAL TREATMENT

Adults

- **Flucloxacillin** 500 mg 6 hourly IV for 2-4 weeks

Children

- **Flucloxacillin**
  - 5-12 years; 250 mg 6 hourly for 2-4 weeks
  - 1-5 years; 125 mg 6 hourly for 2-4 weeks

- < 1 year; 62.5 mg 6 hourly for 2-4 weeks

And

Adults

- **Ciprofloxacin** 400 mg IV 8-12 hourly for 14 days (to be infused over 60 minutes)

Children

- **Ciprofloxacin** 10 mg/kg 12 hourly for 14 days (to be infused over 60 minutes)

In patients with penicillin sensitivity

Adults

- **Clindamycin** 300 mg 6 hourly for 7 days IV

Children

- **Clindamycin** 3-6 mg/kg 6 hourly for 7 days

Or

Adults

- **Ciprofloxacin** 400 mg 8-12 IV hourly for 14 days (to be infused over 60 minutes)

Children

- **Ciprofloxacin** 10 mg/kg 12 hourly for 14 days (to be infused over 60 minutes)

Or

Adults

- **Augmentin** 1.2 g 12 hourly IV (Increased to 1.2 g 8 hourly for 7 days in severe infections)

Children

- **Augmentin**
  - 12-18 years; 600 mg to 1.2 g 12 hourly (Increased to 1.2 g 8 hourly for 7 days in severe infections)
  - 3 months-12 years; 30 mg/kg 12 hourly (Increased to 30 mg/kg 8 hourly for 7 days in severe infections)
  - 7 days-3 months; 30 mg/kg 8 hourly for 7 days
  - Preterm and < 7 days; 30 mg/kg 12 hourly for 7 days

And

Adults

- **Ciprofloxacin** 400 mg 8-12 IV hourly for 14 days (to be infused over 60 minutes)

Children

- **Ciprofloxacin** 10 mg/kg 12 hourly for 14 days (to be infused over 60 minutes)
- Antibiotic cover for surgery as appropriate after culture and sensitivity testing
- Antibiotic impregnated cement spacer indicated for local control of infection
- Give **Ibuprofen** 400mg 8 hourly after food

Alternatively:

- Give **Aspirin** 10mg/kg every 8hrs, preferably after food, up to an adult maximum of 600 mg per dose
- For children, give **Paracetamol** instead of Aspirin

11.9 RHEUMATOID ARTHRITIS

CLINICAL DESCRIPTION

Chronic systemic inflammatory disease characterized by a symmetrical, deforming, peripheral polyarthritis.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Arthritis: Symmetrical, polyarthritis of MCPs, PIPs of hands and feet → pain, swelling, deformity, Swan neck, Boutonniere, Z-thumb, Ulnar deviation of the fingers, Dorsal subluxation of ulnar styloid
- Morning stiffness >1hour
    - Improves with exercise
    - Larger joints may become involved
- Nodules
    - Commonly elbows also fingers, feet, heal
    - Firm, non-tender, mobile or fixed

Diagnosed when any 4 out of the following findings are present

- Morning stiffness >1h (lasting >6wks), Arthritis ≥3 joints, Arthritis of hand joints, Symmetrical, Rheumatoid nodules, +ve RF, Radiographic changes

INVESTIGATIONS

- Anti-CCP: 98% specific (Ag derived from collagen)
- Rheumatoid Factor +ve in 70%
- ANA: +ve in 30%
- FBC (anaemia, ↓PMN, ↑platelet),
- ↑ESR
- ↑CRP
- Radiography

TREATMENT

Treatment objectives

- relief symptoms
- modulate immunity with DMARDs as soon as possible

NON-PHARMACOLOGICAL

- Regular exercise
- Physiotherapy
- Occupational therapy: aids, splints
- Surgical: ulna stylectomy, joint prosthesis

PHARMACOLOGICAL

Principles:

- Disease Modifying Anti-Rheumatoid Drugs (DMARDs): use early
- **Steroids: IM, PO or intra-articular for exacerbations**
    - **Prednisolone** 0.5-1 mg/kg body weight 24hourly
    - Take corticosteroids with food and **Omeprazole** 20mg 12hourly to prevent gastric ulcers
- NSAIDs: good for symptom relief
    - **Diclofenac** 50 mg 8 hourly PO or 100 mg 12 hourly as required
    - **Ibuprofen** 400mg 12 hourly
    - Add **Omeprazole** 20mg 12hourly to the steroids to prevent gastric ulcers

Consider addition of **Paracetamol** 1g 6 hourly or **Tramadol** 50 to 100 mg 12 hourly to help relieve acute pain

- Prevent osteoporosis and gastric ulcers

DMARDs

- 1st line for treating RA
- Early DMARD use associated with better long-term outcome
- All DMARDs can → myelosuppression → pancytopenia

Main agents (discuss with a specialist before initiating these drugs)

- **Methotrexate** 7.5 to 25 mg PO weekly : It is generally continued indefinitely
- (SE: hepatotoxic, pulmonary fibrosis, anaemia and leucopenia)
- Give it together with **Folic acid** 5 to 15mg daily
- **Sulfasalazine** 500 mg daily, increased by 500 mg every week to 2-3 grams daily in divided doses
    - (SE: hepatotoxic, SJS, ↓ sperm count)
    - Preferred agent in pregnancy
- **Hydroxychloroquine** 200 – 400 mg daily. Maximum dose of 6.5 mg/kg per day
    - (SE: retinopathy, seizures)
    - Regular eye checkup needed

Combination triple therapy (methotrexate plus sulfasalazine plus hydroxychloroquine).

Other Agents (discuss with a specialist before initiating these drugs)

- Leflunomide (SE: ↑ risk of infection and malignancy)
- Gold (Gold sodium thiomalate 10mg/ml)(SE: nephrotic syndrome)
- Penicillamine (SE: drug-induced lupus, taste change)
- Biologicals
- Anti-TNF (SE: ↑ infection (sepsis, TB), ↑ AI disease, ↑ Ca)
- Severe RA not responding to DMARDs
- Screen and treat for TB first

Complications

- De Quervain's Tenosynovitis
- Atlanto-axial subluxation
- Immune
- AIHA
- Vasculitis
- Amyloid
- Lymphadenopathy
- Cardiac: pericarditis and pericardial effusion
- Carpal Tunnel Syndrome

- Pulmonary
  - Fibrosing alveolitis (lower zones)
  - Pleural effusions (exudates)
- Ophthalmic
  - Epi-/scleritis
- Raynaud's
- Felty's Syndrome (RA + splenomegaly + neutropenia)

When to refer a rheumatoid arthritis patient

- Presence or suspicion of complications listed above
- No response to DMARDs
- Suspicion of life-threatening drug side effects

11.10 RHEUMATIC FEVER

CLINICAL DESCRIPTION

Rheumatic fever is an inflammatory disease that can involve the heart, joints, skin and brain.

ACUTE ATTACK

Treatment

- Give **Benzathine Penicillin** 1.2MU IM single dose
- Children <30 kg: **Benzathine Penicillin** 600,000 units

Alternatively, if compliance can be ensured:

- **Phenoxymethylpenicillin** 250 mg every 6 hourly for 10 days
- Children: **Phenoxymethylpenicillin** 12.5 mg/kg/dose

Alternatively, if penicillin allergy:

- **Erythromycin** 500mg every 8hrs for 10 days

ACUTE CARDITIS

- Strict bed rest until carditis has resolved

Adults and children:

Treatment

- Give **Aspirin** 25mg/kg, preferably after food, 6 hourly
- Reduce dose if tinnitus or other toxic symptoms develop
- Continue treatment with this until fever and joint inflammation are controlled
- Then reduce dose gradually over a 2week period

If symptoms recur:

- Restart full dose

In severe carditis with heart failure and not responding to aspirin:

- Add **Prednisolone** 2 mg/kg OD
- Reduce dose gradually after 3-4 weeks
- Treat heart failure

CHOREA

Treatment

Adults and Children:

- Give **Haloperidol** 25 micrograms/kg every 8hrs

PROPHYLAXIS OF RHEUMATIC FEVER

Prevention of further attacks

- Continue treatment until at least age 25

Treatment

- Give **Benzathine Penicillin** 1.2 MU IM monthly. Children < 30 kg: 600,000 units/dose

Alternative if compliance can be ensured:

- Give **Phenoxymethylpenicillin** 250mg bd

Alternative if penicillin allergy:

- Give **Erythromycin** 500 mg daily
- Children <30 kg: 250mg

PROPHYLAXIS OF BACTERIAL ENDOCARDITIS

- Needed to prevent bacterial endocarditis in those with previous rheumatic fever or any heart valve abnormalities of other cause.

Before Dental Extraction

Prophylaxis in Adults and Children > 30 kg:

- Give **Amoxycillin** 3g oral taken 1 hour before the dental procedure

Alternatively, if penicillin allergy:

- Give **Erythromycin** 1.5g taken 1 hour before the procedure and 500 mg 6 hours later

Prophylaxis in Children > 30 kg:

- Give **Amoxycillin** 50 mg/kg taken 1 hour before dental procedure, and repeated 6 hours later

Alternatively, if penicillin allergy:

- Give **Clindamycin** 600mg, orally, taken 1 hour before the procedure and 300mg 6 hours later

Prophylaxis in Children > 30kg:

- Give **Clindamycin** 600mg IM/IV 30min prior to the procedure followed by 300mg 6 hourly.

{20mg/kg for children) OR

- Give **Ceftriaxone** 1g IV prior to the procedure or 50mg/kg

For high-risk patients add:

Gentamicin 1.6mg/kg prior to the procedure OR

Vancomycin 1g IV (20mg/kg/IV for children <l0 years old) prior to the procedure.

PROPHYLAXIS BEFORE OTHER PROCEDURES

For genito-urinary surgery or instrumentation:

- Give **Amoxycillin** 1g IV or IM*plus*
- Give **Gentamycin** 2mg/kg IV or IM 30 minutes before the procedure, then
- Give **Amoxycillin** 500mg taken 6 hours later

Alternative if penicillin allergy:

- Give **Erythromycin** 500mg every 12hrs for 48 hours, instead of **Amoxicillin**
  - For obstetric and gynecological procedures
- Not required except for those with prosthetic heart valves who should receive prophylaxis as for dental procedures

CELLULITIS AND TROPICAL PYOMYOSITIS

- Treatment for cellulitis is both medical and surgical
- Medical treatment may prevent abscess formation at the start of infection, when the muscle is swollen, hot and painful
- Immobilize and give:

Treatment

Adult and children:

- Give Flucloxacillin 1g IV 6 hourly for at least 14 days plus,
- Give **Ciprofloxacin** 500mg orally 12 hourly for 5-7 days

If penicillin allergic:

- Give **Ceftriaxone** 2g IV daily for 2 weeks

Note: For Pyomyositis, perform surgical treatment (abscess drainage) when the swelling becomes fluctuant, alongside antibiotics

CHAPTER 12: SEXUAL AND REPRODUCTIVE HEALTH

12.1 OBSTETRIC CONDITIONS

12.1.1 ANTENATAL CARE (2016 WHO MODEL)

CLINICAL DESCRIPTION

Prioritize on person-centered health and well-being to prevent maternal and perinatal morbidity and mortality and provide a positive pregnancy experience through timely and appropriate evidence-based practices implemented throughout normal pregnancy and childbirth.

Recommended interventions:

1. Nutrition interventions
2. Maternal and fetal assessment
3. Preventive measures
4. Interventions for common physiological symptoms
5. Health system interventions to improve utilization and quality of ANC

Frequency and timing of contacts in the 2016 WHO ANC model

- First trimester: Up to 12 weeks
- Second trimester: 20 weeks and 26 weeks
- Third trimester: At 30, 34, 36,38 and 40 weeks.

Note: *Inform the woman to return for delivery after one week if not delivered*

Hemoglobin (once every 3 months), blood grouping and rhesus, VDRL, PITC (at booking visit and 3 months after), HBsAg and Hepatitis C antibody test, urine dipsticks (at each visit), at least an early USS (if not available and if necessary, then refer)

TREATMENT / MANAGEMENT

- Full history and examination
- Preventive measures: **Folic acid** 0.4mg PO daily (3months preconception up to 12 weeks GA), Insecticide treated net**, Tetanus Vaccine (TTV)** (schedule: at 0, 4weeks after 1st dose, 6 months after 2nd dose, one year after 3rd dose, one year after 4th dose), **SP** 3 tablets stat every 4-6 weeks, **albendazole** 400mg stat dose (Once off).

- 60mg **Elemental Iron** daily or 300mg **Ferrous Sulphate** or equivalent or multi-mineral supplements (MMS), single dose 1500/75mg **Sulfadoxine Pyrimethamine** (schedule: every month from >/= 13 weeks), single dose 400mg **Albendazole** or 500mg **Mebendazole**, **COVID Vaccine**
- Counsel on healthy eating and keeping physically active, early presentation if unwell

12.1.2 HYPERTENSIVE DISORDERS IN PREGNANCY

CLINICAL DESCRIPTION:

Systolic BP greater than 140 mm Hg and Diastolic BP greater than 90 mm Hg on at least two occasions of four hours apart, Hypertensive disorders in pregnancies are major cause of perinatal morbidity and mortality.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

Classification of hypertensive disorders in pregnancy:

Chronic hypertension	Onset before pregnancy or onset at < 20 weeks gestation or persistent HTN after 12 weeks post-partum, baseline proteinuria may or may not exist.
Gestational HTN	Onset after 20 weeks gestation and HTN resolves by 12 weeks postnatal, no proteinuria.
Preeclampsia super imposed on chronic hypertension	HTN before pregnancy or onset at <20 weeks gestation or persistent after 12 weeks post-partum plus. New onset proteinuria or worsening of pre-existing proteinuria
Preeclampsia	Gestational hypertension accompanied by one or more of the following new-onset conditions: Proteinuria Signs & symptoms of significant end organ dysfunction Visual disturbance (Photopsia and or scotomata) Severe headache or persistent headache Altered mental status Persistent right upper quadrant pain or epigastric pain unresponsive to analgesia Thrombocytopenia(< 100 platelets/microL) Progressive renal insufficiency (serum creatinine >0.9mg/dl or 97.3 micromole/L), acute kidney injury Pulmonary oedema

	Left ventricular failure Placental insufficiency (oligohydramnios, IUGR, fetal demise)
Eclampsia	Preeclampsia plus new-onset, generalized, tonic-clonic seizures or coma

TREATMENT

PHARMACOLOGICAL

Management of Gestational hypertension

At the health centre

- If >/=160/110mmHg
  - Give **Hydralazine** 5mg slow IV push over 20 minutes
  - or **Nifedipine** 10mg PO stat
- If </= 160/110mmHg
  - Give **Methyldopa** 500mg PO stat
- Refer to the hospital

At the hospital

- Control blood pressures with methyldopa, Nifedipine or hydralazine to levels of less than 160mmHg systolic and less than 110mmHg
- If blood pressures are still >/= 160/110mmHg after a maximum of 20mg of hydralazine and at the district hospital, discuss with a consultant and refer
- If the blood pressure is still high and at the central hospital, give hydralazine infusion
- Monitor for features of preeclampsia
- Review in high-risk antenatal clinic if stable
- Deliver at 38 weeks 6 days

Management of Pre-eclampsia

At the health Centre

- If >/=160/110mmHg
  - Give **Hydralazine** 5mg slow IV push or nifedipine 10mg po stat
- If </= 160/110mmHg
  - Give **Methyldopa** 500mg po stat
- If patient has severe features start magnesium sulphate
  - Give a loading dose of 4g **Magnesium Sulphate** 20% solution in 500 ml of Normal Saline infused over 10 minutes plus 5 g of **Magnesium Sulphate** 50% solution in each buttock deep IM with 1 ml of 1% lignocaine

- If only 50% **Magnesium sulphate** solution is available: mix 8mls of 50% solution of Magnesium sulphate with 12mls of normal saline to make 20% Magnesium sulphate solution

- If gestational age is less than 34 weeks, give **dexamethasone** 6mg IM 12 hourly for 48hours
- Refer immediately to the next level of care

At the hospital

- All women with pre-eclampsia should be hospitalized and placed in Labour Ward or HDU for evaluation.
- Blood pressure management as above; If the blood pressure are still high and at the central hospital, give hydralazine infusion
- If the blood pressures are still high, then start labetalol 20mg IV slow push
- Blood pressures should be consistently maintained below 160mmHg systolic and below 110 mmHg diastolic. Avoid lowering BP abruptly. **DO NOT GIVE** Nifedipine sublingual
- If patient has severe features start magnesium sulphate as at the health Centre
    - Monitor urine output, respiratory rate.
    - Monitor for signs of Magnesium sulphate toxicity (Absent deep tendon reflex, respiratory rate < 10/ minute, Respiratory distress (oxygen saturations < 92%).
    - If convulsion occurs within or after 15 minutes after the loading dose, reload patient by giving 2g $MgSO_4$ in 250 mL of normal saline or ringers lactate given over 20 minute.
    - Withhold or delay drug if:
        - Respiratory rate falls below 16 per minute.
        - Patellar reflexes are absent.
        - Urinary output has fallen below 30 mL per hour over the preceding 4 hours.
    - In case of respiratory arrest:
        - Shout for help
        - Assist ventilation with mask and bag.
        - Give **Calcium Gluconate** 1 g (10 mL of 10% solution) in 100ml N/S IV slowly over 10-20minutes.
- If gestational age is less than 34 weeks, give **Dexamethasone** 6mg IV 12 hourly for 48hours.
- Do urgent FBC, U & Creatinine, AST & ALT.
- Fetal monitoring in pre-eclampsia should include assessment of fetal biometry, amniotic fluid.
- If pre-eclampsia with severe features deliver immediately through induction of labour and for those with contra-indications to induction of labour perform a caesarean section.

- If pre- eclampsia without severe features, consider delivery at 34-week gestation or earlier if severe features develop.
- If facility has nursery deliver after completion of dexamethasone, if no nursery refer patient to a facility with neonatal care.

Postpartum

- Keep on **Magnesium sulphate** 24 hours after delivery and continue to monitor BPs. If still high, keep on **Nifedipine**.
- Discharge after 48 hours of being stable.
- Review in clinic after one week after discharge.

Management of Eclampsia

- Check circulation, airway, breathing (CAB). Correct hypoxia with oxygen as needed.
- Protect patient from injury (left lateral position in bed with rails or on floor)
- Admit to LW or HDU
- Blood pressure control as described above
- Magnesium Sulphate protocol as described above
- If at the health centre refer immediately
- If at the hospital control blood pressures and seizures and deliver by the quickest method

12.1.3 PRETERM LABOUR AND BIRTH

CLINICAL DESCRIPTION

Onset of contractions that cause progressive cervical dilation at < 37 weeks gestation. It's associated with significant neonatal morbidity and mortality, especially between 28-34 weeks gestation.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Lower abdominal pain, lower back pain, may have rupture of the membranes or not, contractions, cervical dilatation, and effacement on VE.

INVESTIGATIONS

- FBC, Urine dipsticks and urine microscopy
- Check MPs and MRDT

TREATMENT

- Prevention
  - Screen and treat asymptomatic UTI / bacteriuria.
  - If previous preterm birth and current singleton gestation, then treat with **Hydroxyprogesterone Acetate** 250mg.
  - Offer a choice of either prophylactic vaginal progesterone or prophylactic cervical cerclage to women with:
    - A history of spontaneous preterm birth or mid-trimester loss between 16+0 and 34+0 weeks of pregnancy and in whom a transvaginal ultrasound scan has been carried out between 16+0 and 24+0 weeks of pregnancy that reveals a cervical length of < 25 mm.
  - Consider prophylactic cervical cerclage for women in whom a transvaginal ultrasound scan has been carried out between 16+0 and 24+0 weeks of pregnancy that reveals a cervical length of < 25 mm and who have either:
    - Had PPROM in a previous pregnancy or a history of cervical trauma
- Established preterm labor
  - Refer to district hospital if at health Centre
  - At the district or tertiary hospital:
    - Monitor fetal heart rate and contractions
    - IV line with NS at maintenance rate
    - Send investigations if available: FBC, urinalysis / urine dipsticks, speculum exam to check for abnormal discharge.
    - Do a wet prep/mount for trichomonas and bacterial vaginosis
    - USS for presentation, AFI, placental location, EFW, EGA and anatomy
    - Give Steroids if gestation age is <34 weeks
      - ✓ **Betamethasone** 12 mg IM every 24 hours, 2 doses; or
      - ✓ **Dexamethasone** 6 mg 12 hourly, 4 doses
    - Tocolytic medications to delay delivery for 48 hours (for steroids) if contractions are present:
      - ✓ **Nifedipine** (immediate release) 20 mg load then 10 mg PO if still contracting after 30 minutes and 10mg 2 hourly (hold if maternal BP < 90/50 mm Hg)

        Or

      - ✓ **Indomethacin** 50-100 mg load then 25- 50mg PO 6 hourly for 48 hours (Only if <32 weeks)

Or

- ✓ **Salbutamol** 250 ug IV slow push over 5 minutes

- Delivery and neonatal care: Refer to district hospital or tertiary hospital if at health centre.
  - ➢ Inform NICU so that neonatologist or pediatrician may attend delivery
  - ➢ Deliver with intact membranes if possible
  - ➢ Minimize trauma by easing out the head in second stage of labour
  - ➢ Forceps may be used to assist delivery; avoid vacuum extraction
  - ➢ Clear airway immediately, if necessary, avoid hypothermia and transfer neonate to NICU as soon as possible
  - ➢ Consider Caesarean delivery if breech presentation
  - ➢ Consider using **Magnesium sulfate** for neuroprotection if viable, EGA <32 weeks, and concern for imminent preterm birth (dosage as per preeclampsia protocol; or if IV infusion available, give 4g IV loading dose over 30 minutes, followed by 1 g per hour maintenance).
    - o If antenatal magnesium sulfate has been started for fetal neuroprotection, tocolysis should be discontinued.
    - o For planned preterm birth for fetal or maternal indications, magnesium sulfate should be started ideally within 4 hours before birth.
    - o Magnesium sulfate should be discontinued at delivery, if delivery is no longer imminent, or when a maximum of 24 hours of therapy has been administered.

12.1.4 PRETERM PRELABOUR RUPTURE OF MEMBRANES (PPROM) /PRELABOUR RUPTURE OF MEMBRANES (PROM)

CLINICAL DESCRIPTION

Rupture of the membranes before labour (PROM is >37 weeks gestation while PPR0M is before 37weeks).

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- History of draining liquor / watery vaginal discharge

TREATMENT

Management if gestation less than 34 weeks

- No digital vaginal examination
- Perform sterile speculum examination and rule out cord prolapse
- Check vital signs and assess fetal heart rate 4 hourly
- Provide a pad and observe for color, amount, and smell of liquor daily

PHARMACOLOGICAL

If at a Health Centre:

- If draining for > 12 hours, commence **Erythromycin** 250mg 6 hourly for 7 Days
- Give **Dexamethasone** 6mg IM 12 hourly for 48 hours/ **Betamethasone** 12mg IM daily for 48 hours
- Refer immediately

At the Hospital

- Manage as described above
- Deliver at 34 weeks if there are no signs of chorioamnionitis
- If signs of intra-uterine infection (temperature > 37.5^{0}C, uterine tenderness, purulent or offensive liquor,), or fetal distress, plan urgent delivery regardless of gestational age

Management if gestation 34 weeks or greater

- Do sterile speculum exam to confirm draining and rule out cord prolapse
- If membranes have been ruptured for more than 12 hours, give antibiotics:
  - Give **Ampicillin** 2g IV 6 hourly once labour starts.

  Or

  - **Benzylpenicillin** 2 MU IV 6 hourly until delivery and continue until 48 hours post delivery.
  - Give **Erythromycin** 250mgs 6 hourly if the patient is not in labour.
- If labour does not begin spontaneously within 24 hours induce labour, if no contraindication to vaginal delivery. Perform c-section if no contraindication.

12.1.5 CHORIOAMNIONITIS

CLINICAL DESCRIPTION

Intra-uterine infection in pregnancy.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Foul-smelling vaginal discharge after 28 weeks of pregnancy, Fever/chills, abdominal pain, uterine tenderness, maternal and fetal tachycardia, maternal tachypnoeic.

TREATMENT

PHARMACOLOGICAL

At the Health Centre

- Give **Benzylpenicillin** 2.5 MU IV stat or
- Give **Ampicillin** 2gms IV stat

Refer to hospital

At hospital

- Give **Metronidazole** 500mg IV 8 hourly, and **Ampicillin** 1g 6 hourly /**Benzylpenicillin** 2 MU IV 6 hourly, **Gentamycin** 240 mg IM single dose daily.
- Deliver urgently**,** Induce, or accelerate labor with **Oxytocin** if the cervix is favorable and no contraindications; do caesarean section if necessary.
- If mother has amnionitis or if membranes were ruptured for more than 12 hours before delivery, start newborn on **Benzylpenicillin** 50,000 IU/kg/dose IM 12 hourly, and **Gentamycin** 5 mg/kg IM od for 5 days if birth weight >1500 g).
- Continue for 48 hours after the fever subsides, but not less than 5 days.

12.1.6 ANTEPARTUM HEMORRHAGE

CLINICAL DESCRIPTION

Bleeding from the genital tract occurring from 28+0 weeks of pregnancy and prior to the birth of the baby.

CLINICAL FEATURES

- Sudden onset abdominal pain, with or without vaginal bleeding, woody hard uterus or prolonged contractions, fetal distress / fetal demise, +/- hemodynamic instability, +/- coagulopathy.

TREATMENT

NON-PHARMACOLOGICAL

Management at the Health Centre

- Initial: ABCDE approach
- If patient stable:
  - Full history and physical examination including vital signs
  - Insert 2 large bore cannula, start 1litre of Ringer's Lactate or normal saline
  - Abdominal palpation for SFH, contractions, tenderness, signs of acute abdomen and FHR assessment
  - **Avoid digital vaginal examination; rather do a sterile speculum examination.**
  - Request blood and blood products as required.
  - Ultrasound examination to rule out placenta previa (if available)
  - Once placenta previa is ruled out, do a vaginal examination
  - Explain the findings to the patient
  - Plan for urgent delivery.

12.1.7 MEDICAL CONDITIONS IN PREGNANCY

12.1.7.1 MALARIA IN PREGNANCY

CLINICAL DESCRIPTION

Similar presentation as in non-pregnant woman, however prone to complications:

- Hypoglycemia, anaemia, miscarriage, fetal growth restriction, low birth weight, preterm delivery

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Fever, malaise, general body pains, low appetite, headache, abdominal pain, nausea, vomiting, symptoms of anaemia. Splenomegaly.

INVESTIGATIONS

- FBC / Check hemoglobin
- Check MPs and MRDT
- Check random blood glucose
- Urinalysis / urine dipsticks

TREATMENT

PHARMACOLOGICAL

- In 1st trimester of pregnancy give oral **Quinine** 10mg/kg body weight, administered 8 hourly for 7 days OR
- In 2nd and 3rd trimester give **Lumefantrine Artemether (LA)** 12 hourly for 3 days.

Note: Pregnant women are susceptible to hypoglycemia when taking quinine.

Severe Malaria in Pregnancy

Hypoglycaedmia, reduced level of consciousness, anaemia, reduced urine output / cocacola coloured urine, convulsions

Refer to the MOH National Malaria Control Program Revised **Guidelines for the Treatment of Malaria in Malawi, 5th edition, 2020,** for full details of malaria management.

12.1.7.2 HIV/AIDS IN PREGNANCY

Refer to HIV treatment guidelines

12.1.7.3 ANEMIA IN PREGNANCY

CLINICAL DESCRIPTION

Anaemia in pregnancy is defined as HB of less than 11g/dl, (severe anemia is HB less than 7g/dl at any gestational age).

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Fatigue
- Shortness of breath on exertion
- Headache
- weakness,
- heart palpitations
- dizziness

- Pallor of the skin and mucous membrane.

INVESTIGATION

- FBC or hemoglobin check if FBC not available
- MPs and MRDT
- Urine dipsticks, urine, and stool microscopy
- Peripheral blood film for hematology if at tertiary level.

TREATMENT

PHARMACOLOGICAL

At Health Centre

If HB is < 8 g/dl or any complications, refer to the hospital

Prevention

- Provide all antenatal women with **Ferrous Sulphate** 325mg 12 hourly
- Advise on diet rich in green leafy vegetable, liver, fish, eggs, red meat
- To prevent hook worm, give **Albendazole** (400 mg stat)
- To prevent malaria, give 2 doses **SP** (three tablets each dose) 4 weeks apart, starting after quickening (16 weeks' gestation)
- Advise to keep adequate interval between pregnancy > 2 years' minimum
- All breastfeeding mothers should take iron supplements

At District Hospital

Prevention (as above in Health Centre)

- FBC and treat according to the result
- If HB is < 7g/dl especially if symptomatic, then blood transfusion
- Transfuse rapidly if anemia due to blood loss.
- Transfuse slowly and with diuretics if chronic anaemia. (To reduce risk of congestive cardiac failure due to sudden circulatory overload.)
- Treat with ferrous Sulphate/ folic po bd and recheck HB in 2 to 4 weeks.
- Treat malaria or schistosomiasis if indicated
- If Haemoglobinopathy (e.g., sickle cell anemia) is suspected, then refer

12.1.8 CARDIOVASCULAR DISEASES IN PREGNANCY

CLINICAL DESCRIPTION

Cardiovascular disease (CVD) is a class of diseases that involve the heart muscle, chambers, valves or blood vessels. These may be congenital or acquired. It is associated with increased risk of maternal morbidity and mortality.

SIGNS AND SYMPTOMS

- Severe progressive dyspnea, orthopnea, paroxysmal nocturnal dyspnea, hemoptysis, syncope with exertion, chest pain, palpitations, nocturnal cough, sudden reduction in ability to perform ordinary physical activity, increasing dyspnea on exertion, and hemoptysis are associated with CCF, irregular pulse.

INVESTIGATIONS

- CXR (shielded), ECG, echocardiogram, ABG where available.

MANAGEMENT

- All pregnant patients with cardiac disease should be referred to Central Hospital for management.
- Preconception counselling for known cardiac disease in order to assess risk and optimize treatment (i.e., preconception surgery, family planning)
- Explain the cardiac anomaly to the patient and its impact on pregnancy

Antenatal management

- Antenatal care visits: regular visits with obstetrician +/- cardiologist
- Determine the patient's functional capacity (NYHA)
- For detailed antenatal management refer to O & G protocols and guidelines

Intrapartum management

- Admit for vaginal delivery (Caesarean delivery or induction for obstetric indications only).
- Consult anesthesiologist immediately so that he/she is aware of high-risk patient.
- Open partograph, monitor vital signs every 30 minutes, and record fetal surveillance.
- Semi-recumbent position with lateral tilt.
- Minimize IV fluids- strict monitoring of fluid intake and urine output.
- Treat with oxygen at 4-6 L/min as needed.
- Adequate analgesia with **Pethidine** 100 mg IV or epidural if available.

- Treat with **X-Penicillin** 2.4 MU IV 6 hourly and **Gentamicin 240mg** IV stat, no need for antibiotic in labour.
- Second stage of labour: assist delivery with vacuum or forceps.
- Third stage of labour: AMTSL with **Oxytocin** 10 IU IM (no ergometrine).

Postnatal management

- Avoid PPH, anaemia, sepsis, VTE, development of CCF
- Keep in HDU until > 24hrs after delivery if no complications
- Keep in postnatal ward at least 48 hours to monitor for complications
- For patients on anticoagulation, start heparin 6-12 hours after vaginal delivery or 12-24 hours after caesarean delivery
- Inform pediatrician of maternal history of cardiac disease so that newborn is evaluated for congenital heart disease (i.e., examination, echocardiogram)
- Contraception: consider surgical sterilization for life-threatening cardiac disease or intrauterine contraceptive devices, may need to avoid estrogen
- Review mother and infant at 6-week postnatal visit

12.1.9 COVID 19 IN PREGNANCY

CLINICAL DESCRIPTION

Acute respiratory infection caused by SARS-CoV-2 virus. There is growing evidence that pregnant women may be at increased risk of severe illness from COVID-19 compared with non-pregnant women, particularly in the third trimester.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Cough, fever, rhinorrhea, headache, anosmia, malaise, diarrhea

INVESTIGATIONS.

- CXR, FBC, RBS

MANAGEMENT

Prevention

- Vaccination in pregnancy against COVID-19 is strongly recommended and should be offered to all pregnant women

Antenatal care

- All women should receive care as per WHO guidelines with appropriate PPE for the health care worker

Asymptomatic COVID positive patients

Refer to Malawi COVID 19 Guidelines

Severe disease: Refer to district or tertiary hospital

- Refer to Covid19 treatment manual

12.1.10 ASTHMA IN PREGNANCY

CLINICAL DESCRIPTION

Reversible airway inflammation and bronchoconstriction.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Asthma is unpredictable in pregnancy: 1/3 of women report improvement, 1/3 remain the same, and 1/3 worsen.
- Trigger (often viral), chest tightness, shortness of breath, cough, wheezing, tachypnea

INVESTIGATIONS

- Peak flow meter or spirometry, pulse oximetry

MANAGEMENT

- Avoid triggers and use inhaled corticosteroids to decrease underlying inflammation (for detailed information refer to O & G protocols and guidelines and MSTG respiratory conditions section).
- Antenatal clinics visit monthly if on regular medication.
- Avoid GERD in 3rd trimester by using Proton Pump Inhibitor or H2 blocker
- Peak flow meter EVERY 12HRS (first thing in the morning and 12 hrs later) if available
- For mild - moderate persistent asthma: salbutamol inhaler 1-2 puffs EVERY 8HRS or corticosteroid inhaler (i.e., beclomethasone)
- For acute and/or severe exacerbations:

- Admit to HDU
- O2 therapy to keep SaO2 >95%
- inhaled bronchodilator (salbutamol, ipromium bromide and normal saline) through a nebulizer or spacer every 10-20 min until improvement seen
- IV fluids
- IV Aminophylline 250 mg over 10 min or MGSo4 2g stat
- Sit up
- 4-hourly fetal monitoring
- Systemic steroids (i.e. hydrocortisone or prednisone IV) for up to 5-7 days
- Continuously assess response to treatment, complete response is resolution of symptoms and PEFR>80%
    - Incomplete response is continuation of symptoms PEFR<80% personal best
    - Urgent intervention required when PEFR <50% personal best
- Indication for intubation and ventilation: inability to maintain respiratory drive, worsening hypercapnia, respiratory acidosis, confusion and inability to maintain SpO2> 95% despite high flow oxygen

Intrapartum management

- Refer if at the health centre
- continue regular inhaler prn
    - Use of IV hydrocortisone if patient has been on oral steroids >7.5mg/day for >2 weeks
- 4-hourly fetal monitoring
- **Misoprostol** if indication for labour induction
- **Oxytocin** if PPH
- Avoid use of **PGF2** and **Ergometrine**

12.1.11 DIABETES IN PREGNANCY

CLINICAL DESCRIPTION

It is a group of metabolic disease characterized by hypersensitivity from defects in insulin secretion, action or both. Can be gestational or preexisting.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- History: Polyuria, polyphagia, polydipsia. Suspect/screen in macrosomia, unexplained IUD, Family Hx of DM, Maternal obesity, excessive weight gain

At Health Centre

Refer to the next level

At District hospital

Management

Goal is to maintain FBS at 6 - 8MMOl/Ifor gestational

INVESTIGATIONS

- RBS, Hb A_1C, Ophthalmic examination, baseline urine dipsticks for proteinuria, baseline renal function tests.

Note: (It is advisable to manage only uncomplicated diabetes mellitus)

Pregnancy Care

- Pregnancy counselling: diet, ideal weight, and sugar levels
- Switch to insulin if unstable on oral drugs

Antenatally

- Continue pre- pregnancy regimen if blood sugar is controlled.
- Consider in patient admission for DMS education and glucose control.
- Antenatal care every 2 weeks until 30 wks. gestation, then weekly until delivery
- Check FBS. If <6mmol/l (108 mg/dl), patient is managed by diet alone.
- If > 6 mmol/l **Insulin** must be started.
- If first trimester, total daily dose = weight x 0.7 units
- If second trimester, total daily dose = weight x 0.8 units
- If third trimester, total daily dose = weight x 0.9 - 1.0 units
- Given as 2/3 of total daily dose in the morning at breakfast: 1/3 **Soluble Insulin** and 1/3 as **Long-Acting Insulin**
- Given as 1/3 of total daily dose in the evening at dinner (17 hrs): ½ as **Long-Acting Insulin**
- For example, for weight of 72 kgs in third trimester, give 16 units S**oluble Insulin** and 32 units L**ong-Acting Insulin** at breakfast and 12 units **Soluble Insulin** and 12 units **Long-Acting Insulin** at supper.
- Ultrasound every 4 weeks

Intrapartum Management

- Elective delivery at 38 -39 weeks
- No specific treatment if labor progresses normally and quickly
- For induction, or prolonged labor: add 1/3 of her daily insulin as soluble to 1 L of **Dextrose Normal Saline {DNS)** and treat 40dpm

- For caesarean: skip **A.M Insulin**, start **DNS**
- Place **Oxytocin** in separate bag of **Normal**
- **Saline {NS)** fluid using separate IV access
- At 39 weeks' gestation for women with well controlled blood sugar and no vascular disease.
- At earlier gestation for class D and higher, polyhydramnios, macrosomia, poor blood glucose control, Chronic Hypertension on medication or IUGR and IUD
- Caesarian delivery for EFW > 4S00 on UD.

Postnatal period

- Breastfeeding infant early and notify pediatric clinician of maternal diabetes
- Use insulin sliding scale for 5 days post vaginal delivery and then resume pre pregnancy regimen
- Treat with DNS at 3L daily post C/S until tolerating PO and then use insulin sliding scale
- Advise mothers to start diabetic diet as soon as possible.

Note: COMPLICATED DIABETES (Refer to central hospital)

12.1.12 DYSFUNCTIONAL LABOR SYNDROME

CLINICAL DESCRIPTION

Labor not progressing according to expectation

Causes: Consider 3 P's:

- Passenger: macrosomia, malpresentation, malposition
- Power: inadequate contractions
- Passage: inadequate pelvis, rickets, pelvic deformities
- Cephalopelvic disproportion

INVESTIGATIONS

- If fetal macrosomia or malpresentation suspected, perform an ultrasound scan if available.

TREATMENT

NON-PHARMACOLOGICAL/PHARMACOLOGICAL

Management

- Explain findings to the mother
- Ensure adequate pain relief (PCM, pethidine) and hydration
- Consult senior or refer as soon as possible if at a health centre
- If contractions are inadequate, then augment labour (refer to O & G protocol and guidelines)
- If obstructed labour (caput ++, moulding>++, Cervix poorly applied, Bandls ring, maternal and fetal distress) then C/S (refer to C/S section)

12.2 CAESAREAN SECTION

CLINICAL DESCRIPTION

Delivery of the baby through an abdominal incision for maternal or fetal indication.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- The following clinical features may suggest an indication for referral for caesarean section: Cephalopelvic disproportion, breech presentation or any other malpresentation, fetal macrosomia, malposition, previous c-section delivery, history of myomectomy, fetal distress, failed induction of labour.

Management at the health Centre

- Refer to the Hospital
- Pre – referral management
    - Insert a large intravenous cannula (preferably green or grey)
    - Collect blood samples for FBC and group and cross match
    - Commence IV Fluids (Normal saline or Ringer's Lactate, **but never 5% dextrose**)
    - Catheterize the patient
    - Explain the findings to the patient

At District Hospital

- Preoperative management

- Prophylaxis: Give **Cefazolin** 2g IV STAT OR **Ampicillin** 1g IV STAT (30 min-1hr before operation) OR **Ceftriaxone** 2g IV STAT if the other two drugs are unavailable
- Ensure FBC result to assess Hemoglobin level and platelet count.
- Get consent

Post-operative management

- Analgesia
  - Opiates
    - **Pethidine** 50 – 100 mg IM 4 hourly for 48 hours OR
    - **Morphine** 5 – 10 mg IM 4 hourly for 48 hours
  - NSAIDS
    - **Diclofenac suppository** 100mg 12 hourly for 5 days OR
    - **Ibuprofen** 400mg PO 8 hourly for 5 – 7 days
    - **Paracetamol** 1g PO 6 hourly for 5 – 7 days
- Antibiotics
  - INDICATIONS Offensive smelling liquor (Chorioamnionitis), prolonged surgery (> 2 hours), Massive blood loss (>1500mls), Surgical site contamination, prolonged labour with multiple vaginal examinations (≥ 6 VEs).
  - 1st Line: **Ampicillin** 1g IV 8 hourly and **Metronidazole** 500mg IV 8 hourly for 5 days (or **metronidazole** 400mg PO 8 hourly for 5 days)
  - Second line: **Ceftriaxone** 2g IV daily for 5 days and **Metronidazole** 500mg 8 hourly for 5 days (or **Metronidazole** 400mg PO 8 hourly for 5 days)
- Monitor for signs of sepsis throughout the postoperative stay. Provide Routine post-operative wound care

12.3 INTRAUTERINE FETAL DEATH (IUFD)

CLINICAL DESCRIPTION

Death of the fetus > 28 weeks gestation or > 1kg weight

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Patient complains of absence of fetal movement, no increase in the size of the pregnancy, SFH smaller than gestational age, absence of fetal heart sounds on fetoscope or doppler If IUD is few days old breast size may diminish and colostrum secretion may start in some cases.

INVESTIGATIONS

- USS with no fetal cardiac activity (Verify by 2 health care providers),
- FBC, fasting blood sugar, VDRL, blood group and rhesus, urine dipstick, MRDT, Placental histology and fetal autopsy are advisable if cause of foetal death is uncertain.

MANAGEMENT

At Health Center refer to hospital

- Give woman option of immediate induction of labour (refer to Reproductive Health protocols) versus waiting for spontaneous labour
- If augmentation of labour, then manage like live birth
- Ensure adequate analgesia in labour (Pethidine 100mg im 6 hourly until delivery occurs)
- Ensure privacy to the extent possible
- Provide bereavement counseling
- Prescribe **Bromocriptine** 2.5mg 12 hourly for 5 days for lactation suppression
- Evaluate for completeness of placenta and membranes to decide the need for evacuation of retained products of conception.
- Comment on abnormal features. (e.g., fetal congenital anomalies, retroplacental clot, umbilical cord knotting or nuchal cord)
- If the patient is rhesus negative, give **Anti D immunoglobulin** (RhoGAM) 300 µg (1500 IU) within 72 hours of delivery

12.4 CORD CARE

- Wait for 1 to 3 minutes or for cessation of the cord pulsation, then clamp
- Tie the cord with two sterile ties: one 2 cms from the baby's body and the next 3cms from the first tie
- Apply **7.1% Chlorhexidine Di gluconate** to the cord stump soon after cutting to prevent infection
- Continue monitoring the stump for bleeding, especially in the first 24 hours
- Bleeding later from the cord might indicate hemorrhagic disease of the newborn (due to Vitamin K deficiency) or an infection. Refer urgently.

12.5 POSTPARTUM HAEMORRHAGE (PPH)

CLINICAL DESCRIPTION

Blood loss of greater than 500 mL after giving birth vaginally or a blood loss of greater than 1,000 mL after a cesarean section, or any amount of bleeding following delivery, that is significant enough to cause hemodynamic instability.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Vaginal bleeding, pallor, hypotension, tachycardia, thirst, cold and clammy peripherals, increased capillary refill time.

INVESTIGATIONS

- FBC, sickling status
- Bedside clotting test
- Blood grouping and cross-matching
- Ultrasound scan (if patient is stable to check for retained placenta tissue)
- Thorough physical examination to look for genital tract trauma

12.5.1 PRIMARY PPH

TREATMENT

- Abnormal vaginal bleeding within 24 hours of delivery
- Set up an IV line and empty bladder
    - Replace blood loss with IV fluids (isotonic crystalloids) and blood when available
- Identify and treat the cause
- If uterine atony:
    - Rub up a contraction
    - Give 10 units **Oxytocin** IV stat then 40 units in 1 litre N/S, infuse over 4 hours
    - If **oxytocin** not available, give **Misoprostol** 800mcg rectally or sublingually stat
    - **Tranexamic acid** (1g IV over 10 minutes) is recommended if oxytocin does not rapidly stop the bleeding, to be used within 3 hours of delivery.
    - Use of non-pneumatic anti-shock garment as temporizing measure
- Refer to hospital with nurse accompaniment if at the health centre
- If bleeding does not stop despite uterine massage and uterotonics then consider:

- Bimanual uterine compression or external aortic compression
- Additional uterotonics such as ergometrine if available
- Intrauterine balloon tamponade
- A second dose of **Tranexamic acid** IV, 1g over 10 minutes can be given 30 minutes after the 1st dose
- Examination under anesthesia: repair any genital tract trauma and proceeding to exploratory laparotomy, and surgical management including B-Lynch suture or hysterectomy if bleeding continues.
    - If retained placenta, attempt manual removal or evacuation in theatre
    - If ruptured uterus suspected, proceed to laparotomy and assess need / possibility for repair versus hysterectomy.

12.5.2 SECONDARY PPH

CLINICAL DESCRIPTION

Bleeding from the genital tract 24 hours post-delivery until 42 days

Causes: Retained products, often with infection, endomyometritis

TREATMENT

PHARMACOLOGICAL

- Set up an IV line and resuscitate
- Replace blood loss with IV fluids/blood
- Empty bladder
- Rub up a contraction
- Give **Oxytocin** 10 units IM
- If patient is septic start antibiotics
    - Give **Ceftriaxone** 2g iv daily and **Metronidazole** 400 mg 8 hourly
    - OR **Ampicillin** 1g 6 hourly/ **Benzyl penicillin** 2 MU IV 6 hourly, **Gentamycin** 240mg daily, **Metronidazole** 5 0 0 mg 8 hourly
    - Second line: **Meropenem** 1 g 8 hourly

12.6 POST-NATAL CARE

- For care of a woman from immediately after birth to 6 weeks, refer to Reproductive Health protocols

12.7 MATERNAL SEPSIS/SEPTIC SHOCK

CLINICAL DESCRIPTION

Sepsis is bacterial infection in pregnancy, childbirth, post-abortion, or postpartum period.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Tachycardia (greater than120)
- hypotension (systolic blood pressure less than 90)
- respiratory distress (reduced oxygen saturations <94% or respiratory rate greater than 25)
- jaundice
- reduced urine output (less than 0.5ml/kg/hour)
- reduced level of consciousness
- Features of malaria
- Breast engorgement / abscess
- Abdominal / uterine tenderness
- Foul smelling vaginal discharge or lochia

Septic shock is a subset of sepsis in which underlying circulatory and cellular metabolism abnormalities are profound enough to substantially increase mortality.

INVESTIGATIONS

- FBC, urine MC&S, blood culture, MPs, MRDT, HIV test, examine for neck stiffness, breast abscess, chest infection.
- lumbar puncture or other swabs for microscopy e.g. high vaginal swab as appropriate. Consider if additional imaging is required, e.g. ultrasound, CXR

TREATMENT

PHARMACOLOGICAL

- **Airway, breathing, circulation (ABC)**
  - O2 (can be discontinued if normal oxygen saturations)
  - Correct hypotension with IV crystalloid fluids (up to 30ml per kg over first 3 hours, given as 500ml rapid boluses).
- **Caution and senior advice are required in women with preeclampsia or severe anaemia.**

- If persistent hypotension or myocardial dysfunction, then consult anesthesia and physician.

- Broad spectrum intravenous antibiotics should be commenced urgently (**Ceftriaxone+ Metronidazole or Benzyl Penicillin + Gentamicin + Metronidazole** for 7 days if source is not known).
- Remove the source. E.g., Incision and drainage, delivery, laparotomy, evacuation of retained products, as directed by infectious source.
- Monitor response to treatment by charting the vital signs. Consider monitoring of the fetus or neonate if appropriate.
- If not responding to initial treatment or septic shock, then transfer to HDU or ICU for intensive monitoring

12.8 SYPHILIS IN PREGNANCY

CLINICAL DESCRIPTION

Syphilis is an STI caused by Treponema pallidum that can be transmitted from mother to fetus.

CLINICAL FEATURES

- Primary Syphilis: Single painless ulcer (chancre)
- Secondary Syphilis: Rash involving the palms and soles, fever, malaise, arthritis, condylomalata, glomerulonephritis
- Tertiary (late) Syphilis: neurosyphilis, granulomatous disease of skin and subcutaneous tissues (gummatous disease)

Potential Adverse Pregnancy Outcomes: Miscarriage**,** Preterm birth**,** Fetal hydrops**,** Stillbirth**,** Congenital infection **and** Perinatal Death

INVESTIGATION

- All pregnant women should be screened for syphilis at their first contact with medical personnel using VDRL or RPR.

TREATMENT

PHARMACOLOGICAL

- **Benzathine penicillin** 2.4MU IM once weekly for 3doses (for latent syphilis, only1dose for primary syphilis)

- If allergic to penicillin, then **Erythromycin** 500mg PO 6 hourly for 14 days for early syphilis or **Erythromycin** 500mg 6 hourly for 30days

- After sexual contact with a known or possibly infected individual, presumptive treatment with single dose of **Benzathine Penicillin** 2.4MU IM x1.
- Monitor for Jarisch-Herxheimer reaction, an acute febrile reaction with headache, myalgia, rash and hypotension.
  - It may also cause preterm labour.
- Partner notification and treatment.
- Fetal USS to identify severely infected fetus (placentomegaly, IUGR, microcephaly, hepatosplenomegaly, hydrops, ascites, polyhydramnios).

12.9 GYNAECOLOGY

12.9.1 ABNORMAL UTERINE BLEEDING

CLINICAL DESCRIPTION

Bleeding which deviates from normal menstrual pattern: interval, duration and amount.

It may be acute or chronic

Note: Episode of heavy bleeding requiring immediate intervention.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Prolonged heavy cyclical bleeding, intermenstrual bleeding, cyclical bleeding
- If prolonged or heavy bleeding, may have tachycardia, palpitations, pallor, dizziness and general malaise.

INVESTIGATION

- Investigate for PALM-COEIN (Polyps, adenomyosis, leiomyomas, malignancy, coagulopathy, ovulatory dysfunction, endometrial causes, iatrogenic causes, none classified causes)
- Pregnancy test, clotting test

TREATMENT

- Stabilise (resuscistate) and then definitive management of cause.
- To reduce/stop bleeding
  - Give **high dose ibuprofen** 800mg 8 hourly for5 days
  - Give **Tranaxemic Acid** 1g 8 hourly po for up to 5 days
  - **Combined oral contraceptive** 2 tabs daily for 10days then 1 daily 2-6 cycles unless contraindicated. (For women over 40 years discuss with senior clinician before giving COC)
  - Give **Ferrous Sulphate** 200mg daily for 2-4 weeks or until Hb is normal. Refer if persistent
- *Adolescents*, usually physiological, pathology rare
  - Exclude pregnancy and its complications and manage conservatively
  - If bleeding is heavy manage as above
- Women of childbearing age:
  - Strongly suspect complications of pregnancy including ectopic pregnancy. Other causes: use of hormonal contraceptives, DUB, IUCD, fibroids, choriocarcinoma, cervical cancer
  - Speculum examination mandatory to rule out local causes

Where no organic cause found

- Give **Cyclic Progesterone** 5-10mg 12 hourly for 14 days on second part of the cycle; alternatively, oral COC 1 od 3-6 cycles
- If no improvement refer to specialist

Post-menopausal women

- Important causes are endometrial cancer, cervical cancers, cervical polyps, atrophic vaginitis
- Always need investigation therefore refer early

AT THE HOSPITAL

- Speculum examination mandatory
- USS for masses and endometrial thickness. If >4mm, do obtain endometrial sample for histology.

12.9.2 ABORTION AND ITS COMPLICATIONS

CLINICAL DESCRIPTION

Loss of pregnancy before viability (gestational age less than 28 weeks or fetal weight less than 500g)

CLINICAL FEATURES

- Threatening: LAP, PV bleeding, no POC passed cervical os closed
- Inevitable: LAP, PV bleeding, no POC passed, cervical os open
- Complete: LAP, pv bleeding, POCs passed, os closed.
- Incomplete: : LAP, pv bleeding, some POCs passed, os open.
- Missed: Incidental finding of empty gestation sac or absent fetal cardiac activity on USS with no symptoms.
- Septic: Incomplete with features of sepsis and foul smelling POCS or discharge.

MANAGEMENT: OPTIONAL

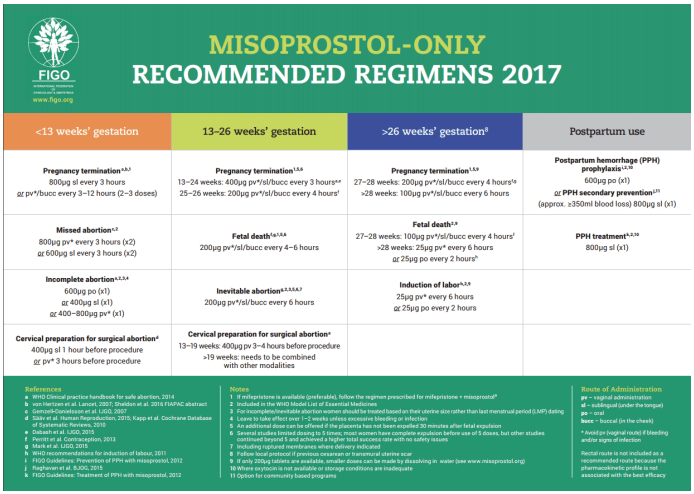
Complications

Post abortal haemorrhage

- Resuscitate and stabilize the patient
- Carry out vaginal examination
- Remove products of conception and/or foreign bodies
- Give **Oxytocin** 10 units IM
- Give **Misoprostol** 600mcg PO or 400mcg sublingually
- **Comprehensive post abortal management plan**
    - Counselling for contraception, HTC, future fertility plans/pregnancy care
    - Cervical cancer screening
    - STI/HIV prevention and treatment

Missed miscarriage:

- Accelerate expulsion of the fetus with 200mg **mifepristone** as a single dose followed by 800mg **misoprostol** 48 hours later in first trimester (if mifepristone is not available, use misoprostol alone)
- REFER TO FIGO TABLE FOR A DOSES OF MISOPROSTOL



Inevitable

- **Oxytocin** 10IU in 1l in the second trimester or Await spontaneous expulsion.

Incomplete:

- MVA in the first trimester. Uterine evacuation for second trimester. For all cases of evacuation or MVA give prophylactic antibiotics prior to surgery: Give single STAT dose **Doxycycline** 400mg PO and **Metronidazole** 400mg PO

Complete

- Give single STAT dose **Doxycycline** 400mg PO and **Metronidazole** 400mg PO
- If patient is able to take PO medication, then provide full course of antibiotics.
  - give **Doxycycline** 100mg 12 hourly for 7 days and **Metronidazole** 400mg 8 hourly for 7 days *IV* antibiotics
- If patient is septic
  - Give **Ceftriaxone** 2g iv daily and **Metronidazole** 400 mg 8 hourly
  -
  - **OR** **Ampicillin** 1g 6 hourly/ **Benzyl penicillin** 2 MU IV 6 hourly, **Gentamycin** 240mg daily, **Metronidazole** 5 00mg 8 hourly IV fluids: N/S or RL
- MVA in the first trimester and blunt curettage in the second trimester

12.9.3 ECTOPIC PREGNANCY

CLINICAL DESCRIPTION

Pregnancy outside the uterine cavity. The fallopian tube is the common site for ectopic pregnancy.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Often presents as ruptured
- Signs of hemorrhagic shock (low BP, high PR, confusion)
- Abdominal distension/tenderness
- Pain / tenderness in the iliac fossae
- PT positive
- USS: empty uterus
- Complex mass in the adnexa
- Free fluid in the abdomen/POD

INVESTIGATION

- Urine pregnancy test
- Ultrasound, FBC, Blood grouping save / crossmatch

TREATMENT

NON-PHARMACOLOGICAL

- Management: ABCDE approach
- Explain diagnosis and management to the patient
- If at the health Centre, refer immediately to the hospital after the above and communicate to the referral Centre

PHARMACOLOGICAL

- Insert 2 large bore IV cannula, take FBC and group and cross match samples, start **Ringer's Lactate** or normal saline, catheterise

At Hospital:

- If first presentation is at the hospital, manage patient as above plus
  - FBC, group and cross match
  - Laparotomy stat (salpingectomy). Do not wait for resuscitation

- Cover for chlamydia with **Doxycycline** 100mg 12 hourly for 7 days
- Explain diagnosis and management to the patient

12.9.4 VAGINAL CANDIDIASIS (MONILIASIS)

CLINICAL DESCRIPTION

Common, excessive overgrowth of yeast in the vagina. Infection occurs more frequently in patients taking antibiotics, pregnant women, HIV/AIDS patients and patients with diabetes.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Intense vulvo-vaginal itchiness, vaginal and vulval inflammation / redness, thick white rubbery discharge, superficial pain during sexual intercourse or during urination.

INVESTIGATION

- High vaginal swab and wet mount microscopy if available.

TREATMENT

PHARMACOLOGICAL

Adults:

Give **Clotrimazole** 500mg intravaginal as single dose or **Clotrimazole** 200mg intravaginal once daily for 3 days OR:

- Give Miconazole 200mg intravaginal once daily for 3 days

OR

- Give Fluconazole 150mg orally as single dose (contra-indicated in pregnancy)

OR

- Give Nystatin Pessary 100,000 IU vaginally 12 hourly for 7 days

To avoid re-infecting her partner, the male partner should:

- Apply the same vaginal cream as the patient Recurrent vulvovaginal candidiasis should be referred to hospital

12.9.5 DYSMENORRHEA

CLINICAL DESCRIPTION

Lower abdominal pain just before or during menstruation

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Lower abdominal pain just before or during menstruation
- Pain and cramping in the lower abdomen, lower back pain radiating down the legs.

INVESTIGATIONS:

- USS for PID, endometriosis, fibroids, urine dipstick

TREATMENT

NON-PHARMACOLOGICAL

- hot water bottle

PHARMACOLOGICAL

- Give **Mefenamic Acid** 500mg 8 hourly during menses for not more than 7 days

Alternatively

- Give **Ibuprofen** 400 mg 8 hourly {see section on analgesics}
- **Diclofenac** suppositories 100mg PR PRN

If no response:

- Give cyclical courses of **Low Estrogen Combined Oral Contraceptive** tablets once daily for 3 - 6 months

If there is still no improvement

- Refer to hospital

12.9.6 OBSTETRICAL FISTULA

CLINICAL DESCRIPTION

Abnormal opening or communication between the vagina and the bladder and rectum.

Obstructed labour is the most common cause of urogenital fistula in Malawi. Other aetiologies include pelvic surgery, radiation therapy and trauma or instrumental vaginal delivery.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Draining urine or stools through the vagina

INVESTIGATIONS:

- Speculum examination plus or minus dye test.

TREATMENT

NON-PHARMACOLOGICAL

Discourage early pregnancies.

- Encourage all pregnant women to attend antenatal care.
- Encourage health workers to use and interpret of partograph for laboring women
- Encourage all women to deliver at health facility
- Avoid delay in performing C/S

PHARMACOLOGICAL

- Catheterize patient with prolonged Labor for 5 days and give **Amoxicillin** 500mg 8 hourly and **Metronidazole** 400mg 8 hourly for 5 days.

At Health Centre

- Insert Foley's catheter and refer all patients with draining urine and/or stools to the District Hospital

At District Hospital

- Reassess the patient to confirm the diagnosis with physical examination and dye test
- Insert urinary catheter and bring patient back for repair after 3 months.

Referral:

- Refer all complicated fistulae to the Central Hospital, such as: VVF of more than 2cm, rectal vaginal fistulae, ureteral vaginal and urethral vaginal fistulae

12.10 CONTRACEPTIVES

For more information, refer to the contraceptive manual

CLIENT ASSESSMENT

- History
  - Age, LMP, parity, number of living children
  - Medical history/ chronic illness (to assess eligibility criteria for method chosen)
  - Desire for more children or limit
  - Desired timing for birth of next child
  - Number of sexual partners
- Physical examination
- Patient education on the different methods

COUNSELLING

Counsel patient on the following

- Type of contraceptive method
- Effectiveness of each method
- Duration of use
- Advantages and disadvantages
- When and where to seek help in times of complications
- When and where to get it removed or changed
- Return of fertility
- Address myths

12.11 SEXUAL ASSULT

DEFINITION: Non-consensual sexual act.

- Refer to SGBV guidelines for more information

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Status of the clothes (torn, dirty, stains), Visualize entire body to draw a detailed body map. Note distinguishing features Mark abnormalities (i.e., contusions, scratches bites, ligature marks, old and new trauma).

INVESTIGATIONS

- Physical examination
  - Include pertinent negatives.
  - **Pelvic exam**: Visualize the external genitalia before using a speculum
  - Look for evidence of penetration (trauma especially around the introitus)
  - Speculum examination: look for evidence of trauma in the vagina and cervix
  - Take high vaginal swab
  - Negative findings do not exclude sexual assault.
- Time - dependent specimens include sperm/semen, foreign material, swabs of body secretions and fingernail scrapings.
- HIV counselling and testing
- Urine pregnancy test (if positive pelvic scan to estimate gestational age)

TREATMENT

NON-PHARMACOLOGICAL

PHARMACOLOGICAL

- Manage physical effects of assault such as wounds, bruises
- If victim has attained menarche and presents within 5 days after assault
  - **Postinor-2**: 2 pills stat or 1 pill 12 hours apart
  - **OR Levonorgestrel 1.5 mg stat**
  - OR **Microgynon** 4 pills and repeat after 12 hours
  - OR **Mifepristone** 10mg stat
- Presumptive treatment for STI

- **Benzathine penicillin**
  - <25 kg: 600 000IU stat,
  - 25 – 35 kg: 1,200,000 IU stat;
  - adults: 2,400,000 IU stat IM
- **Gentamycin** 6mg/kg or 240 mg IM Stat
- **Metronidazole** 2g Stat or 5mg/kg every 8hrs for 7 days
- **Doxycycline** 100 mg 12 hourly for 7 days
  - If pregnant or breastfeeding give **Erythromycin**
  - If <8 years' **Erythromycin** 12.5 mg/kg 6 hourly for 7 days

- **If HIV negative** and within 72 hours
  - Provide PEP (tenofovir/ lamivudine)
  - PEP (tenofovir/ lamivudine/ dolutegravir) for children
- Provide counselling on post-traumatic stress to victims and guardian
- Assess safety for victims
- Refer to other support services such as social worker, victim support unit in the police
- Provide date for follow up
- **If pregnant**
  - Conduct an obstetric scan for dating
  - Book antenatal care

12.12 SEXUALLY TRANSMITTED INFECTIONS (STIS)

CLINICAL DESCRIPTION

Refer to the Management of Sexually Transmitted Infections using Syndromic Management Approach**,** Guidelines for Service Providers

All patients who present with STI symptoms should be offered HIV Testing and Counselling.

NB: Women with abnormal vaginal discharge or symptoms of an STI **MUST HAVE A VAGINAL SPECULUM EXAMINATION AS PART OF THEIR EVALUATION TO EXCLUDE CERVICAL CANCER!!**

Note: Prompt and effective treatment of STIs helps prevent spread of HIV infection

General Management:

- Ensure adequate privacy in patient management.
- Establish a correct diagnosis whenever possible. This involves doing blood tests and obtaining tissue samples for laboratory analysis to identify the specific causative agent and institute specific treatment (in the hospital setting).
- Make efforts to trace, treat and counsel all sexual contacts.
- Provide health education and counselling on each return visit.

- Advice on 'safer sex' practices to prevent re- infection, i.e., abstinence, correct use and storage of condoms, mutual faithfulness of uninfected partners, decrease in number of sexual partners, use of non-penetrative sexual techniques and the importance of partner notification and treatment.
- Offer a supply of condoms at each patient's visit.

Note: Periodically check the patient's understanding of the above issues by asking him/her to repeat the information give

Syndromic management of STIs

The syndromic approach is based on the fact that most common causes of an STI generally present with certain groups of signs and symptoms (syndrome) and treatment given is supposed to target the commonest possible causes of that syndrome. It should be noted, however, that these signs and symptoms only point to certain diagnoses. The caregiver should ALWAYS seek to establish the definitive diagnosis whenever possible as stated above. This may necessitate a speculum examination.

Common STI syndromes:

- Genital ulcer disease (GUD)
- Urethral discharge (UD)
- Genito-urinary symptoms in women (GUS)
- Lower abdominal pain (women) (LAP)
- Enlarged inguinal lymph nodes (bubo)
- Balanitis/balanoposthitis

12.12.1 GENITAL ULCER DISEASE (GUD)

Common Causes: Genital herpes, Chancroid and Syphilis may be present concurrently. Genital herpes is the most prevalent amongst the three. Treat patients with GUD for the above three infections

GENERAL MANAGEMENT TREATMENT

- Give **Ciprofloxacin 500**mg PO stat for 3 days and
- Give **Benzathine penicillin** 2.4 MU IM stat
- Give **Acyclovir 400mg** 8 hourly for 7 - 10 days
- Tell patient to return for follow-up care in 7-10 days, *see below*

*Note: Acyclovir is indicated only in symptomatic GUD clients. If genital herpes infection is suspected and this is the first episode, treat with **Acyclovir** for 7-10 days. If it is a recurrent genital herpes infection, lower the dose frequency to twice a day and treat for a shorter duration – 3 days.*

Offer analgesia if indicated, particularly in GUD with pain.

If patient allergic to penicillin/Ciprofloxacin and pregnant or lactating:

- Give **Erythromycin** 500mg 6 hourly for 15 days plus
- Give **Acyclovir** 400 mg 6 hourly for 7 – 10 days

Infants born to mothers treated for GUD with **Erythromycin** alone:

- Give **Benzathine Penicillin** 500,000 IU/kg as a single dose

Follow-up care of GUD

- Inform the patient to return 7-10 days after starting treatment.
- *If the ulcers have not healed or are getting worse*, repeat GUD treatment if there is evidence of noncompliance.
- If the client complied fully and there is no improvement:
  - Give **Azithromycin** 2g stat.
  - Review in further 7-10 days
  - If no improvement after 14 days, **refer for specialist opinion (patient may need a tissue biopsy)**
  - If improved, follow patient's progress until completely healed
  - No further antibiotics are required at this time
- If the ulcers have improved but not completely healed:
  - Repeat chancroid treatment **Ciprofloxacin** 500mg single dose
  - Review in further 7-10 days
  - Subsequent action as above
- If the ulcers have completely healed:
  - Reinforce counselling and patient education
  - Promote/provide condom

12.12.2 ABNORMAL VAGINAL DISCHARGE (AVD)

- *Causes:* Vaginal infection, cervical infection, endometrial infection/pelvic inflammatory disease (PID)
- *Common causes of vaginal infections:* Trichomonas vaginalis, candida albicans and bacterial vaginosis.
- *Common Causes of cervical infections:* Neisseria gonorrhoeae and chlamydia trachomatis.

Note: *Vaginal discharge is normal during and after sexual activity; at various points throughout the menstrual period; and during pregnancy and lactation.*

Note*: it is mandatory to perform a pelvic examination which includes a speculum examination for all women presenting with abnormal vaginal discharge.*

GENERAL MANAGEMENT

- Do risk assessment to identify women at risk of cervical infection
- Treat all women with vaginal discharge and a positive risk assessment for *gonococcus* and *Chlamydia infection*, plus *trichomoniasis* and
    - If the discharge is white and curd-like also treat for *candidiasis*.
- Treat all women with vaginal discharge and a negative risk assessment for *trichomoniasis* and *bacterial vaginosis*
    - If the discharge is white and curd-like, also treat for *candidiasis*.

TREATMENT

If vaginal discharge is present and the risk assessment is positive:

- Give **Gentamycin** 240mg IM stat plus
- Give **Doxycycline** 100mg 12 hourly for 7 days, *plus*
- Give **Metronidazole** 2g orally single dose

If the discharge is white or curd-like add 1 **Clotrimazole pessary** 500mg inserted intravaginally stat

If vaginal discharge is present and risk assessment is negative: Give **Metronidazole** 2g orally single dose stat ONLY

If the discharge is white or curd-like add **1 Clotrimazole pessary** 500mg inserted intravaginally stat

If no discharge is found and risk assessment is positive:

- Give **Gentamycin** 240mg IM stat plus
- Give **Doxycycline** 100mg 12 hourly for 7 days

If no discharge is found and risk assessment is negative:

- Reassure client, counsel, educate and provide condoms.
- Advise client to come back if symptoms persist.
- Offer HIV testing after providing information and counselling
- Offer cervical cancer screening

Note: Examination of GUS in women should never be omitted only for convenience of the health worker.

12.12.3 LOWER ABDOMINAL PAIN IN WOMEN (LAP)

It may be a serious condition

Notes:

- Not every woman with lower abdominal pain has PID.
- Be sure to exclude any conditions which require immediate surgical or gynaecological treatment

Associated Signs and symptoms

- Fever, abnormal vaginal discharge, cervical motion tenderness, and often adnexal tenderness or masses on bimanual examination.
- Signs and symptoms of acute illness requiring immediate gynaecological/surgical attention
    - Missed or overdue or delayed period; delivery or miscarriage; abnormal uterine bleeding; abdominal guarding or rebound tenderness; active vaginal bleeding.

GENERAL MANAGEMENT

If the patient has a missed/overdue period or abnormal vaginal bleeding:

Check vital signs

- Do a urine pregnancy test
- Offer analgesia
- Consider admission and/or referral if necessary

When referring, ensure patient's general condition is stable

- If the patient is very ill, bleeding heavily or in shock:
    - Set up an IV drip and commence resuscitation
- If the patient does not have missed/overdue period or abnormal vaginal bleeding but does have any of the following:
    - Recent delivery; Recent/suspected miscarriage; Rebound tenderness; Abdominal guarding
        - If at the health centre Give first dose of treatment for PID.
        - Refer immediately for hospital admission after resuscitating the patient should this be required.

- *Treatment if at the hospital, Admit if the patient:* is obviously sick; is pregnant; vomits oral medication or if adequate follow-up care cannot be provided.

If the patient does not have missed/overdue period or abnormal vaginal bleeding and does not have any of the signs/symptoms listed above but does have cervical excitation tenderness or fever:

- Give **Gentamycin** 240mg IM stat,
- Give **Doxycycline** 100mg 12 hourly and
- Give **Metronidazole** 400mg 8 hourly for 10 days.
- Remove IUCD if any and offer other means of contraception
- Treat partner for gonococcal and chlamydial infection as described above
- Review patient after 72 hours:
  - *If improved*, complete 10-day course of treatment for PID
  - *If not improved*, refer for gynaecological or surgical consultation
  - *If the patient does not have missed/overdue period or abnormal vaginal bleeding and does not have any of the signs/symptoms listed above, and does not have cervical motion tenderness or fever:*
  - Determine whether the patient has any other genitourinary complaint/syndrome and manage as per appropriate syndrome:
  - Ask her to return if the abdominal pain persists

12.12.4 PELVIC INFLAMMATORY DISEASES (PID)

Signs and symptoms: A triad of lower abdominal pain, abnormal vital signs (particularly fever and tachycardia) and peritonism (guarding or rebound tenderness with cervical motion and adnexal tenderness)

Patients additionally have positive risk screen and abnormal vaginal discharge

Other additional factors are

- Failure to respond to syndromic treatment regime within 72 hours
- Presence of tender pelvic mass which may be an abscess or an ectopic pregnancy
- History or suspicion of recent induced abortion, delivery or miscarriage
- Active vaginal bleeding
- Missed, overdue or delayed period
- Pregnancy
- Heavy menstrual bleeding
- Vomiting

Note: The patient should be admitted

TREATMENT

- If deranged vital signs, dehydration etc:
  - Give IV fluids
  - Offer analgesia
  - Parenteral antibiotics.
    - 1st line
      - ✓ **Ceftriaxone** 2g IV daily
      - ✓ **Metronidazole** 500mg IV 8 hourly
    - Alternatively
      - ✓ **Gentamicin** 240mg IV daily
      - ✓ **Metronidazole** 500mg IV 8 hourly
      - ✓ **Ampicillin** 1g IV 8 hourly
- When improved and able to swallow switch to oral antibiotics:
  - **Doxycycline** 100mg 12 hourly and
  - **Metronidazole** 400mg 8 hourly for 10 days
  - Analgesic
- If pain is severe:
  - Give **Pethidine** 100 mg IM then PRN

Notes:

- Post abortal sepsis and puerperal sepsis may present as acute PID. If these are recognized, the following must be done:
- Admit and treat with parenteral antibiotic therapy.
- If retained products of conception suspected, *evacuate the uterus* within 12 hours of antibiotic therapy regardless of the patient's temperature
- Provide supportive care such as blood transfusion, iv fluids and closely monitor vital signs.

12.12.5 ENLARGED INGUINAL NODES (BUBO)

- Both chancroid and lymphogranuloma venereum (LGV) can cause bubo.
- Exclude the following conditions which may also cause enlarged inguinal lymph nodes: septic skin lesions on thigh, foot, leg, toes, buttock, anus, perineum, scrotum, penis, labia, vulva and vagina, systemic infections. e.g., Hepatitis B, HIV, infectious mononucleosis, syphilis, TB, bubonic plague, cat scratch fever, trypanosomiasis, lymphoma, leukemia, Kaposi's sarcoma.
- Exclude other conditions which may cause groin swelling unrelated to enlarged lymph nodes including inguinal hernia, lipoma, a boil in overlying skin.
- Confirm presence of bubo by careful examination

Note: All patients with bubo should be carefully examined for signs of other STIs

TREATMENT

- If bubo present and genital ulcer present, treat as for genital ulcer disease
- If bubo present, and painful, fluctuant or recent onset (under 2 weeks) and no genital ulcer present: treat patient and partner for LGV
- Give **Doxycycline** 100mg 12 hourly with food for 14 days. If pregnant/ lactating, give **Erythromycin** 500mg 6 hourly for 14 days
- If bubo fluctuant, aspirate through adjacent normal skin (do not incise)
- If enlarged inguinal lymph node present, but not painful, fluctuant or of recent onset (under 2 weeks) and no genital ulcer present: look for other causes of inguinal swelling:
    - e.g., generalized lymphadenopathy (rule out secondary syphilis and HIV), hernia, tumour.
- Refer for biopsy if indicated
- *If bubo not present but other signs of STI found,* treat accordingly
- *If bubo not present and other signs of STI not found*, reassure, educate/counsel the patient
- Promote/provide condoms

CHAPTER 13: OPHTHALMIC CONDITIONS

13.1 CONJUNCTIVITIS

13.1.1 ALLERGIC CONJUNCTIVITIS

CLINICAL DESCRIPTION

Condition characterised by conjunctival inflammation caused by airborne allergens.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Itchy eyes, Excessive tearing, Watery/non-purulent discharge, Burning/foreign body sensation, Conjunctival hyperaemia (redness/pink eye)
- Eyelid oedema
- Conjunctival papillae ranging from small to large or 'cobblestone' on the tarsal conjunctiva (seen on everting eyelid) depending on severity of condition. Usually bilateral, but one eye can be affected more than the other. Associated with other allergic conditions such as allergic rhinitis, asthma.
- A positive family history of atopic disease may be present

TREATMENT

- Avoid triggers/allergens when identified. Patients should not rub their eyes

Mild disease:

- Cool compresses over the eyelids to reduce oedema
- **Artificial tears, Hypromellose or Viscotears** 6hourly or 8 hourly

Moderate disease

- Mast cell stabilizers e.g., **Sodium Cromoglycate** eye drops 6 hourly
- Antihistamines e.g., Olopatadine eye drops

Severe Disease

- Treat as moderate disease with a short course of low potent steroid eye drops such as **Fluorometholone** eye drops 0.1% EVERY 8HRS, otherwise **Dexamethasone eye** drops 0.1% 8 hourly may be used

Topical steroids should only be used for a maximum of 2 weeks

13.1.2 BACTERIAL CONJUNCTIVITIS

CLINICAL DESCRIPTION

An acute conjunctivitis that develops secondary to a bacterial infection

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Pinkness or redness of the eye
- Burning, itching
  - A sensation of grittiness or mild pain or discomfort in the eye.
  - Thick, sticky discharge from the eye and swollen eye lids.
  - It is usually bilateral but may be unilateral.

TREATMENT

- Eyelids to be cleaned of discharge before using topical antibiotics.
- Eye drops options include:
  - **Chloramphenicol** 0.5%,
  - **Ciprofloxacin** 0.3%,
  - **Ofloxacin** 0.3%
  - **Moxifloxacin** 0.5%

*Note: Eye ointments such as **Chloramphenicol** and **Tetracycline** provide higher concentrations for longer periods than drops but inappropriate for day use because of blurred vision.*

13.1.3 OPHTHALMIA NEONATRUM (ON)

CLINICAL DESCRIPTION

Conjunctivitis developing within the first month after birth because of infection transmitted from mother to infant during delivery.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Chlamydia ON

- Most common. Occurs 5 - 14 days after birth. May be unilateral or bilateral.
- Red eye, watery discharge, lid oedema, pseudo membranes (depending on severity)

- Gonococcal ON
  - Occurs 2 - 7 days after birth. Almost always bilateral.
  - Severe and copious purulent discharge, red eyes, marked lid oedema and chemosis,
- Herpetic ON
  - Occurs 1 - 14 days after birth
  - Periocular vesicles, lid oedema, moderate redness of the eyes.

TREATMENT

- Ophthalmia neonatorum may have both ocular and systemic complications; therefore, it should be treated systemically.
  - Chlamydia ON: **Erythromycin suspension** 50mg/kg/day 6 hourly for 14 days with **Tetracycline eye** ointment every 6hrs
  - Gonococcal ON: **Ceftriaxone** 50mg/kg/24hr (maximum 125mg) IV or IM with tetracycline eye ointment every 6hrs for 2 weeks. Frequent eye irrigation with sterile isotonic saline is recommended as adjunct therapy.
  - Herpetic ON: **Acyclovir** 45-60mg/kg in 3 divided doses for 14 days and topical **Acyclovir** 5 times daily

PROPHYLAXIS

- Given within 24 hours after birth as a single dose.
- Povidone-iodine 2.5% or Tetracycline 1% ointment
- Single dose of **ceftriaxone** 50mg/kg I or IV should be given to infants born to mothers with untreated gonococcal infection.

13.2 KERATITIS

13.2.1 BACTERIAL KERATITIS

CLINICAL DESCRIPTION

Corneal inflammation caused by bacterial infection

Risk factors: Contact lens wear, trauma, ocular surface disease (such as herpetic keratitis, bullous keratopathy, and dry eyes), chronic blepharitis, trichiasis, and exposure keratopathy, severe allergic eye disease and corneal anesthesia). Other factors include topical or systemic immunosuppression such as diabetes, vitamin A deficiency and measles.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Painful red eyes, Photophobia, blurred vision, Mucopurulent or purulent discharge, Circumlimbal injection and corneal opacities ± oedema ± anterior uveitis,
- May complicate with limbal and scleral extensions, corneal perforations and endophthalmitis.

INVESTIGATIONS

- Corneal scrapings (microscopy, culture, sensitivity)

TREATMENT

- Topical antibiotics
  - Initially at hourly intervals day and night for up to 48 hours. Later reduced to 2-hourly during waking hours for a further 48 hours then every 6hrs for 7 days or until the epithelium has healed.
  - Consider using eye ointments eg **Chloramphenicol** eye ointment 1% or **Tetracycline** eye ointment 1%
- Oral antibiotics
  - Give **Ciprofloxacin** 750mg every 12hrs 7-10 days or **Augmentin** 625mg every 12hrs 7-10 days (in threatened or actual corneal perforation or a peripheral ulcer in which there is scleral extension, for isolates for which there are potential systemic complications e.g., *N. Meningitides}.*
- Subconjunctival antibiotics
  - Only indicated if there is poor compliance with topical treatment.
- ***Cycloplegics*** (Atropine 1% gut every 12hrs or Cyclopentolate 1% gut every 8hrs).

- ***Topical steroids*** therapy to reduce corneal scarring **ONLY** after the ulcer has been sterilized and fungal infection has been excluded.
- *RED FLAGS:*
    - Consider using a bandage contact lens in impending or actual corneal perforation
    - Counsel patient and guardians on visual prognosis

13.2.2 VIRAL KERATITIS

CLINICAL DESCRIPTION

Corneal inflammation caused by viral infection

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Painful red eyes, Photophobia, blurred vision, circumlimbal injection and corneal opacities ± oedema ± anterior uveitis,
- Corneal staining in a dendritic pattern, reduced corneal sensitivity

INVESTIGATIONS

Corneal scrapings (microscopy, culture, sensitivity))

TREATMENT

- Treatment of epithelial keratitis
    - Topical **Acyclovir** 3% ointment five times daily.
    - **Acyclovir** 200–400 mg PO five times a day for 5–10 days indicated in immunodeficient patients, children, and patients with marked ocular surface disease.
    - Debridement may be used for dendritic but not geographic ulcers.
    - The majority of dendritic ulcers will eventually heal spontaneously without treatment.
- Treatment of Disciform Keratitis
    - Initially with topical steroids (**Prednisolone** 0.5% eye drops) with **Acyclovir** 5% eye ointment both EVERY 6HRS for 4 weeks, then tapering of both can be done
    - A weak steroid such **Fluorometholone** 0.1% on alternate days maybe used subsequently for several months
- Treatment of Stromal Necrotic Keratitis
    - Lowest effective topical steroid therapy to control inflammation
    - Topical **Acyclovir** 5% eye ointment five times a day

- Oral **Acyclovir** (400mg every 12hrs for a year) to reduce the rate of recurrent epithelial and stromal keratitis. The benefit is greatest in patients with frequent debilitating bilateral disease or if involving an only eye

13.2.3 FUNGAL KERATITIS

CLINICAL DESCRIPTION

Corneal inflammation caused by fungal infection

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Painful red eyes, Photophobia, blurred vision, mucopurulent discharge
- Circumlimbal injection, corneal infiltrates with feathery margins
- May complicate to endophthalmitis (independent hypopyon)

INVESTIGATIONS

Corneal scrapings (microscopy, culture, sensitivity)

TREATMENT

- Epithelial debridement over the lesion enhances penetration of antifungal agents.
- Topical treatment initially hourly for 48 hours and then reducing as signs permit.
- Use topical **Natamycin** 5% gutt or **Econazole** 1% gutt, **Amphotericin B** 0.15%, **Miconazole** gutt 1% or **Voriconazole** 1 or 2% for either filamentous or candida infections.
- Subconjunctival Fluconazole may be used in severe cases with hypopyon.
- Systemic anti-fungals may be required for severe keratitis or endophthalmitis such as **Fluconazole** 200mg twice daily for a week or **Voriconazole** 400 mg twice daily for one day then 200 mg twice daily, **Itraconazole** 200 mg once daily, reduced to 100 mg once daily.
- Cycloplegics (**Atropine** 1% gutt every 12hrs or **Cyclopentolate** 1% gutt EVERY 8HRS.
- **Ciprofloxacin eye drops** 0.3% EVERY 6HRS should also be used as bacterial co-infection is common

13.3 IMMUNE-MEDIATED UVEITIS

CLINICAL DESCRIPTION

Inflammation of the uvea. Usually associated with systemic disease: arthritis,

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Redness, Photophobia/tearing, Blurred vision/floaters, Circumlimbal injection, flare, cells in anterior chamber, posterior synechiae

INVESTIGATIONS

- FBC, ESR/CRPVDRL/RPR, HIV, serum ACE
- Imaging: Chest xray/CT chest

TREATMENT

- Treatment of immune-mediated uveitis involves predominantly the use of anti-inflammatory and immunosuppressive agents.
- Mydriatics
  - **Tropicamide** (0.5% and 1%),
  - **Cyclopentolate** (0.5% and 1%),
  - **Phenylephrine** (2.5% and 10%)
  - **Atropine** 0.5% to 1%
- Steroids
  - Topical steroids useful only for anterior uveitis because therapeutic levels are not reached behind the lens.
  - Periocular steroids
  - Therapeutic concentrations maybe achieved behind the lens e.g. **Triamcinolone Acetonide** (Kenalog) and depot steroids such as **Methylprednisolone Acetate** (Depomedrone).
  - Intraocular steroids
    - Intravitreal injection of **Triamcinolone Acetonide** (4mg in 0.1ml) or Slow-release steroid implant (**Flucinolone Acetonide**) via pars plana. Useful in patients with posterior uveitis.
  - Systemic steroids
    - Give oral **Prednisolone** 1mg/kg
    - Intravenous injection of **Methylprednisolone** 1g/day for 3 days. Antimetabolites

- **Azathioprine** 1mg/kg/day once a day or in 2 divided doses. Double dose after 1-2 weeks. For Sight- threatening uveitis and as a steroid-sparing therapy in patients with intolerable side effects from systemic steroids
- **Methotrexate** 10-15mg/week (children can be given 30mg/week) as a steroid-sparing agent in patients with uveitis associated with Sarcoidosis. **Folic Acid** 2.5-5.0mg/day is co-administered to reduce bone marrow toxicity.
    - Patients must refrain from alcohol.
- **Mycophenolate Mofetil** 1g every 12hrs which may be increased to 4g daily. A good alternative to azathioprine in unresponsive or intolerant patients.
    - Contraindicated in children. Monitoring involves a weekly full blood count for 4 weeks and then monthly.

13.4 CYTOMEGALOVIRUS (CMV) RETINITIS

CLINICAL DESCRIPTION

Affects up to 40% of people with AIDS with CD4 count ≤50 cells/mm^3. In patients already on HAART, consider drug failure or non-compliance. Uncommonly occurs in the absence of AIDS i.e., from relative immunosuppression from systemic corticosteroid use, chemotherapeutics etc.

TREATMENT

- Systemic treatment
    - HAART: to regain CD4 count >50/mm^3 which is an effective prophylaxis against CMV retinitis
- Anti CMV therapy
    - **Ganciclovir** 5mg/kg IV EVERY 12HRS for 2-3 weeks, then 5mg/kg od during the induction phase. Oral **Ganciclovir** 300-450mg daily for prophylaxis and maintenance may be given when retinitis is stable until CD4 count is more than 100-1S0 cells/µl. Ganciclovir is marrow toxic and hence the need for regular FBC checks.
    - **Foscarnet** 90mg/kg every 12hrs for up to 2 weeks for induction and 90-120mg od for maintenance.
        - Foscarnet is nephrotoxic and causes electrolyte imbalances and seizures.
    - Give **Valganciclovir** 900mg every 12hrs in the induction phase for 3 weeks, followed by maintenance therapy of 900mg every day
    - Intravitreal treatment
        - **Ganciclovi**r 2 mg in 0.08ml
        - **Foscarnet** 1.2-2.4 mg
        - Give **Ganciclovir** intraocular implant (for long term treatment)

13.5 ENDOPHTHALMITIS

CLINICAL DESCRIPTION

Endophthalmitis is a purulent inflammation of the intraocular fluids (vitreous and aqueous) usually due to infection.

13.5.1 ENDOGENOUS BACTERIAL ENDOPHTHALMITIS

CLINICAL DESCRIPTION

- Originates from sources within the body

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Decreased vision, pain and tearing, purulent discharge
- Conjunctiva injection, hypopyon, corneal oedema, vitritis, reduced fundus view secondary to vitreous inflammation.

INVESTIGATIONS

- Vitreous tap (microscopy, culture, and sensitivity)

TREATMENT

- The choice of agents is dependent on culture and sensitivity results
- Empirically treat endophthalmitis with systemic antibiotics with **Ceftazidime** 1g 12 hourly and **Vancomycin** 1g every 12hrs for 2-3 weeks
- Isolated endophthalmitis is treated with oral **Ciprofloxacin** 750mg 12 hourly for 7-14 days and intravitreal antibiotics as in postoperative endophthalmitis below.

13.5.2 POSTOPERATIVE BACTERIAL ENDOPHTHALMITIS

CLINICAL DESCRIPTION

Infectious endophthalmitis shortly after ocular surgery (24 – 48 hours)

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Loss of vision, pain and tearing, purulent discharge and lid swelling/oedema

- Conjunctiva injection, hypopyon, corneal edema, vitritis, reduced fundus view secondary to vitreous inflammation

INVESTIGATIONS

Vitreous tap (microscopy, culture, and sensitivity)

TREATMENT

- Intravitreal antibiotics are the key to management.
- Empirical treatment Intravitreal Injections
  - **Vancomycin** (1mg in 0.1ml) and **Ceftazidime** (2.25mg in 0.1ml) OR
  - **Vancomycin** (1mg in 0.1ml and **Amikacin** (O.4mg in 0.1ml) if penicillin allergy
- Periocular Antibiotic Injections
  - **Vancomycin** 2.5 mg in 0.5 ml and Ceftazidime 100 mg in 0.5 ml OR
  - **Vancomycin** 2.5 mg in 0.5 ml and Amikacin 2.5 mg in 0.S ml OR
  - **Vancomycin** 2.5 mg in 0.5 ml and Gentamicin 20 mg in 0.5 mL
- Topical treatment:
  - **Ciprofloxacin/moxifloxacin/ofloxacin** eye drops hourly and atropine eye drops 12 hourly
  - then add **Dexamethasone** eye drops 8 hourly after 2 days
  - Oral steroids: **Prednisolone** po 1-1.5mg/kg
  - Oral Antibiotics (Are of uncertain benefit).
    - Fluoroquinolones e.g., **Ciprofloxacin** 750 mg 12 hourly for 7-10 days
  - Steroids
    - Periocular steroids e.g., **Dexamethasone** 6 mg in 0.25 ml OR **Triamcinolone** 1mg should be considered if systemic steroids are contraindicated

13.6 GLAUCOMA

CLINICAL DESCRIPTION

This is an optic neuropathy with characteristic visual field defects which correspond to the pattern of optic nerve damage.

13.6.1 PRIMARY OPEN ANGLE GLAUCOMA (POAG)

CLINICAL DESCRIPTION

Glaucoma with a normal (open) anterior chamber angle and raised intraocular pressure (IOP)

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Gradual loss of vision, Narrowed field of vision

TREATMENT

- Prostaglandin analogues - the first line treatment (avoid in uveitis)
  - **Travopost** 0.004% (Travatan) every day
  - **Latanoprost** 0.005% (Xalatan) every day
  - **Bimatroprost** 0.03% Lumigan
  - Beta adrenergic antagonists, contraindicated in Asthma
- Selective a-1 antagonists
  - **Betaxolol** 0.5% 12 hourly
- Non-Selective B antagonists
  - **Timolol** 0.5% 12 hourly
- Alpha 2 adrenergic agonists
  - **Brimonidine** 0.2% 8 hourly
- Carbonic anhydrase inhibitors
  - Systemic
    - **Acetazolamide** 125 - 250mg 6 hourly
  - Topical
    - **Brinzolamide** 1% (Azopt)every 12 hourly
    - **Dorzolamide** 2% (Trusopt) every 8 hourly
- Parasympathomimetic (Cholinergics)
  - **Pilocarpine** 2%, 4% 6 hourly gel or drops
- *Surgical Treatment*
  - Trabeculectomy - when maximal medical treatment is suboptimal in IOP control
  - Consider transcleral cyclophotocoagulation in eye with poor visual potential
  - Consider argon laser trabeculoplasty (ALT)/selective laser trabeculoplasty (SLT) if not possible to perform trabeculectomy
    - Minimally Invasive Glaucoma Surgery (MIGS)
    - Shunt devices
- The medical and surgical treatment of POAG is also applicable to pseudo exfoliative glaucoma and pigmentary glaucoma.

13.6.2 PRIMARY ANGLE CLOSURE GLAUCOMA

CLINICAL DESCRIPTION

Glaucoma with a narrowed anterior chamber angle

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Sudden blurry vision, Redness, Headache and eye pain, Nausea, and vomiting
- Very high intraocular pressure

INVESTIGATIONS

TREATMENT

- As for POAG
- **Surgical treatment (definitive treatment)**
  - Bilateral Nd-YAG laser peripheral iridotomy
  - Consider lens extraction and/or trabeculectomy (NB: Risk of aqueous misdirection syndrome)

13.6.3 ACUTE PRIMARY ANGLE CLOSURE GLAUCOMA

CLINICAL DESCRIPTION

Angle closure glaucoma with abrupt onset

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Sudden blurry vision
- Redness
- Abrupt onset of severe eye pain (usually unilateral) and headache
- Nausea and vomiting
- Very high intraocular pressure, fixed or mid-dilated pupil

TREATMENT

- Systemic
  - **Acetazolamide** 500mg IV stat then 250mg PO 6 hourly.
  - If IOP is not improving consider systemic hyperosmotic agent (e.g. mannitol 20% solution IV 1 – 1.5g/kg).
  - Ipsilateral eye:
  - β-blocker (e.g. **timolol** 0.5% stat, then every 12hrs).
  - Sympathomimetic (e.g. **apraclonidine** 1% stat).
  - Steroid (e.g. **prednisolone** 1% stat, then every 30–60min).
  - **Pilocarpine** 2% (once IOP <50mmHg, e.g. twice in first hour, then every 6hrs).
- Admit patient
- **Surgical treatment (definitive management)**
  - Bilateral Nd-YAG laser iridotomy or surgical Peripheral iridectomy.

13.6.4 NEOVASCULAR GLAUCOMA

CLINICAL DESCRIPTION

Secondary glaucoma where anterior chamber angle is closed by "new" blood vessels

CLINICAL FEATURES

SIGNS AND SYMPOMS

- Decreased vision, Headache and eye pain, Photophobia
- Corneal oedema, hyphema, vitreous haemorrhage, high IOP

TREATMENT

- Pan retinal photocoagulation to decrease retinal ischaemic drive.
- Consider intravitreal anti-VEGF therapy (e.g Bevacizumab)
- Reduction of IOP and inflammation
  - Medical
    - Cycloplegic (e.g. **atropine** 1% 12 hourly) + frequent topical steroids (e.g. **prednisolone acetate** 1% 6 hourly) + ocular hypotensive agents as for POAG.
  - Surgical
    - Tube-shunt procedures (eg Ahmed valve)
    - Consider trabeculectomy
    - Cyclodestruction (e.g. cyclodiode) if poor visual prognosis.
  - Pain control

- Cycloplegia (e.g. **atropine** 1% 12 hourly)
- Artificial tears
- If the eye is blind and painful, consider retrobulbar injection of absolute alcohol (96%) or **chlorpromazine** 25mg , or evisceration/enucleation.

13.7 ORBITAL CELLULITIS

CLINICAL DESCRIPTION

This is an ophthalmic emergency. Risk factors include sinus disease, traumatic orbital septal perforation, and post orbital surgery

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- fever, periocular pain, inflamed eye lids, proptosis, restricted and painful extraocular movements, poor visual acuity, RAPD, reduced color vision

INVESTIGATIONS

- FBC, BC, CSF analysis if meningeal or cerebral signs develop
- CT scan of the orbits, paranasal sinuses and brain

TREATMENT

- Hospital admission
- ENT assessment is mandatory.
- Antimicrobial therapy
  - **Ceftazidime** 1g IV 8hourly and **Metronidazole** 500mg IV 8hourly. Therapy should be continued until the patient is apyrexial for 4 days.
- Optic nerve function monitoring
  - Visual acuity, colour vision, pupillary reactions, and light brightness appreciation.
- Surgical intervention should be considered in orbital or subperiosteal abscesses, unresponsiveness to antibiotics and in decreasing vision.

13.8 REFRACTIVE ERRORS

CLINICAL DESCRIPTION

Visual problems that arise from inability to focus light accurately on the retina due to an abnormal length or shape of the eyeball. The diagnosis is established after performing a refraction.

13.8.1 HYPEROPIA (FAR-SIGHTEDNESS)

CLINICAL DESCRIPTION

- Near objects appear blurred

Classification

- Mild hyperopia error of ≤+2.00 D
- Moderate hyperopia error of +2.25 to +5.00 D.
- High hyperopia i.e., ≥+5.00 D.

SIGNS AND SYMPTOMS

- Dull frontal headache, usually felt in the afternoon or after doing near work, blurry vision at near, eye strain, fatigue after a close-up task such as reading and difficulty focusing on nearby objects.

13.8.2 ASTIGMATISM

CLINICAL DESCRIPTION

Imperfection in the curvature of the refractive surfaces of the eye.

CLINICAL DESCRIPTION

SIGNS AND SYMPTOMS

- Blurry vision or areas of distorted vision, eyestrain, headache (usually temporal), squinting to try to see clearly, eye discomfort and diplopia.

13.8.3 MYOPIA (NEAR-SIGHTEDNESS)

CLINICAL DESCRIPTION

Distant objects appear blurred

Classification based on clinical entity

- Simple myopia
- Pathological myopia

CLINICAL DESCRIPTION

SIGNS AND SYMPTOMS

- Eye strain, headache, squinting (eye misalignment) and difficulty with seeing objects far away such as road signs.

13.8.4 PRESBYOPIA

CLINICAL DESCRIPTION

A condition in which the eyes gradually lose the ability to focus on near objects due to age-related sclerosis of the lens.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Blurred vision at normal reading distance, eyestrain, headache associated with doing near work and holding reading material at arm's length.

Diagnosis of refractive errors

- Perform refraction for near and distant vision
- In addition to dry refraction, **ALL** children should have a wet refraction (give **cyclopentolate** eye drops before refraction)

TREATMENT

Management of Refractive errors

- Correct with spectacles. Reading glasses (readers) if presbyopia
- Can prescribe multifocal- bifocals, trifocals or progressive lenses, or contact lenses.

- Consider monovision correction - one eye corrected for near and the other eye for distance in special cases.
- Refractive surgery.

Management/control of myopia progression

- Spectacles and contact lenses
- Consider pharmacological means in children
  - 0.05% **atropine** in children at bedtime 3 to 4 nights a week for a period of 6 Months.
- Behavioral
  - Increase outdoor time and exposure to sunlight.
  - Reduce the time spent doing near work.

13.9 DIABETIC RETINOPATHY (DR)

CLINICAL DESCRIPTION

Microvascular damage to the retina secondary to diabetic hyperglycemia. There are two main classes of the disease:

13.9.1 NPDR (NON-PROLIFERATIVE DIABETIC RETINOPATHY)

CLINICAL DESCRIPTION

This is the early stage of DR characterised by the presence of haemorrhages and microaneurysms on the retina**.** The retinal blood vessels may leak resulting in intraretinal fluid accumulation and leakage of exudates. When this happens in the macula, it is called macular oedema, and this is the most common reason why people with diabetes lose their vision. Retinal microvascular obstruction in the macula may also occur resulting in macular ischemia

13.9.2 PDR (PROLIFERATIVE DIABETIC RETINOPATHY)

CLINICAL DESCRIPTION

PDR is the more advanced stage of diabetic retinopathy characterised by retinal neovascularization i.e., growth of fragile new blood vessels on the retina. The new vessels often bleed into the vitreous and can form fibrous tissue that results in a tractional pull on the retina.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

Symptoms of diabetic retinopathy:

- Changes in vision
  - Blurry vision or intermittent changes from blurry to clear
  - blank or dark areas in the field of vision
  - poor night vision, and
  - faded or washed-out colors
  - visual loss.
- Floaters

TREATMENT

Management of PDR

- Pan retinal photocoagulation with argon laser
- consider Intravitreal Anti Vascular endothelial growth factors (Anti VEGFs) eg Bevacizumab, Ranibizumab, Aflibercept
- Vitrectomy for PDR with tractional retinal detachment

Management of Clinically Significant Macular Oedema

- Focal/grid macular laser
- Intravitreal Anti VEGFs (eg Bevacizumab, Ranibizumab, Aflibercept) once monthly for 4 months or more depending on response

REFERRAL CRITERIA

- Refer to a tertiary facility when fundoscopy shows any of the following:
  - Severe NPDR
    - Presence of hemorrhages in four quadrants of the retina or if there is venous beading in two quadrants or if there are intraretinal microvascular abnormalities in one quadrant of the retina.
  - PDR
    - Presence of features such as new vessels or fibrosis on the retina, vitreous hemorrhage, preretinal hemorrhage or tractional retinal detachment
  - Clinically significant macular oedema (CSMO)
    - retinal thickening at or within 500 µm of the center of the macula.

- hard exudates at or within 500 µm of the center of the macula, if associated with adjacent retinal thickening; or a zone or zones of retinal thickening one disc area in size, at least part of which is within one disc diameter of the center of the macula

13.10 OCULAR MALIGNANCIES

13.10.1 OCULAR SURFACE SQUAMOUS NEOPLASIA (OSSN)

CLINICAL DESCRIPTION

A spectrum of squamous conjunctival neoplasms that range from dysplasia to carcinoma in situ to invasive squamous cell carcinoma of the conjunctiva (SCCC). Associated with increasing age, increase UV light exposure, and immunosuppressive conditions such as HIV/AIDS (especially in relatively young individuals), immunosuppressed organ transplant recipients. If left untreated invasive OSSN may lead to local extension that may lead to extensive ocular and periocular morbidity and may lead to death from intracranial extension and or regional metastasis.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Varies with pattern of growth, size of lesions and duration.
- They include itchiness, foreign body sensation, redness, unsightly conjunctival growth or fungating tumour.
- Maybe flat or raised with increased vascularization and may appear leukoplakic and have a cauliflower appearance surface appearance

INVESTIGATIONS

- HIV (+/- viral load and CD4 count)
- Histology

TREATMENT

Medical Treatment

- Topical **5-Flourouracil** 0.4% 8 hourly for a week followed by a week break; repeat for up to 3 months
- ALWAYS review weekly looking for response and complications – if complications appear **STOP** the medication immediately and treat as appropriate

Surgical Treatment

- Total excision of the lesion with a 2-4 mm free margin
- Extended enucleation or exenteration (total or partial) with or without lid sparing surgery in lesions invading the globe or involving the orbit.

13.11 RETINOBLASTOMA

CLINICAL DESCRIPTION

Intraocular tumour in children. Can be unilateral, bilateral. Trilateral retinoblastoma is when there is also an intracranial neuroblastic tumour. It is Life-threatening

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- This depends on the tumour size, its location on the retina, its growth pattern – endophytic, exophytic or infiltrative and its effect on visual functions.
- The most common are leukocoria (white reflect from the pupil) and exophthalmos (proptosis). Squint (eye misalignment), red eye, poor vision, vitreous haemorrhage, microphthalmos and orbital cellulitis, anterior scleral staphyloma, hyphaemia and buphthalmos were rare presentations.

INVESTIGATIONS

- The main diagnostic criteria are clinical and not histological confirmation before treatment. Enucleation, a standard mode of tissue collection for histopathology assessment is a treatment modality and it is the mainstay treatment modality in Malawi.
- Clinical evaluation
    - ➢ This should include a thorough family history, a complete physical examination which should include visual acuity (to assess macula involvement), the pupillary reflexes and extraocular movements (may point towards trilateral disease) and fundoscopy. Evidence of anterior segment involvement (iris neovascularization, hyphemia, or pseudo hypopyon) have a relative increased risk for metastatic disease.
    - ➢ Assess for local and regional spread as well as other non-ocular tumours
- Imaging studies
    - ➢ Intraocular calcifications in small children are pathognomonic of retinoblastoma.
    - ➢ These may include ultrasonography, X-Rays, CT scan, and MRI. X Rays and CT scan pose risks for secondary tumours from radiation exposures.

TREATMENT

- Multifaceted and demands a multidisciplinary approach.
- The primary objective in treatment is to save life. Secondarily, efforts are made to save the globe and where possible salvage vision.
- Consider the following
    - Counselling the guardians on treatment options and what to expect
    - Screening of family members to establish whether the index patient may have germline or somatic disease.
    - Genetic counseling of the parents, patient (if old enough) and siblings on the possibility of tumor development in future offspring and the need for early and regular ophthalmic examinations.
- Mainstay treatment for Retinoblastoma in Malawi is surgical
    - For patients with presumed intraocular retinoblastoma, start with enucleation
    - Always do an EUA in the other eye – in cases on uniocular retinoblastoma
    - Intraoperatively always measure and document the length of the resected optic nerve, the thickness of the base and resection margin of the nerve, and any evidence of scleral, or extraocular muscle involvement.
    - Always send the eyeball for histological assessment
    - If any evidence of possible extraocular involvement eg tumour cells at the resection margins, consider chemotherapy – see below.
    - For patients presenting with evidence of extraocular involvement (proptosis, orbital cellulitis etc)
    - Consider chemotherapy – Vincristine, Carboplatin and Etoposide, every three week for up to three cycles and consider enucleation after three cycles.
- Follow up of patients
    - This depends on the patient's age
        - For those below 3 years, review (conduct EUAs in the only eye and examine the socket) every three months until they are 3 years old.
        - At 3 years or older, review every six months (do EUAs in the better eye and examine the socket) until the patient is 5 years old.
        - Thereafter review yearly.

13.12 CATARACT

CLINICAL DESCRIPTION

Opacification or clouding of the natural intraocular lens. Associated with advanced age, diabetes mellitus, uveitis, trauma, steroid use, congenital

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Painless, gradual loss of vision at distance or near, Glare, Increasing near-sightedness that quickly reverses, Loss of contrast sensitivity and ability to discern colours Leukocoria or absence of red reflex

INVESTIGATIONS

- RBS

TREATMENT

- Surgical
- Small incision cataract surgery (SICS) with intraocular lens implantation
- Phacoemulsification
- Pre-op care:
  - Dilation: tropicamide +/- phenylephrine
  - Anaesthesia: lignocaine 2% with hyaluronidase given as subtenon, peribulbar or retrobulbar injection
- Post-op care:
  - Analgesic of choice for 5 days, **Neodex** combination eye drops 6 hourly for 3 weeks

  OR
  - **Dexamethasone** eye drops 6 hourly and **Gentamicin** eye drops 6 hourly for 3 weeks
- Complications
  - subluxated/dislocated lens, uveitis, glaucoma, blindness
- Referral criteria to a cataract operating centre
  - Best corrected visual acuity of 6/60 or less
  - Refer ALL children with cataract

13.13 STRABISMUS (SQUINT)

CLINICAL DESCRIPTION

Misalignment of the eyes

- Types
  - Esotropia: eye rotated so that cornea is turned nasally
  - Exotropia: eye rotated so that cornea is turned temporally
  - Hypotropia: eye rotated so that cornea is turned downwards

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Eye strain
- Double vision

INVESTIGATIONS

- Misalignment seen on corneal light reflex and cover tests

TREATMENT

- Depends on the type of strabismus and the underlying cause
  - Non-surgical: refractive error correction or use of prisms
  - Surgical: strabismus surgery
  - amblyopia treatment such as patching, in children
- Complications
  - Amblyopia (in children), double vision
- Referral Criteria
  - Refer ALL cases

13.14 OPHTHALMIC EMERGENCIES

13.14.1 OPEN GLOBE INJURIES

CLINICAL DESCRIPTION

Laceration on the cornea or sclera

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- History of injury (always ascertain the mode of injury), reduction/loss of vision following trauma, bleeding from the eye, severe pain, tearing and sensitivity to light, the feeling that there is something in the eye
- Obvious corneal laceration visible on direct light
- Prolapsed iris can be seen plugging the laceration
- Peaked pupil
- Subconjunctival hemorrhage/hematoma whose posterior limits cannot easily be delineated
- Anterior chamber is flat +/- hyphema
- Eyeball is soft

INVESTIGATIONS

- Examine under topical anesthetic eye drops, gently examine the eye under full aseptic conditions. The laceration will be visible.

TREATMENT

- Management before referral to a treating centre
  - **Tetanus Toxoid** (TTV) 0.5ml IM STAT
  - Place plastic shield on affected eye
  - **Ceftriaxone 2g** IV STAT or **Ciprofloxacin** 500mg PO 12 hourly for 5 days
  - Give analgesic but preferably avoid NSAIDs to prevent worsening the bleeding

COMPLICATIONS

- Retinal detachment
- Endophthalmitis
- Glaucoma
- Traumatic cataract

- Blindness

REFERRAL CRITERIA

- Refer ALL cases to a treating center

13.14.2 CLOSED GLOBE INJURIES

13.14.2.1 TRAUMATIC HYPHEMA

CLINICAL DESCRIPTION

This is blood in the anterior chamber as a result of injury

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- History of injury, usually blunt trauma
- Poor vision
- Blood clots visible in the anterior chamber.

TREATMENT

- If a child, admit in hospital and keep under observation. If left unattended, chances of a re-bleed are high resulting in intraocular pressure elevation and corneal endothelial staining
- If anterior chamber is 1/3 full in an adult, can treat as an outpatient
- If anterior chamber is >⅓ full, admit the patient
- Bed rest and bed should be elevated at 45°
- **Dexamethasone** 0.1% eye drops 6 hourly
- **Cyclopentolate** eye drops 8 hourly for cycloplegia
- **Timolol** 0.5% 12 hourly if IOP is elevated or **acetazolamide (Diamox)** 250mg PO 8 hourly (remember to ask about renal problems and sulphur allergy before giving acetazolamide)
- **Gentamicin** 0.3% eye drops 8 hourly to prevent or treat associated infection
- Analgesic of preference but avoid NSAIDs

COMPLICATIONS

- Corneal endothelial staining
- Glaucoma

REFERRAL CRITERIA

- Full chamber hyphema
- Children with any hyphema
- Hyphema not improving after 4 days

13.14.2.2 RETROBULBAR HAEMORRHAGE OR HAEMATOMA

CLINICAL DESCRIPTION

Bleeding in the retrobulbar space. This may be due to ocular trauma or during retrobulbar injections of drugs or anaesthesia and during sinus surgery. This is rare but sight threatening if not managed urgently

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- History of facial trauma, or periocular interventions
- Proptosis with or without visual impairment
- Severe pain which may be associated with nausea or vomiting

INVESTIGATIONS

- Ultrasonography – visualize the hematoma or active bleeding

TREATMMENT

- Conservative – if mild and minimal risk for vision impairment.
    - Admit patient and raise the head of the bed
    - Digital ocular massage
    - **acetazolamide** 250-500mg PO/IV STAT then maintenance of 250mg 6 hourly for 3 days to reduce IOP OR **mannitol** 1-2g/kg IV over 30-60 mins to reduce the volume of the vitreous
    - **Methylprednisolone** 1g IV STAT for neuroprotection
    - Consider adjusting any antithrombotic agents the patient may be on – always discuss with the physicians looking after the patient
- Surgical
    - Lateral canthotomy and inferior cantholysis

13.14.2.3. CHEMICAL INJURY

CLINICAL DESCRIPTION

For Chemical injury always treat (see below) and ask questions later. Prognostic features of chemical corneal injuries depend on

- The pH - alkalis are more damaging than acids
- Duration of contact
- Corneal involvement
- Limbal involvement
- Associated nonchemical injury such as thermal injury and blunt trauma
- Conjunctival involvement

TREATMENT

- Immediate irrigation with water or 2 litres of normal saline until pH is normalized
- Double evert the upper eye lids and remove any retained particulate matter
- Repeat pH after 20 minutes, if abnormal repeat the irrigation
- Daily pH tests, any derangements may indicate the presence of retained chemical particulates and warrants further irrigations and forniceal inspection

Acute management:

- Use preservative free drugs where possible
- Preservative free topical antibiotics e.g.
    - **Moxifloxacin 0.3**% 6 hourly
- Topical cycloplegia e.g. **Atropine** 1% gutt 12 hourly
- Topical lubricants e.g. **Carmellose** 1 hourly
- Oral analgesia

Severe Chemical Injuries

- Admit
- Give
    - Topical steroids e.g **Prednisolone** 1% 2- 3 hourly for < 10 days -
    - Topical ascorbic acid – **Sodium Ascorbate** 10% 2 hourly for < 10 days
    - **Oral Ascorbic Acid** 1g every 12hrs
    - Systemic **Tetracyclines** 100mg 24 hourly for 3 months
    - **Acetazolamide** 250mg 6 hourly ± **Timolol 0.5**% 12 hourly
- Patients need to be counselled for long term follow up to manage complications

CHAPTER 14: ORAL AND MAXILLOFACIAL CONDITIONS

14.1 CANDIDIASIS/OROPHARYNGEAL

CLINICAL DESCRIPTION

This is an infection of the mouth caused by Candida albicans. It is commonly known as oral thrush. The infection sometimes also affects the pharynx.

The predisposing factors include trauma, denture wearing, dryness of the mouth, inhaled steroids, radiotherapy, diabetes mellitus, antibiotic therapy, age extremes (infant, elderly), HIV/AIDS and immunosuppressants.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Creamy white or yellow plaques on normal mucosa
- Patches on the palatal and buccal mucosa and dorsum of the tongue and gums.
- Removal of plaques reveals bleeding surface.

INVESTIGATIONS

- Periodic Acid Schiff (PAS)
- Potassium Hydroxide Smear (KOH)
- Sabouraud's dextrose agar (SDA)

TREATMENT

PHARMACOLOGICAL TREATMENT

- Give **Nystatin oral suspension** 100,000 IU every 6 hourly for 10-14 days
- **Note**: Oral suspension should be taken after food
- Review after 14 days
- **Paint Gentian Violet aqueous solution** 0.5 % on the lesions 6 hourly for 7 days
- Give **Clotrimazole Troches** 10 mg 8 hourly for 4 weeks (children)

ALTERNATIVELY

- Give **Chlorhexidine** 0.2% mouth rinses 8 hourly (should not be used together with Nystatin)

- If not resolved after 7 days:
- Continue with above treatment and add
- **Ketoconazole** 200-400 mg 12 hourly for 10-14 days
- Children: 1-4 years: Give **Ketaconazole** 50 mg 12 hourly for 10 - 14 days
- Children: 5-12 years: Give **Ketaconazole** 100 mg 12 hourly for 10 -14 days

Note:

- **Ketoconazole** interacts with the following ARVs: **Nevirapine, protease inhibitors and Didanosine**

Alternatively

- Give **Fluconazole** 6 mg/kg on day 1 (200 mg), then 3 mg/kg (100 mg) once a day for 14 days

For extensive candidiasis, give **Amphotericin B** 50 mg (5 ml every 8 hours per day) or 0.5 – 0.7 mg/kg/day for 5- 7 days

PROPHYLAXIS:

Adults

- Give **Fluconazole** 100 mg daily for long term

Children

- Give **Fluconazole 3-6 mg/kg** daily for long term

14.2 CARIES, TOOTHACHE

CLINICAL DESCRIPTION

Acute or chronic inflammation of the pulp. Can be suppurative and could lead to necrotic pulp.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Throbbing continuous or intermittent toothache which is worse at night. Sometimes the pain is aggravated by hot or cold drinks. It is usually due to dental caries or trauma.

INVESTIGATIONS

- X–ray: Intraoral (PA, bite wing)
- Pulp testing.

TREATMENT

Depends upon the extent of caries and clinical judgment:

- If minimal and confined to the enamel, apply topical Fluoride
- If in enamel and dentine but not involving the pulp, do a Filling
- If involving the pulp and there is periapical infection and/ or pulp inflammation do Root Canal Therapy
- If severe, do tooth extraction followed by

Analgesics e.g., **Paracetamol** 1 gm 8 hourly for 3 days or in severe cases give

- **Ibuprofen** 200 - 400 mg 8 hourly for 3 days or **diclofenac** 50 – 100 mg 8 hourly for 3 days
- When associated with abscess give **Amoxycillin** 250 - 500 mg 8 hourly for 5 days and **Metronidazole** 200 - 400 mg 8 hourly for 5 days

Note:

- •Antibiotics are not indicated unless there is infection
- •Reinforce oral hygiene practices including use of fluoridated toothpaste to all patients

14.3 DENTAL ABSCESS

CLINICAL DESCRIPTION

A fluctuant swelling found in relation to or around a carious tooth caused by spread of infection following the death of the pulp.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Tenderness of the tooth when tapped. Painful swelling which is either localized or sometimes spreads to other adjacent tissues. It is found on the apical region of the tooth and could be with or without sinus. There is tenderness, headache and patient may be febrile. The abscess could be pointing or discharging.

INVESTIGATIONS

- • X–ray (intra–oral)

TREATMENT

NON-PHARMACOLOGICAL

- Consider incision and drainage

PHARMACOLOGICAL

- Give **Amoxycillin** 250 mg - 500 mg 8 hourly for 7 days And Give **Metronidazole** 200 mg - 400 mg (Children:7.5 mg/kg/dose) 8 hourly for 7 days or
- Give **Benzyl Penicillin** 1-2 MU (Children: 25,000 units/kg/dose) IM or IV 6 hourly for 7 days and
- Give **Metronidazole** 250 mg - 500 mg IV 8 hourly for 7 days
- Give **Aspirin** 300mg - 600 mg 8 hourly
- If abscess persists after 2 weeks, do culture and sensitivity
- Remove source of infection:
  - Extraction of infected tooth
  - Root canal therapy /Apicectomy

ALTERNATIVELY

- Give **Erythromycin** 250 mg - 500 mg 6 hourly for 7 days (if allergic to penicillin) and
- Give **Paracetamol** 1 g 8 hourly for adults, Children give **Paracetamol** 250mg 8 hourly
- Give **Ibuprofen** 400 mg 8 hourly for adults (if Paracetamol is ineffective)
  - Children give **Ibuprofen** 200 mg 8 hourly (if Paracetamol is ineffective)
- Oral hygiene measures e.g., warm saline washes, povidone iodine washes

Note: For moderate to severe pain, refer to pain management ladder

ADMIT IF

- Patient is febrile, dehydrated, and weak
- Severe trismus present
- Severe swelling is present:
- give injectable antibiotics, preferably **Crystalline penicillin** 2-4 million units 6 hourly for 5 days combined with iv **Metronidazole** 500 mg and If abscess persists after 2 weeks, do culture and sensitivity

14.4 GINGIVITIS

CLINICAL DESCRIPTION

Acute or chronic inflammation of the gums caused by infection from the accumulation of bacteria plaque around the necks of the teeth.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Gum is red and swollen or puffy. Bleeds easily when touched. Diagnosis is mainly clinical.

TREATMENT

NON – PHARMACOLOGICAL

- Reinforce oral hygiene practices, i.e., tooth brushing at least twice a day to remove plaque; in the morning after breakfast and in the evening before going to beds
- Conventional therapy: scaling and cleaning to remove all tooth surface adherents

PHARMACOLOGICAL TREATMENT

- Advice on saline mouth washes or other antiseptic mouth washes twice a day until symptoms resolve
- Antibiotics are not indicated unless one has Acute Necrotizing Ulcerative Gingivitis **(ANUG)**
- **(ANUG)** or Linear Gingival Erythema (LGE)

14.5 PERIODONTAL ABSCESS

CLINICAL DESCRIPTION

The clinical presentation arises as a complication of inflammation of the dental pulp or periodontal pocket. The condition may be acute and diffuse or chronic with fistula or localized and circumscribed. It is in the apical aspect of the supporting bone.

CLINICAL FEATURES

SIGNS SYMPTOMS

- Toothache, Pain during intake of hot or cold foods/drinks, Pain on bringing the tooth on occlusion, Tenderness on percussion (vertical percussion)
- Swelling of gingiva around the affected tooth

TREATMENT

For posterior teeth: Extraction of the offending tooth under local anesthesia

- **Lignocaine** 2% with **Adrenaline** 1:80,000 IU (to establish drainage) is the treatment of choice followed by analgesics
  - Adult: **Paracetamol** 500 mg – 1g 8 hourly or 6 hourly for 3 days,
  - Child: **Paracetamol** 10 -15 mg/kg 8 hourly or 6 hourly for 3 days.

For anterior teeth (incisors, canine and premolars: Extraction is carried out only where root canal treatment is not possible. Give antibiotics: *Adult*

- **Amoxicillin** 500 mg 8 hourly for 5-7 days.

CHILDREN

- **Amoxicillin** 25 mg/kg in 8 hourly doses for 5 days.

PLUS

- **Metronidazole** 400 mg 8 hourly for 5-7 days
- *Children 7-10 years*, 200 mg 8 hourly

14.6 PERIODONTITIS

CLINICAL DESCRIPTION

This is the progression of the inflammation of gingivitis into the deep tissue affecting the periodontal membrane causing periodontal pockets, introduction of infection and destruction of periodontium. Can be acute or chronic inflammation of gums and periodontium (tooth attachment).

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Reddened, swollen gingiva
- Easily bleeding gingival on gently probing
- Loose/mobile teeth
- Bad breath from the mouth
- Gingival recession
- Periodontal pocket

INVESTIGATIONS

- Mainly X-ray (orthopantomogram (**OPG**)) to determine extent of bone loss

TREATMENT

NON-PHARMACOLOGICAL TREATMENT

- Reinforce oral hygiene practices

PHARMACOLOGICAL TREATMENT

- Root planning +/- antibacterial irrigant
- Antibiotics are not indicated unless the following exists:
    - Necrotizing ulcerative Periodontitis (NUP)
    - Exudate discharging from the periodontal pockets
    - Patient is non-responsive to conventional therapy
    - Juvenile Periodontitis
    - Aggressive Periodontitis

Note: Advise on saline mouthwashes or other antiseptic mouth washers twice a day until symptoms resolve

14.7 ODONTOGENIC AND MAXILLOFACIAL INFECTIONS

14.7.1 CELLULITIS AND ALL DEEP SPACE INFECTIONS

CLINICAL DESCRIPTION

In this category the most important is Ludwig's angina. This is an inflammation of floor of the mouth and other related structures − This is a life−threatening condition, starts as a

unilateral swelling of soft tissues around lower mandible usually arising from the lower second or third molars. The infection spreads to other tissues crossing the midline and becomes bilateral swelling.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Patients presents with rapid progressive swelling, difficulty in breathing, elevated tongue, drooling, difficulty in swallowing (dysphagia), bilateral facial space involvement, elevated temperature, severe jaw trismus (<10 mm), toxic appearance, compromised host defense, patient is dehydrated, weak and febrile.

INVESTIGATIONS

- FBC
- Culture and sensitivity
- Skull views

TREATMENT

NON – PHARMACOLOGICAL

- Admit patient
- Assess the patient for vital signs
- Ensure airway patency
- Removal of the cause
- Extraction of the offending tooth or
- Treat the tooth endodontically with root canal therapy
- Sequestrectomy (removal of necrotic bone)
- Keep patient hydrated (2-3L Fluids/24 hours for maintenance)
- Encourage high-calorie food intake

PHARMACOLOGICAL

- Give analgesics for pain relief
- Prescribe appropriate antibiotics for rapidly progressive swelling as follows:
  - Give **Amoxycillin** 250 mg - 500 mg 8 hourly for 7days or **Benzylpenicillin** 0.5-

2.0 MU IM or IV 6 hourly for 7days plus

- Give **Metronidazole** 200 mg - 400 mg 8 hourly or 7days or **Metronidazole** 250 mg-500 mg IV 8 hourly for 7 days
- If patient is allergic to penicillin
- Give **Erythromycin** 250 mg - 500 mg 8 hourly (after food) for 7 days or
- Give **Clindamycin** 150 mg - 300 mg (plus Metronidazole as above)
- If severe difficulty in breathing perform tracheostomy
    - If the condition persists after a long time of first line antibiotic, give **Ceftriaxone** 2g od for 5 days

Note: Antibiotics are indicated for diffuse swelling, compromised host defenses, involvement of fascial spaces, severe pericoronitis, osteomyelitis

At Health Centre level refer the patient to a district hospital

14.7.2 SALIVARY GLAND DISEASE

14.7.2.1 RETENTION CYSTS, THYROGLOSSAL DUCT CYSTS, BRACHIAL CLEFT CYSTS, ENLARGEMENTS, RANULAS ETC.

CLINICAL DESCRIPTION

A cyst is an enclosed sac formed by the cluster of cells which group together

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Tooth sensitivity, swelling, tooth displacement, unexplained tooth mobility, numbness, or tenderness

INVESTIGATIONS

- Skull views (PA, LO, TL, OPG)
- Occlusal views
- Ultrasound scan
- CT scan or MRI

TREATMENT

- Surgical procedure (if indicated)
- Give **Ciprofloxacin** 250 - 500 mg 12 hourly for at least 5 days plus
- Give **Metronidazole** 200 - 400 mg 8 hourly for at least 5 days if there is infection

14.7.3 MUMPS (EPIDEMIC PAROTITIS)

CLINICAL DESCRIPTION

Mumps is a contagious disease caused by a filterable virus. The parotid glands are the salivary glands most involved with mumps, but the sublingual and submandibular glands may also be affected. In 75-80% of cases both glands are involved.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Swelling of the involved gland, Redness and slight swelling of the duct opening, Displacement of the auricle, the secretions are not purulent. Sometimes there is fever

INVESTIGATIONS

- FBC
- Diagnosis is clinical

TREATMENT

OBJECTIVES

- Relieve symptoms

NON-PHARMACOLOGIC:

- Massage the gland

PHARMACOLOGIC

- **Paracetamol**
- Children 30 - 40 mg/kg/24 hr. divided into 4 – 6 doses
- Adults 1g PO 8 hourly or PRN

ALTERNATIVES

- **Tramadol** 100 mg PO 8 hourly. PRN for adults.
- **ADRs:** dependence, abdominal pain, anorexia, central nervous, stimulation, vertigo, skin rashes, sweating and vomiting. C/Is: Respiratory depression, in the presence of acute alcoholism, head injury, during pregnancy and lactation
- **N.B.** Not recommended for children below 12 years of age

14.7.4 ACUTE AND NON-CHRONIC NONOBSTRUCTIVE SUPPURATIVE SIALADENITIS

CLINICAL DESCRIPTION

Acute bacterial infection of the salivary glands usually involves the paratoid glands. This condition is usually seen in debilitating patients. The usual causative organism is Staphylococcus aureus.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

Pain and swelling of the involved gland

- Purulent secretions can be expressed from the orifice of the duct
- Fever

INVESTIGATIONS

- Sialography shows a tree in leaf appearance

FBC

- Tissue should be taken for histology in doubtful cases

TREATMENT

NON-PHARMACOLOGIC

- Bed rest
- Restricted jaw movement

PHARMACOLOGIC

- **Clindamycin** 150 to 300 mg PO 6 hourly or 300 mg IM or IV 6 hourly
- In severe infections 20 mg/kg/24hr. IM or IV into 4 doses

ALTERNATIVELY

- **Cloxacillin** 500 mg PO 12 hourly for 7 – 10 days

OR

- **Cephalexin**: Adults 50 mg to 1 gm 6 hourly PO for 7-10 days

- Children 6 to 12 mg/kg PO 6 hourly. Maximum 25 mg/kg 6 hourly

14.7.5 TRIGEMINAL AND GLOSSOPHARYNGEAL NEURALGIA

CLINICAL DESCRIPTION

Trigeminal neuralgia (TN), also called tic douloureux, is a chronic pain condition that affects the trigeminal or 5th cranial nerve, one of the most widely distributed nerves in the head. The intensity of pain can be physically and mentally incapacitating.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Unilateral pain with a trigger zone

INVESTIGATIONS

- CT Scan or MRI

TREATMENT

PHARMACOLOGICAL TREATMENT

- Give **Carbamazepine** 100 mg 12 hourly for a month then review
- Give **Phenytoin** 300 mg -500 mg 12 hourly per day, can be administered by IV
- for severe TN pain
- Give **Gabapentin** 300 mg 8 hourly Give **Baclofen** 5 mg 12 hourly or 8 hourly a day which can be increased
    - Usual effective dose is 50-60 mg per day
    - Can be used alone or in combination with Carbamazepine

Note: If trigeminal neuralgia persists after 2 months refer to neurosurgery

14.7.6 LOCAL ANAESTHESIA TOXICITY IN DENTAL SURGERY

CLINICAL DESCRIPTION

Local anesthetic systemic toxicity (LAST) is a life-threatening adverse event that may occur after the administration of local anesthetic drugs through a variety of routes. While generally safe, local anesthetic agents can be toxic if administered inappropriately, and in some cases may cause unintended reactions even when properly administered**.**

14.7.6.1 MILD LOCAL ANAESTHETIC TOXICITY

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Talkativeness, anxiety, slurred speech, confusion, Nausea, vomiting, Constriction of pupils (miosis), Drowsiness, lethargy, sedation, unconsciousness, coma.

TREATMENT

- Stop administration of local anesthetic
- Monitor vital signs
- Observe for 1-hour

14.7.6.2 MODERATE LOCAL ANAESTHETIC TOXICITY

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Stuttering speech, nystagmus, tremors, headache, dizziness, blurred vision, drowsiness

TREATMENT

- Place in supine position
- Monitor vital signs
- Administer oxygen
- Observe for 1-hour

14.7.6. 3 SEVERE LOCAL ANAESTHETIC TOXICITY:

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Seizure, cardiac dysrhythmia, or cardiac arrest

TREATMENT

NON – PHARMACOLOGICAL

- Place in supine position
- If seizures, protect from nearby objects,
- Suction oral cavity if vomiting occurs
- Transport to emergency care facility / intensive care unit
- Notify EMS/ Summon for medical assistance
- Monitor vital signs
    - If at any time the patient becomes unresponsive, no normal breathing, and no palpable pulse consider the diagnosis of cardiac arrest
    - Immediate CPR and defibrillation congruent with current recommendations

PHARMACOLOGICAL

- Administer **Oxygen** 4 to 6 L/min by nasal cannula
- Give **Diazepam** 5-10 mg IV slowly as stat dose

14.8 MOUTH ULCERS (SORES)

CLINICAL DESCRIPTION

This is a condition in which there is damage to the mucosal lining of the mouth, including the tongue. These are similar to ulcers due to the herpes simplex virus. They are painful and may occur singly or in groups. They frequently recur and can be very troublesome.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- One or more painful sores on part of skin lining of the mouth
- Swollen skin around the sore
- Problems with eating and brushing due to tenderness
- Irritation of the sores with by, spice or sour foods
- Loss of appetite

INVESTIGATIONS

- Clinically diagnosed

TREATMENT

PHARMACOLOGICAL TREATMENT

- **Chlorhexidine gluconate** 10-15ml as a mouthwash, kept in the mouth for about 30 seconds to 1 minute 12 hourly 0r 8 hourly daily dosage based on medical condition
    - Topical oral anesthesia (buccal paste)
    - Normal saline mouth washes /salty water rinse every 8 hours until the condition clears
    - Can also use hydrogen peroxide followed by warm water rinse if there is an infection
- If related to HIV infection, please refer to section on Management of the
- HIV-Related Diseases,
- All ulcers in the mouth regardless of the HIV- status, lasting more than three weeks, should be investigated for cancers.

14.9 ORAL TRAUMA

CLINICAL DESCRIPTION

Facial trauma may involve injuries to the soft tissue of the face to the mandible or maxilla, the cheekbones or the zygomatic arch, the nose, eye sockets or the teeth. Oral and maxillofacial trauma may result in the following:

- Fractures of the teeth and alveolar bone
- Fractures of the maxilla, mandible orbit and nose
- Contusions, lacerations, and cuts of soft tissues in general, the trauma varies in severity and may be associated with a variety of complications
    - Severe hemorrhage, Airway obstruction, Trauma to the eye, Injury to intracranial structures, Injuries to the cervical spine, Contamination and/or infection of tissues
    - Varying degrees of deformity and interference with the function(s) of the injured structure/organ.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Pain on opening the mouth, bruising, swelling, or tenderness
- Difficulty in chewing, speaking, or breathing
- Loose, broken, or missing teeth

- Change in the biting of teeth
- Bleeding from the mouth

INVESTIGATIONS

- FBC
- CT Scan
- Skull views (PA ,LO,TL, OMV ,SMV, OPG)

TREATMENT

NON – PHARMACOLOGICAL

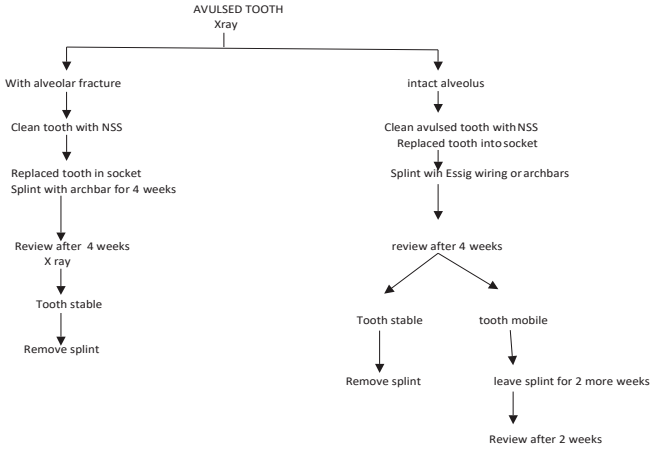
- Maintain patent airway
- Clean the area with NSS
- Check for fractures and break in the skin or mucosa, treat accordingly
- Control bleeding without damaging tissue, by suturing or gauze packs
- Always suture the facial **skin** with fine nylon 4/o or 5/o
- Ensure proper apposition of skin edges
- Sutures and simple fractures can be treated under local anesthesia
- Complex and complicated fractures may be treated under LA and pre-medicated with **Pethidine** 100mg IM for 18 years and above
- Fractures not suited under local anesthesia must be treated under general anesthesia
- Remove stitches on the 7- 10th day

PHARMACOLOGICAL

- Give **Penicillin** orally when able to swallow or parenteral if they cannot swallow
- Give **Tetanus toxoid**– tetanus antitoxin prophylaxis 1500 IU SC/IM if actively immunized plus
    - If not actively immunized give the above plus first dose vaccine 0.5 ml, then Second dose vaccine 0.5 ml after 1 to 2 months, then third dose vaccine 0.5 ml after 6 to 12 months
- Give analgesics e.g., **Paracetamol** 1 gm 8 hourly for 3 days When in severe pain give **Pethidine** 50–100 mg IM STAT

Admit If

- In severe pain
- Blood loss is severe
- Injuries are extensive
- Airway is compromised



14.11 TEMPOROMANDIBULAR JOINT DISORDERS

- These are varied, of special concern is dislocation.

14.11.1 DISLOCATED MANDIBLE

CLINICAL DESCRIPTION

The condylar head moves forward and out of the socket.

CLINICAL FEATURES

- The mouth remains open and cannot close spontaneously. Sometimes pain is present. Diagnosis is mainly clinical. If the mandibular midline deviates to one side, the dislocation is unilateral.

INVESTIGATIONS

- CT Scan, MRI
- Skull views (PA, TL, OPG, Arthrography of TMJ)

TREATMENT

Reduction of dislocated mandible

- Advise the patient on prevention and that there may be permanent changes in opening.
- Injection of Local anesthesia **2 % Lignocaine** (2–5 mls) into the joint or adjacent area of insertion of lateral pterygoid muscle may allow spontaneous reduction.

MANUAL REDUCTION

- Pre–medicate with a benzodiazepine (e.g., **Diazepam** 5–10 mg IV). The patient's head is stabilized.
- The operator places his thumbs on the external oblique line of the mandible (lateral to the third molars) with fingers placed under the chin.
- A rotatory motion is performed by the thumbs pressing downwards and forwards, and the fingers pressing upwards until the mandible is reseated.
- Stabilize the jaw to maintain mandible in position using Barton's bandage for at least six (6) weeks.
- If conservative management fails, surgical intervention becomes inevitable

14.11.2 POST EXTRACTION BLEEDING (PEB)

CLINICAL DESCRIPTION

- Commonly due to disturbing the blood clot by the patient through rinsing or inadequate
  - ➢ Compression on the gauze, though at times may be due to bony/tooth remnants.
- Bleeding socket can be primary (occurring within first 24 hours post extraction) or secondary
  - ➢ Occurring beyond 24 hours post extraction.

CLINICAL FEATURES

- Prolonged bleeding 8-12 hours after extraction
- No blood clot on the socket

INVESTIGATIONS

- FBC
- LFT
- Bleeding time, PTT, TT

TREATMENT

NON – PHARMACOLOGICAL

- Instruct a patient to avoid spitting and rinsing

PHARMACOLOGICAL

- Stop any treatment with aspirin
- Personally press adrenaline pack for 15−30 minutes
- If persistent − give **Vit. K** 10 mg IM STAT and maintain the pack or consider the following:
- Suturing, bone wax, gelatin sponge

Note: give antibiotics as a prophylaxis preferably Metronidazole

14.11.3 INFECTED SOCKET

CLINICAL DESCRIPTION

A post extraction complication due to infection of the clot due to contamination (infected socket). The condition is painful and if not managed well could lead to osteomyelitis.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Severe painful socket 2-4 days after tooth extraction
- Fever
- Necrotic blood clot in the socket
- Swollen gingiva around the socket
- Sometimes there may be lymphadenopathy and trismus (Inability to open the mouth)

INVESTIGATIONS

- Intraoral X-rays

TREATMENT

- Under local anesthesia with **Lignocaine 2%** socket debridement and irrigation with **3% Hydrogen peroxide**. The procedure of irrigation is repeated the 2nd and 3rd day

and where necessary can be extended to 4th day if pain persists. On follow-up visits local anesthesia is avoided unless necessary.

- Patient is instructed to rinse with warm saline (5ml spoonful salt in 200 mls cup of warm water) or **3% hydrogen peroxide** 8 hourly or 6 hourly in a day.
- Antibiotics prescribed to prevent progression to osteomyelitis: **Amoxicillin** 500 mg PO 6 hourly for 5 days.

PLUS

- **Metronidazole** 400 mg 8 hourly for 5 days.
- X-Ray: Periapical X-ray of the socket may be necessary when there is poor progression apart from the above treatment, aim is to check whether there is no root remnant, foreign body or any local bone pathology

14.11.4 DRY SOCKET

CLINICAL DESCRIPTION

It is a post extraction complication due to failure to form clot (dry socket). The condition is very painful and it defers from infected socket by lack of clot and its severity of pain.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Severe pain 2-4 days post-extraction
- Pain exacerbated by entry of air on the site
- Socket devoid of clot
- It is surrounded by inflamed gingiva

INVESTIGATIONS

- Intraoral X-rays

TREATMENT

- Treatment is under local anesthesia with **Lignocaine 2%** socket debridement and irrigation of **3% hydrogen peroxide**. The procedure of irrigation is repeated the 2nd and 3rd day and where necessary can be extended to 4th day if pain persists. On follow-up visits local anesthesia is avoided unless necessary

14.12 ORAL MAXILLOFACIAL CANCERS/TUMOURS

CLINICAL DESCRIPTION

Cancer in the maxillofacial region is one of the 10 most common cancers that occurs in the human body. It manifests itself in the form of tumours that generally appear on the face, the neck and in the mouth

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Abnormal bleeding in any area of the mouth or difficulty in swallowing, chewing or speaking.
- Pain, tingling or dryness of the mouth without any apparent cause.
- Sores that do not heal properly.
- Persistent infections in the mouth.
- White, red or black marks in the mouth.
- Presence of hardness, a lump or swelling in the mouth or on the face and/or neck.
- Ulcers in any part of the mouth that do not heal within 15 days.

INVESTIGATIONS

- FBC
- CT Scan, MRI
- Skull views (PA, TL, LO, OPG, OM)
- Histology studies

TREATMENT

NON – PHARMACOLOGICAL

- Depends on the type of cancer and rate of growth
- Biopsy is a must (FNA, incision and excision)
- Prompt referral for rapidly growing tumours (NHL, Burkitt's Lymphoma)
- Palliative therapy
- Surgical intervention
- Reinforce oral hygiene practices

PHARMACOLOGICAL

- Antibiotics where there is evidence of infection

- Refer to oncology for chemotherapy/ radiation therapy

Note: Early referral from health Centre and district hospital is important

CHAPTER 15: PARASITIC CONDITIONS

15.1 MALARIA

15.1.1 NON-SEVERE, UNCOMPLICATED

CLINICAL DESCRIPTION

Refer to the MOH National Malaria Control Program Revised **Guidelines for the Treatment of Malaria in Malawi, 5th edition, 2020,** for full details of malaria management

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Fever or recent history of fever in pregnant women or children under the age of five years and fever or history of fever plus one other symptom or sign suggestive of malaria in over five children and adults

INVESTIGATIONS

- All suspected uncomplicated malaria cases at all levels of the health care delivery system should be tested using malaria rapid diagnostic tests (mRDTs) or by microscopic examination of blood film wherever possible
- Testing (film or mRDT)
- Repeat diagnostic test (film or mRDT) if:
  - the first test was positive and there is persistent fever or worsening condition despite suitable antimalarial treatment

TREATMENT

- The first test was negative and antimalarial treatment was not given, but the patient's fever persists or condition deteriorates
- In the event that both mRDT and microscopy are not available, REFER TO THE FACILITY WHERE THE TESTS CAN BE DONE: BUT IF SUSPECTING SEVERE MALARIA, GIVE PRE-REFERAL TREATMENT, INJECTABLE ARTESUNATE. Don't treat on the basis of presumptive diagnosis

First-Line Treatment

- Give Lumefantrine 120mg/Artemether 20mg
- (LA) even to pregnant women in 1st trimester

- Lumefantrine-artemether comes in two orals
- formulations:
    - Non-dispersible **LA** [LA(ND)] for older children weighing 20kgs or more including adults and
    - Dispersible **LA** [LA(D)] for children weighing less than 20kg

Note: If LA(D) is not available, LA(ND) can be used to treat children weighing less than 25kg

Dosage Schedule for dispersible {D) and non- dispersible {ND) Lumefantrine-Artemether {LA- 120mg/20mg tablets).

Body weight in Kg (age in years)	No. of tablets at approximate timing of dosing					
	Day 1		Day 2		Day 3	
	Start dose	After 8 hrs	AM	PM	AM	PM
LA(D) ≤14.9 kg (<3)	1	1	1	1	1	1
LA(D) 15-24.9kg (>3-8)	2	2	2	2	2	2
LA(ND) 25-34.9kg (>9-14)	3	3	3	3	3	3
LA(ND) ≥35 kg (>14)	4	4	4	4	4	4

- First dose should be given as DOT. If vomiting occurs within 30 minutes, repeat the dose
- Dose is given according to body weight
- If possible, each dose should be taken with milk, which improves the absorption of lumefantrine component of the combination
- If fever persists beyond 72 hours, do malaria microscopy, and if the result is positive, give second line treatment in patients with contractions or intolerance to LA give second line treatment.

Second-Line Treatment

Give **Artesunate** 4 mg/kg/day and **Amodiaquine** 10 mg/kg/day 24 hourly for 3 days

Dosage schedule for fixed combination dose of artesunate-amodiaquine

Body Weight {kg)	Age	Daily dose for 3 days artesunate-amodiaquine	Preparation strength per tablet
5.0- 8.9	2-11 months	1 tablet	25 mg/67.5 mg
9.0-17.9	1-5years	1 tablet	50mg/135mg

18.0-35.9	6-13 years	1 tablet	100 mg/270 mg
>36	14 years old and above	2 tablets	100mg/270mg

Note:

- Treatment failure to first line treatment (LA) should be suspected if symptoms persist or the patient clinically deteriorates three to 14 days after initiation of LA drug therapy
- Side effects: Transient rise in transaminases and transient reduction in white blood cell count. The dosing schedule is indicated in Table 1.4 below

15.1.2 SEVERE MALARIA

CLINICAL DESCRIPTION

Most severe malaria occurs in children under 5 years of age. Severe malaria is a medical emergency and as such treatment should begin immediately, whether the patient presents at the community, health center, or hospital level. Suspect severe malaria if a patient has one or more of the following conditions (mostly seen in combination):

Clinical manifestations and some laboratory findings

Clinical manifestations	Some laboratory findings
• **Impaired level of consciousness (cerebral malaria)** • **Respiratory distress (acidotic breathing)** • **Repetitive** • **convulsions** • **Circulatory** • **collapse** • **Pulmonary** • **oedema** • **Prostration** • **Excessive or persistent vomiting** • **Extreme pallor Shock (weak pulse, cold extremities) Jaundice (yellowish coloration of eyes) Little or no urine output (think about acute**	• Severe anaemia: (Hb<5 g/dl) (i.e. Hb <5 g/dl or Hct < 15 %) • Hypoglycaemia: (<2.2 • mmol/l or <40 mg/dl) • Hyperlactataemia (lactic acidosis) (blood lactate >4 mmol/l) • Electrolyte imbalance • (hyponatraemia) • Acute kidney injury • (serum creatinine • >265 µmol/l) • Haemoglobinuria

kidney injury) Very dark colored urine • **Spontaneous bleeding (mouth, nose, skin, eyes)** • **Hypovolaemia**	

- Although most children with malaria have a (history of) fever, this may be variable in patients who have progressed to severe malaria
- Examine children with suspected severe malaria for other conditions (e.g. pneumonia, meningitis) as a possible cause of their symptoms and, if found, manage appropriately

Note:

- Patients with hyperparasitaemia: 4+ (40,000 – 400,000/µl or ring stage >5% of RBCs) who do not have any of these indicators of severe (disease) malaria should be admitted for observation. Treat with first-line antimalarial (LA).

If severe malaria is diagnosed in an out- patient, refer the child for hospitalization (see below)

PRE-REFERRAL TREATMENT AT COMMUNITY LEVEL

Refer any patient with severe malaria to the nearest hospital

Treatment

- Give Rectal Artesunate at 10 mg/kg body weight in a single dose, followed as soon as possible by definitive therapy for severe malaria at a hospital
- In the event that Artesunate Suppository is expelled from the rectum within 30 minutes of insertion, a second suppository should be inserted
- If referral is not possible within 12 hours, a second dose of Rectal Artesunate should be administered at 12 hours after the initial dose, then once in every 24 hours until patient is transferred to a hospital

Initial {pre-referral) Dosage of Artesunate Suppositories for patients aged >6 yrs

Weight {kg)	Artesunate dose	Regimen {single dose)
<40	10 mg/kg	Use appropriate no. of 50 mg rectal suppositories
40 -59	400 mg	Two suppositories of 200 mg each
60 -80	800 mg	Four suppositories of 200 mg each
>80	1200 mg	Six suppositories of 200 mg each

Note:

- For children, hold the buttocks together for 10 minutes to ensure retention of the rectal dose
- Treatment with **Rectal Artesunate** is suboptimal, and every effort should be made to refer the patient as soon as possible
- The table below shows the recommended pre-referral doses of **Artesunate Suppositories** for children aged <6 years
    - ➢ As in adult patients, if referral is not possible within 12 hours, a second dose of **Rectal Artesunate** should be administered at 12 hours after the initial dose

Thereafter the dose may be repeated every 24 hours. Refer to the malaria treatment guidelines for RA insertion procedure

Initial {pre-referral) Dosage of Artesunate Suppositories for Children Aged 2months -15 Years {and weighing at least 5 kg)

Weight {kg)	Age	Artesunate dose {mg)	Regimen {single dose)
5 - 8.9	2 – 12 months	50	One 50 mg suppository
9 - 19	13 – 42 months	100	Two 50 mg suppositories
20 - 29	43 – 60 months	200	One 200 mg suppository
30 - 39	6 years	200	One 200 mg suppository

Note: Do not give rectal Artesunate to patients above 6 years of age

PRE-REFERRAL TREATMENT AT HEALTH CENTRE LEVEL

Treatment

- Give Artesunate 3 mg/kg in children <20kg and 2.4 mg/kg (0.12 ml/kg) >20kg and adults IM
- Artesunate should be given by intramuscular injection into the upper- outer quarter of anterior thigh and should not be injected into the buttocks
- To administer IM Artesunate, weigh the patient and determine the number of vials needed for treatment as per the table below:

Number of Required Vials of Parenteral Artesunate by Body Weight

Weight	60 mg vials required
5 kg - 25 kg	1
26 kg - 50 kg	2
51 kg - 75 kg	3
76 kg - 100 kg	4

- Each 60 mg vial of injectable Artesunate must be reconstituted with 1 ml of Sodium Bicarbonate
- Dilute the Artesunate-Bicarbonate mixture with 2 ml of 5% Dextrose Solution or Normal Saline (0.9% Sodium Chloride) to produce a 20 mg/ml solution. Never use water for injection
- Withdraw the appropriate volume in a syringe ([2.4 mg x body weight in kg]/20 mg/ml) for intramuscular injection, rounding to the next whole number in milliliters
- Administration of pre-referral IM Artesunate should be followed as soon as possible by definitive therapy for malaria at a hospital
- If referral is not possible within 12 hours, a second dose of IM Artesunate should be administered at 12 hours after the initial dose
- If referral is still not possible after 24 hours, a third dose of IM **Artesunate** should be given

Alternatively

- If IM **Artesunate** is unavailable or contraindicated, treat with high dose **Quinine** IM, administered in the thigh not the buttock
- Give IM **Quinine** 10 mg (0.2 ml) per kg body weight
- If the volume to be injected exceeds 3 ml, give half into each thigh. An example of body weights and dosing (ml) for IM quinine is given in the table below.

Dosage o/ Parenteral Quinine per body weight

Body weight	Quinine {ml)	Number of injection sites
Under 5 kg	1.0 ml	1
5.1 -7.5 kg	1.5 ml	1
7.6 -10.0 kg	2.0 ml	1
10.1 -12.5 kg	2.5 ml	1
12.6 -15.0 kg	3.0 ml	1
15.1 -17.5 kg	3.5 ml	2
17.6 -20.0 kg	4.0 ml	2
20.1 -22.5 kg	4.5 ml	2
22.6 -25.0 kg	5.0 ml	2
25.1 -27.5 kg	5.5 ml	2
27.6 -30.0 kg	6.0 ml	2

- Administration of pre-referral IM **Quinine** should be followed as soon as possible by definitive therapy for malaria at a hospital
- If referral is not possible within 12 hours, a second dose of IM quinine should be administered 12 hours after the initial dose
- If referral is still not possible after 24 hours, a third dose of IM **Quinine** should be given
    - Give 0.4ml/kg of this solution as the first
    - (loading) dose - this is 20mg/kg
    - Subsequent (12-hourly) doses should each be 0.2ml/kg (10mg/kg)
    - The dose of **Quinine** for an adult at anyone time should not exceed 1,200mg

Injectable artesunate or quinine should be for patients unable to take oral drugs.

- Where there is no scale, weight of the child can be estimated as follows:
- For children of 3months to 12months old
- Weight {Kg) = Age **{months) + 9/2**
- For children of 1 year to 6years old
- Weight {Kg) = [Age {in **years) x 2) + 8**

If IM **Artesunate** and IM **Quinine** are unavailable

- Give **Rectal Artesunate**

ADDITIONAL MANAGEMENT AND SUPPORTIVE MEASURES

Reduce fever:

- Tepid sponging with lukewarm (not cold) water
- Give an antipyretic (**paracetamol** 10 mg/kg; 6 to 8-hourly) as required until fever is reduced. *See dose tables in Section 10.1*

Take 8 immediate measures:

1. Start resuscitation, particularly maintenance of a patent airway.
2. Establish IV line.
3. Make a thick blood smear for immediate malaria parasite count, {if microscopy is not available, an mRDT may be useful to indicate whether malaria infection is present or not)

4. Classify the degree of dehydration, assess patient's fluid requirements and correct accordingly.
5. Control fever if the axillary temperature is 38.5QC or above: Tepid sponge, fanning and oral or rectal paracetamol {15 mg/kg every 4 to 6 hours).
6. Control convulsions: maintain airway, treat with rectal diazepam {0.5 mg/kg) or slow IV diazepam {0.3 mg/kg, maximum 10 mg in an adult), or paraldehyde 0.1 ml/kg IM. Remember to correct any hypoglycaemia or hyperpyrexia in a convulsing patient.
7. Detect and treat hypoglycaemia: hypoglycaemia can be induced by high parasitaemia, fasting and quinine therapy. Hypoglycaemia can recur, especially in pregnant women and children. If blood glucose 3 mmol/l or 54 mg/dl; give 1 ml/kg of 50% dextrose IV, diluted with an equal volume of 0.9% saline or 5% dextrose, give slowly over 3-5 minutes, and check blood glucose after 30 minutes and as required after treatment. Follow with 10% dextrose infusion at 5 ml/kg/hr. If there is no test for blood glucose, treat as if the patient is hypoglycaemic.
8. Start intravenous or intra-muscular artesunate. Dosage schedule is provided from section 2.2.2.2 below. If intravenous or intra-muscular artesunate is unavailable, use intravenous or intra-muscular quinine.

LOOK FOR AND DEAL WITH THE FOLLOWING 8 COMPLICATIONS:

1. Shock: If cold peripheries, delayed capillary refill, or Systolic BP <50 mmHg in children 1 - 5years or <80 mmHg >5 years, suspect Gram-negative septicaemia. In such cases take blood samples for culture. Give parenteral broad-spectrum antimicrobials. Correct fluid disturbance, and then continue with maintenance fluid as follows: for children weighing <10 kg, give 4 ml/kg/hr.;

- **for children weighing 10 – 20 kg**, give 40 ml/hr. *plus* additional 2 ml per kg for each kg of weight in excess of 10 kg;
- **for children weighing >20 kg**, give 60 ml/hr., *plus* additional 1 ml per kg for each kg of weight in excess of 20 kg. Give oxygen if possible.

2 Severe anaemia: Consider the need for blood transfusion: Assess the degree of pallor (no pallor, some pallor or severe pallor – look especially at palms of hands, also mucous membranes). Assess signs that increase the danger of severe anaemia - respiratory distress, altered consciousness, shock and hyper-parasitaemia.

Note: The decision to transfuse with blood should not only be based on low laboratory values, but on a full assessment of the patient**. As a guide, all patients with PCV<12% or Hb<4 g/dl should be transfused, whatever the clinical state; those with any of the above danger signs may be transfused even if PCV is 13-18% or Hb 4-6g/dl.

- Transfuse packed red cells in most cases; in shock or severe acidosis, use whole blood. The volume transfused should be 20 ml/kg.
- **Metabolic acidosis** (deep, fast breathing): **exclude or treat** hypoglycaemia, hypovolaemia and gram negative septicaemia. Give isotonic saline 20 ml/kg of body weight rapidly or screened whole blood 10 ml/kg if PCV <18% or Hb<6 g/dl. Consider lactic acidosis and enquire whether the patient has been taking ART **(lactic acidosis is a side effect of stavudine).**
- **Spontaneous bleeding or coagulopathy:** If patients have underlying malnutrition, concomitant hepatic obstruction and bile salt excretion defects or prolonged fasting for more than 3 days, transfuse screened fresh whole blood, give **Vitamin K** 10 mg IV slowly once a day for 3 days. For Children give 2 – 3 mg/day slow IV. **Vitamin K** injections should not be given to "all" severe malaria patients with spontaneous bleeding, the risks and benefit of Vitamin K administration should be considered. Serious adverse events of Vitamin K injection include hypotension, difficulties in breathing, bradycardia or anaphylaxis.
- **Acute pulmonary oedema in adults**: prevent by avoiding excessive rehydration. Treatment: prop patient up; give oxygen. Stop IV fluids if pulmonary oedema is due to over-hydration, give a diuretic (**furosemide** IV 40 mg for adult and 0.5 – 1 mg/kg/dose for children).
- Acute respiratory distress syndrome:
  - supportive treatment +/- ventilation
- **Acute kidney injury in adults**: detect this by monitoring fluid balance. Identify and correct any dehydration or hypovolaemia. Maintain strict fluid balance. Consider peritoneal dialysis if oliguria persists beyond a few days.
- Common infections and other conditions that present like severe malaria: Perform urinalysis, lumbar puncture (unless contraindicated), blood culture if possible, and chest x-ray.

Box 3: Monitor the Following 8 Observations:

Where possible use Critical Care Pathways (CCPs).

1. Level of consciousness (using coma score)
2. Vital signs every 4 hours (temperature,
3. pulse, respiration, blood pressure)
4. Fluid balance (urine volumes, intake volumes – IV and oral – puffy eyes, chest crepitation, elevated jugular venous pressure)
5. Increasing anaemia (pallor, heart failure with increasing liver size)
6. Occurrence of convulsions –see item 2 in
7. previous Box
8. Blood glucose every 4 hours' while
9. unconscious and also if convulsions occur

10. [Hb]/Packed Cell Volume – at least daily, or more often if anaemia is suspected
11. Ability to suck, drink, eat, sit and walk –measures of overall strength.

MANAGEMENT OF SEVERE MALARIA IN PAEDIATRIC IN-PATIENTS

Treatment

- Give **Artesunate** 2.4 mg/kg body weight IV for adults of 20kg or more and 3.0mg/kg body weight for children of 20kg or less) on admission (at 0 hour)
    - Repeat at 12 hours and 24 hours, after initiating the first dose then once daily for not more than six days
    - Switch to **LA** once the patient can take oral treatment after at least 24 hours of **Parenteral Artesunate**
    - There should be an interval of at least 8 hours between the last dose of **Artesunate** and the first dose of **LA**

Alternatively

- Give **Artesunate** 2.4 mg/kg or 3.0mg/kg body weight for children less than 20 kg IM into the upper-outer quarter of anterior thigh if intravenous bolus is not feasible
- **Note:** Artesunate solution should be freshly prepared prior to administration and should never be stored

*In case **Artesunate** is not available or is contraindicated, then*

- Give Parenteral Quinine
- Refer to section 15.1.2.1 to *determine the number of vials needed for treatment*
- For children, **Quinine** IV is administered as follows:
    - Initial (loading) dose 20 mg (**Quinine Salt**)/kg body weight: inject this dose into 10 ml/kg of 5% **Dextrose** or half strength Darrow's and infuse over 3-4 hours
    - If patient has already received **Quinine** for this illness, the first dose IV infusion should be 10 mg/kg diluted as above and given over 3-4 hours with no loading dose
    - Subsequent doses of 10 mg/kg should be given every 12 hours
    - The infusion should run for 3 – 4hours. Continue the 5% **Dextrose** or half strength Darrow's IV fluid (10 ml/kg given over 3 – 4 hours) between doses of quinine
    - Switch to **LA** once the patient can take oral treatment after at least 24 hours of **Parenteral Quinine**

Note: LA should only be taken 12 hours after last dose of quinine to avoid cardiotoxicity

MANAGEMENT OF SEVERE MALARIA IN ADULT IN-PATIENTS

Treatment

- If the patient can be weighed, intravenous **Quinine** is administered in the same manner as for children
- If the patient cannot be weighed, IV **Quinine** should be given as follows:
  - First dose 900 mg in one litre of 5% Dextrose or ½-strength Darrow's Fluids given over 3 - 4 hours
  - Subsequent doses 600 mg in one litre 5% Dextrose or ½-strength Darrow's Fluids q12h given over 3 - 4 hours
  - Continue the same IV fluids or Ringer's Lactate (10 ml/kg given over 3 - 4 hours) between doses of Quinine (Give a maximum of about 3 litres per 24 hours to avoid fluid overload)
  - Stop intravenous Quinine as soon as the patient can take food and fluids orally and at least 24 hours of Parenteral Quinine has been administered

Note: What if 60+ kg?

- Give the appropriate dose of LA beginning 12 hours of the last dose of quinine for 3 days. For pregnant women in the first trimester give oral quinine plus clindamycin for a total of 7 days

COMPLICATION THAT MAY ARISE IN ADULTS

- Apart from cerebral malaria and anaemia, in adults' other complications may develop such as:
  - Acute renal failure
  - Respiratory distress syndrome (presenting as severe breathlessness)
  - Disseminated intravascular coagulation (DIC) - presenting as prolonged or spontaneous bleeding
  - Jaundice from severe haemolysis or liver cell damage
- Management must be appropriate to each complication that develops
- Fluid and antimalarial drugs are given as for children

TREATMENT OF SEVERE MALARIA IN PREGNANCY

Treatment

- Parenteral artesunate is the recommended treatment for severe malaria in all the trimesters of pregnancy.

- Refer to 15.1.2.5

Note: Random blood glucose should be measured before and after quinine administration

- Shift to **LA** as soon as the patient is able to take oral medication and at least 24 hours of parenteral therapy has been administered (refer to malaria treatment guidelines for details)
- Special attention must be paid to anaemia, hypoglycaemia and pulmonary oedema

See below for further information on the management of complications

BOX 4: MANAGEMENT OF COMPLICATIONS: (SEE THE 8- 8- 8 SCHEDULE ABOVE)

Manage complication as for any adult. Of special importance in pregnancy are:

- Pulmonary oedema: careful fluid management, diuretics if necessary, oxygen if possible, nurse patient in semi- upright position.
- Hypoglycaemia: consider this complication if there is altered consciousness or seizure.
- Treat as in Item 2 in Box 2.
- Anaemia: be prepared for blood transfusion, especially if the patient is close to parturition. Otherwise, indications for blood transfusion are the same as in others - (see Box 2).
- Acute kidney injury: a particular danger if there has been eclampsia or shock. Identification and management as above.
- Shock: consider concealed haemorrhage, continuing blood loss, and septicaemia. Pay special attention to fluid needs. Culture blood if possible. Administer broad spectrum antibiotics in addition to quinine.

MALARIA: SELECTIVE CHEMOPROPHYLAXIS

The appropriate regimen for an individual depends on the circumstances.

Risk Groups

The following high-risk groups should be given antimalarial chemoprophylaxis:

- Patients with immunosuppression caused by illness (e.g. Leukaemia, but not HIV infection or malnutrition) or splenectomy
- Tropical splenomegaly syndrome
- Under 5s with recurrent febrile convulsions

- Individuals with sickle cell disease
- Non-immune visitors (i.e. visitors from non-malarial countries)
- Pregnant women

ANTIMALARIAL PROPHYLAXIS REGIMENS

- Give **Mefloquine** (Lariam) 250 mg weekly
- Contraindicated in pilots, people with history of cardiac disease, neurological disease or depression, and in those taking beta-blocking drugs

Give **Atovaquone-proguanil ('Malarone')** - one tablet daily

- Take for only one week after exposure end Give **Chloroquine** 300 mg - 2 tablets weekly Should be combined with daily proguanil (see below)
- **Chloroquine** causes itching in 40% of black people. Contraindicated in persons with psoriasis or epilepsy
- Risk of retinal damage if taken every week for more than 6 years - advise a change
- Give **Proguanil** (Paludrine®) 200 mg daily
- Should combine with an additional drug such as weekly **Chloroquine**

15.1.3 INTERMITTENT PRESUMPTIVE TREATMENT OF MALARIA IN PREGNANCY (IPTP)

- Intermittent Presumptive Treatment of malaria in pregnancy (IPTp) is one of the major malaria preventive strategies in Malawi
- Pregnant women should receive at least three doses of Sulfadoxine-Pyrimethamine (SP) 525mg after the first trimester
- Administer three tablets of SP with each scheduled antenatal care visit after 1st trimester (at 13 weeks' gestation)
- The doses should be administered at least four weeks apart and given as directly observed therapy (DOT)
- The last dose of SP can be delivered safely up until the time of delivery
- Sulfadoxine-Pyrimethamine can be given either on an empty stomach or with food

Note: HIV positive women receiving **Cotrimoxazole Prophylaxis** should not receive **SP**

15.2 ONCHOCERCIASIS (RIVER BLINDNESS)

CLINICAL DESCRIPTION

Onchocerciasis results from infection with *Onchocerca volvulus.* Humans are the only natural host. **Endemic** in Thyolo, Mwanza, Nneno, Chikwawa, Blantyre, Phalombe, Chiradzulu and Mulanje

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- severe dermatitis/subcutaneous nodules
- poor vision and blindness

INVESTIGATION

- skin snips/eye samples: microfilariae
- examine eye with slit-lamp for microfilariae
- Mazzotti test

TREATMENT

- Adults and children > 15 kg: Give **Ivermectin** 150 mcg (0.15mg)/kg single dose

Ivermectin Dose Table

Weight in kg	Number of tablets given	Total mg
Less than 15	0	0
15 – 25	1	3
26 – 44	2	6
45 – 64	3	9
Above 64	4	12

**ivermectin 3 mg tablets*

15.3 SCHISTOSOMIASIS

CLINICAL DESCRIPTION

Schistosomiasis is an infection with blood flukes of the genus Schistosoma.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

For S. haematobium & S. mansoni

- "swimmer's itch": brief, localized urticaria/pruritus +/- eosinophilia
- Katayama fever: acute illness with fever, oesinophilila +/- pneumonitis
- CNS involvement (ectopic eggs or worms)
    - ➢ meningoencephalitis

- seizures
- pulmonary granulomas (or egg emboli)
  - Right ventricular failure/congestive cardiac failure

for Schistosoma haematobium

- bladder granulomas:
  - terminal haematuria
  - obstructive uropathy (± secondary infection)
  - hydroureter
  - bladder calcification
  - squamous bladder cancer
- genital tract granulomas
  - haemospermia
  - inflammation in vulva/vagina/cervix
  - infertility (Fallopian tube involvement)

For Schistosoma mansoni

- GI tract granulomas
  - colonic ulceration/bleeding; tenesmus
  - portal hypertension
  - hepatosplenomegaly
  - 'pipestem fibrosis' of liver
  - porto-caval shunting

TREATMENT

- Give **Praziquantel** 40 mg/kg as a single dose
- Children below 4 years of age **Praziquantel**
- 20mg/kg as stat dose

Note: Assess all lesions around genitalia to check for genital schistosomiasis

- refer male and female genital schistosomiasis for laboratory diagnostics

15.4 TRYPANOSOMIASIS (SLEEPING SICKNESS)

CLINICAL DESCRIPTION

Suspect in any patient presenting with fever from areas near:

- **Wildlife Reserves**: Vwaza, Nkhotakota, Majete, Mwabvi
- **National Parks**: Kasungu, Liwonde, Lengwe

- Phirilongwe (Mangochi), Machinga, Mwanza
- Lower Shire borders with Mozambique or **from any other areas where** Tsetse fly is found.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Suspect in children from these areas who remain sick after presumptive malaria treatment
- Increased suspicion in any sick patient from these areas with a history of:
  - Headache, Vomiting, Weakness, Changes in mood, Convulsions, Drowsiness, Mental slowness

INVESTIGATIONS

- Travel history is very important
- Suspect also in any patient from these areas where the cause of illness is not otherwise apparent.
- Trypanosomiasis can be acute in children (resembling malaria) and can be more chronic in adults
- Early stage trypanosomiasis may cause myocarditis
- Examination may reveal anaemia, lymph gland enlargement and spleen enlargement
- Nearly all cases have a hard and painful subcutaneous nodule (chancre) which is evidence of an infected bite

TREATMENT

NON PHARMACOLOGICAL

- Procedure at Health Centres
- Refer the patient immediately to the nearest hospital
- Request close family members of the patient to undergo examination at the hospital as they may also be infected

PHARMACOLOGICAL

Hospital management

- Request for a thick blood smear
- If negative more tests will be needed to confirm this diagnosis
- If diagnosis is confirmed by blood smear or other blood test:
  - Start Suramin

  - as follows: Day 1: 5mg/kg
  - Day 2: 20mg/kg
  - Day 3: Do a lumbar puncture
- If LP is normal (stage 1 trypanosomiasis):give
- **Suramin** 20mg/kg on day 3, 10, 17, 24, 31
- If LP is abnormal (stage 2 or CNS trypanosomiasis): stop suramin, start **Melarsprolol (Mel-B)** as follows:
  - Day 3: 1.2mg/kg
  - Day 4: 2.4mg/kg
  - Day 5: 3.6mg/kg
  - Day 6: 3.6mg/kg
- Repeat this 4-day **Melarsprolol** cycle after one
  - and two weeks

NOTES ON TREATMENT REGIMEN

- If any medicine reaction occurs (e.g. skin rash, exfoliative dermatitis, reactive encephalitis) stop treatment and inform the clinical officer or medical officer immediately
- Do a lumbar puncture (LP) on day 3. Subsequent treatment depends on whether this is found to be normal or abnormal
- Freshly reconstitute the **Suramin (Sur)** 1 g vial of powder with 10 mL water for injection to make a 10% solution (100 mg/mL)
- Add the required dose of 20 mg/kg (0.2 mL of injection/kg) up to a *maximum of 1 g* (the whole vial) in adults of 50 kg or over to 200 mL of dextrose 5% and infuse over 2 hours. Alternatively give the dose as a slow IV injection.
- **Melarsoprol (Mel B) dose** is 3.6 mg/kg (=0.1ml/kg). Give this as a slow IV push. Take great care to avoid extravasation as the medicine is highly irritant. In adults of 50 kg or over the dose is the *maximum permissible 180 mg* (i.e. one 5 mL ampoule)
- **Prednisolone** may be added to **Melarsprolol** with a dose of 40mg once daily. The dose in children is 1 mg/kg once daily
- Control any seizures with **Diazepam** 5-10 mg slow IV with or without the addition of **Phenytoin** 150-300 mg as a single daily dose taken with water
- Anti-trypanosomal treatment may cause abortion in pregnancy, but this must be regarded as an unavoidable risk
- Follow-up: review the patient for repeat blood film and LP at 3, 6, 12 and 24 months post- treatment

CHAPTER 16: RESPIRATORY CONDITIONS

16.1 UPPER RESPIRATORY TRACT INFECTIONS

16.1.1 ACUTE RESPIRATORY INFECTIONS (ARI) IN CHILDREN

CLINICAL DESCRIPTION

Most ARI are mild, self-limiting viral infections. The Malawi ARI Control Program emphasizes standard case management as its main strategy. This includes:

- Early diagnosis
- Appropriate drug use
- Timely referral
- Advice on suitable home care

TREATMENT

- Refer to ARI Control Program Guidelines, MOHP 1998 for more information
- Refer to the WHO's Management of the Child with Cough or Difficult Breathing for a summary of patient assessment, classification of illness and treatment instructions

Note ARI Case Management

- Refer all cases for severe disease/pneumonia to hospital for admission after initial IM doses of recommended antibiotics
- Treat all pneumonia cases as out-patients with
- **Cotrimoxazole** or **Amoxicillin**
- Do not use cough syrup – they have no role to play in ARI management

Home care of children with ARI

Advise guardian to:

- Watch out for these danger signs (which may indicate pneumonia) and return quickly to the health facility if any occur:
  - Difficulty breathing
  - Fast breathing
  - Child cannot drink
  - Child becomes more ill
- Feed the child
  - Continue feeding the child during illness
  - Increase feeding after illness

- Clear blocked nose if interfering with feeding
- Increase fluids
  - If > 6 months old, offer the child extra fluids to drink Increase breast-feeding
- Soothe throat and relieve cough
  - Give sips of water or other (preferably
  - warm) fluids
- Treat fever
  - Give **Paracetamol** in the recommended dose every 6 hours until the high fever stops
  - Increase fluids (see above)
  - Do not overdress or overwrap the child, i.e.
  - keep the child lightly dressed
- Complete prescribed treatment
  - Complete this even if the child becomes better
- Return for follow-up assessment after 2 days if child is being treated for pneumonia.

16.1.2 COMMON COLD (NASOPHARYNGITIS)

CLINICAL DESCRIPTION

Common cold is a self-limiting upper respiratory tract infection affecting nasopharyngeal mucosa and sinuses. It is self-limiting and usually resolves within a week. It is mainly caused by viruses (rhinoviruses, corona viruses and Respiratory Syncytial Virus-RSV). Influenzae virus can cause a protracted common cold.

It is highly contagious and spread by airborne droplets, as well as from hands and contact with contaminated surfaces. Secondary bacterial infection may be associated with purulent phlegm or offensive nasal discharge and fever. Occasionally, the common cold is complicated by otitis media and pharyngotonsillitis, particularly in children, in which case one should refer to the appropriate sections for treatment

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Running nose (rhinorrhea)/nasal congestion
- Sneezing
- Cough
- Irritation of the throat
- Fever (often causes fever in young children that may last up to 72 hours)
- Muscle ache.

- Malaise
- Mild headache
- In infant, nasal congestion may interfere with breast feeding and cause difficulty in breathing
- Low grade fever
- Nasal discharge
- Reddening of nasal mucosa
- Watering of eyes

INVESTIGATIONS

- No investigation required

TREATMENT

NO-PHARMACOLOGICAL TREATMENT

- Rest
- Encourage adequate fluid intake
- Gargle lukewarm salt water if sore throat
- Steam inhalation may also relieve nasal congestion

PHARMACOLOGICAL TREATMENT

- Uncomplicated common cold
- 1st Line Treatment: **Paracetamol**, oral, **Adults** 500-1g 6–8-hourly **Children** 10-15 mg/kg/dose 6-8 hourly
    - 6-12 years; 250-500 mg 6-8 hourly
    - 1-5 years; 120-250 mg 6-8 hourly
    - 3 months-1 year; 60-120 mg 6-8 hourly
- Saline (sodium Chloride 0.9%) nasal drops
- Adult and Children 2 drops, into each nostril, 4 hourly to relieve congestion as necessary Or
- Chlorpheniramine maleate, oral
    - Adult 4 mg 12 hourly
    - Children
        - 6-12 years; 2 mg 6-12 hourly daily (max. 12 mg daily)
        - 2-6 years; 1 mg 6-8 hourly (max. 6 mg daily) 1-2 year.
- Cough syrups may also relieve symptoms
- Antibiotics are not recommended in common cold.

Complications

- Secondary bacterial infection (associated with purulent phlegm or offensive nasal discharge and fever).
- Occasionally otitis media and pharyngotonsillitis particularly in children (refer appropriate sections for treatment and refer to ENT clinic where appropriate)

16.1.3 SINUSITIS

CLINICAL DESCRIPTION

Sinusitis is inflammation of one or more paranasal sinuses. Predisposing risk factors are nasal obstruction from allergic rhinitis/polyp**,** dental infection/dental extraction**,** fractures involving sinuses**,** swimming in dirty waters**.** Mainly caused by virus (common cold) hence self- limiting**.** It can also be caused by Bacterial (group A haemolytic streptococci, S. Pneumoniaea, S. aureus H.influenzae, M.catarrhalis).

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Cough and nasal congestion (allergy symptoms)
- Postnasal drip symptoms (throat irritation and throat clearing cough)
- Fever/purulent and foul-smelling nasal discharge and halitosis (if bacterial)
- Frontal headache/pressure in the face
- Tenderness on sinuses area
- If severe may have facial/periorbital swelling and fever

INVESTIGATIONS

- Usually none needed unless complicated sinusitis not responding to treatment (may consider full blood count, parasinuses x-ray/CT scan)

TREATMENT

NON-PHARMACOLOGICAL

- Most sinusitis is viral and self-limiting, requiring no antibiotics
- Steam inhalation may help drainage of blocked sinus

PHARMACOLOGICAL

- Analgesia if pain/headache: **Paracetamol** 1g 6 hourly or **Ibuprofen** 400mg 8 hourly PO or other (adult);

- Antibiotic if signs of bacterial sinusitis:

Adult.

- **Amoxicillin** 500mg 8 hourly for 7 days or **Amoxicillin-clavulanic acid** 625mg 8 hourly or **Cefuroxime** 250 to 500mg 12 hourly PO (alternatively **Erythromycin** 500mg 6 hourly or **Azithromycin** 500mg daily for 5 days if penicillin hypersensitivity)

Children.

- 6-12 years: **Amoxicillin**: 250 mg 8 hourly for 7 days
- 1-5 years: 125 mg 8 hourly for 7 days
- < 1 year: 62.5 mg 8 hourly for 7 days

Alternatively,

Amoxycillin 15mg/kg 8 hourly for 7 days

Or

Amoxicillin + Clavulanic Acid:

- 6-12 years; 400/57 mg 8 hourly for 7 days
- 1-6 years: 200/28.5 mg 8 hourly
- 1 month-1 year: 200/28.5 mg 8 hourly

Cefuroxime:

- 3 months-12 years: 125 mg 12 hourly, double in severe infection.

Erythromycin: 2-8 years: 250 mg 6 hourly for 7 day

- 1 month-2 years: 125 mg 6 hourly

Alternatively,

Erythromycin 10mg/kg 6 hourly for 7 days

Neonate: **Erythromycin** 12.5 mg/kg 6 hourly Or **Azithromycin**: 10 mg/kg daily for 5 days

- Sinusitis prevention for patient undergoing tooth extraction **Benzathine Penicillin** 1.2g IM stat *or* **Amoxycillin** 3g orally stat 1hour prior to procedure and **Metronidazole** 400mg)

Complications of sinusitis

- Periorbital swelling
- Dental abscess

Note: Patients with complications need referral to a specialist

16.1. 4 PHARYNGITIS AND TONSILLITIS

Most sore throats are due to viral infections such as adenovirus and CMV and should not be treated with antibiotics. For pain or fever give analgesic treatment as required, be sure to rule out streptococcal pharyngitis to prevent acute rheumatic fever and other non-suppurative (endocarditis) and suppurative complications (retropharyngeal and peritonsillar abscesses).

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Abrupt onset of pain
- Fever,
- Tender,
- Enlarged cervical lymph nodes,
- White or greyish pharyngeal exudates,
- Absence of lower respiratory tract signs and symptoms
- Absence of signs suggesting viral nasopharyngitis (e.g. Rhinorrhoea, Conjunctivitis, Cough)

TREATMENT

PHARMACOLOGICAL TREATMENT

Adults:

- Give Benzathine Penicillin 1.2 MU single dose IM
  - *Alternatively* (if assured of compliance)
- Give Amoxycillin 500mg 8 hourly for 7 days
  - *Alternatively in penicillin hypersensitive patients:*
- Give Erythromycin 500mg 6 hourly for 7 days

Children:

- Give **Benzathine Penicillin** 0.6MU if <30kg or 1.2 MU >30kg single dose IM
  - *Alternatively* (if assured of compliance)
- Give **Amoxycillin** 15mg/kg 8 hourly for 7 days
  - *Alternatively in penicillin hypersensitive patients:*
- Give **Erythromycin** 10mg/kg 6 hourly
  - OR

- **Azithromycin** 10mg/kg daily for 5 days

Note:

- Do not use cotrimoxazole as it is not effective
- If there is pain or fever give analgesic treatment as required

16.1.5 PERITONSILLAR ABSCESS

SIGNS AND SYMPTOMS

- May cause difficulty in swallowing
- Fever
- Tenderness at the angle of the jaw
- Features of upper airway obstruction such as difficulties in breathing, stridor
- Patient is unable to drink at all

TREATMENT

Adults:

- Give **Amoxycillin** 500mg 8 hourly and **Metronidazole** 400mg 8 hourly

Alternatively

- Give **Benzylpenicillin** 2 MU IV 6 hourly
- Switch when possible (usually after 48-72 hours) to oral **Amoxycillin** 500mg 8 hourly
- Continue for a total of 14 days antibiotic treatment

Alternatively, if penicillin hypersensitivity:

- Give **Erythromycin** 500mg 6 hourly

Children:

- Give **Benzylpenicillin** 50,000units/kg/dose 6 hourly
- Switch when possible (usually after 48-72 hours) to oral **Amoxycillin** 15mg/kg 8 hourly
- Continue for a total of 14 days antibiotic treatment

Alternatively, if penicillin hypersensitivity:

- Give **Erythromycin** 10 mg/kg/dose 6 hourly

Further treatment

- Give analgesic/antipyretic for pain and fever
- *Refer to hospital for the following*
  - If pus is present and does not drain spontaneously then carry out incision and drainage
  - If quinsy is present carry out needle aspiration for analgesic and therapeutic effect

16.1.6 RETROPHARYNGEAL ABSCESS

SIGNS AND SYMPTOMS

- May cause difficulty in swallowing
- Fever
- Tenderness at the angle of the jaw
- Features of upper airway obstruction such as difficulties in breathing, stridor
- If a patient is unable to drink at all Surgical drainage is usually necessary, therefore should be referred.

TREATMENT

Adults:

- Give **Amoxicillin + Clavulanic Acid** 625mg 8 hourly for 14 days
- Analgesic for pain and fever

Children:

- Ceftriaxone 50mg/kg IV daily
- Adjust antibiotics as guided by culture results
- Complete 14 days of antibiotics
- Analgesic/antipyretic for pain and fever

16.1.7 ACUTE BRONCHITIS

CLINICAL DESCRIPTION

Productive cough of purulent sputum, not improving after 3 days, without signs of pneumonia

TREATMENT

- Give **Amoxycillin** 500mg 8 hourly or Amoxicillin + **Clavulanic Acid** 12 hourly for 5 days *or*
- Give **Doxycycline** 200mg on first day followed by 100 mg every day for a further 5 days

16.1.8 CERVICAL ADENITIS

CLINICAL DESCRIPTION

Adenitis may be due to bacterial infection, TB, KS and/or HIV infection among other causes.

TREATMENT

- Give **Amoxycillin** 500mg 8 hourly for 10 days

Alternatively, if penicillin hypersensitivity:

- Give **Erythromycin** 500mg 6 hourly or
- Give **Doxycycline** 200mg on first day
- followed by 100 mg every day for a further 9 days
- For pain or fever give analgesic

Note: If no improvement, do a fine needle aspiration for AFBs

16.2. LOWER RESPIRATORY TRACT INFECTIONS

16.2.1 ASTHMA (RECURRENT WHEEZING)

CLINICAL DESCRIPTION

Asthma is chronic inflammatory airway disease characterized by recurrent reversible airway obstruction, increased responsiveness of bronchial tree to a variety of stimuli resulting into recurrent episodes of wheezing, cough, chest tightness and shortness of breath. *Triggers* include house dust mite, fumes, perfumes, pollen, infection, pets hair, smoke, air pollution, emotions, infection, exercise, drugs (e.g., Aspirin/NSAIDs, beta-blockers such as propranolol), food (e.g. milk, peanut, egg, fish, wheat), weather change etc.

Asthma Phenotypes:

- **Allergic asthma phenotype:** easy to recognize and begins in childhood.
- Associated with a past and/or family history of allergic disease such as eczema, allergic rhinitis, conjunctivitis or food or drug allergy. Eosinophilic inflammation and respond well to inhaled corticosteroid (ICS) treatment.

- **Non-allergic phenotype**: in some adults and have neutrophilic or eosinophilic inflammation and may respond less to inhaled corticosteroid
- **Occupation related asthma**: symptoms may be triggered by work environment exposures
- **Asthma with fixed airway obstruction:** long-standing asthma develop fixed airflow limitation due to airway wall remodeling.
- **Asthma with obesity:** some obese asthma patients have little eosinophilic airway inflammation
- **Exercise induced asthma**: some patients/athletes have asthma symptoms during or after exercise

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Wheezing
- Chest tightness/breathlessness
- Coughing
- Nasal polyp and eczema (in some allergic asthma patients)
- Wheezes and respiratory distress (if during attack)
- May have normal physical examination (in between asthma attacks)

INVESTIGATIONS

- Asthma diagnosis is mainly based on classical recurrent nocturnal and daytime respiratory symptoms +/-wheezes on physical examination.
- Full blood count: mildly high eosinophil count in allergic asthma phenotype
- In some central/private hospitals: high total IgE (in allergic asthma)
- Spirometry: Reduced FEV1, FEV1/FVC <70% with reversible obstruction (increase in FEV1 by 200ml and 12% post-bronchodilator).

Note: Patient with long standing uncontrolled asthma may develop irreversible airway obstruction due to airway remodeling. Spirometry can be normal in asthma between attacks.

- Peak Expiratory Flow Rate: reduced for expected value (for age, sex and height) and excessive diurnal variability of >10% in adults and >13% in children on twice daily measurement of PEFR
- CXR only to exclude complications of asthma (e.g., pneumothorax/pneumomediastinum, pneumonia) or other pathologies
- Stool analysis (to exclude helminths ova)

Beware of mimics of asthma

- Anaphylaxis reaction
- Heart failure causing cardiac asthma due to pulmonary edema
- COPD
- Helminthiasis (Loeffler syndrome)
- Upper-airway obstruction (stridor main feature)
- Vocal cord dysfunction syndrome (paradoxical adduction of vocal cords in inspiration in people with psychological stresses. Diagnosis is through direct laryngoscopy to confirm the paradoxical adduction of vocal cords during inspiration)

COMPLICATIONS OF ASTHMA

- Recurrent acute exacerbations (attacks).
- Pneumothorax/Pneumomediastinum/surgical emphysema (if in severe attack).
- Respiratory failure (in severe attack)
- Pneumonia risk

16.2.2 ACUTE ASTHMATIC ATTACK (ACUTE EXACERBATION)

Can be mild, moderate, severe or life threatening

TREATMENT

TREATMENT OBJECTIVES

- Relieve symptoms of bronchoconstriction with bronchodilators.
- Control airway inflammation with inhaled steroid (very important).
- Prevent further acute attacks and complications.
- Educate patients to avoid triggers where possible.
- Educate patient- good inhaler or spacer use technique and assess at every clinic visit.
- Monitor asthma treatment side effects and address appropriately.
- Assess and address patient fears/myths.
- Assess asthma control at each visit and adjust treatment accordingly

Assess adult patient
Signs of respiratory distress
RR, HR, O_2 saturations, PEFR

Mild	**Moderate**	**Severe**	**Life-threatening**
Undistressed RR < 25 / min, HR < 110 / min O_2 sats > 97% PEFR > 75% predicted	distressed but no signs of severe asthma can complete a sentence PEFR 50-75%	distressed with signs of severe asthma cannot complete a sentence RR > 25 / min, HR > 110 / min SpO_2 sats < 97% PEFR 33-50%	exhausted, drowsy, confused silent chest, cyanotic O_2 sats < 92% PEFR 33%
Treatment 5 mg salbutamol nebulizer *or* salbutamol 4 -10 puffs pMDI or spacer (repeat every 20 min) and reassess in 1h discharge if stable	**Treatment** salbutamol 4 - 10 puffs pMDI or spacer (repeat every 20 min for 1 hr) *or* 5mg salbutamol nebulizer repeat after 15 -20 mins prednisolone 40 mg PO od observe overnight	**Treatment** 5 mg salbutamol nebulizer every and repeat every 10 - 20 mins for 1hr then reassess oxygen supplement (aim 93-95%) prednisolone 40 mg PO od magnesium sulphate 2 g slow IV (over 20 mins) *stat* (dose 40 mg /kg max 2 g) ± aminophylline IV (250 mg slow over 20 mins)	**Treatment** 5 mg salbutamol nebulizer and repeat every 10 - 20 mins for reassess oxygen supplement prednisolone 40 mg PO od *or* IV hydrocortisone 200 mg 6 - 8 hrly magnesium sulphate 2 g slow IV +/- aminophylline IV ICU review for elective intubation and mechanical ventilation

Discharge on
prednisolone 40 mg PO od for 5 -7 days
(prednisolone 1mg / kg max 50 mg od)
salbutamol inhaler
beclomethasone inhaler 2 puffs bd
see in clinic in 4-6 weeks

Ongoing care
regular medical review (involve seniors)
if no improvement, needs ITU review
consider pneumothorax, chest infection, other respiratory pathology
ensure adequate hydration (including IV fluids)

Note: during asthmatic attack

- Can use plastic bottle as a spacer for inhalers
- Systemic steroids (oral prednisone or IV hydrocortisone) are VERY important: exacerbation= inflammation. Give within 1hour of patient arrival to hospital as it takes about 4 hours for the steroids to start working

- **Magnesium sulphate** IV 1.2 -2 g *stat* (40 mg / kg, max 2 g) (dilute in saline and infusion over 20 minutes): mode of action: bronchodilator and anti-inflammatory. Side effects: hypotension and respiratory depression (rare). Contra-indicated in severe renal failure (creatinine clearance < 30 ml / min), AV block, myocardial disease, myasthenia gravis.
- Give IV aminophylline slowly and watch for toxicity (arrhythmias and seizures). Dosage: IV **Aminophylline** 250 IV slow push over 20minutes or 250 - 500mg as IV infusion in 1L of 5% **Dextrose** or 0.9% **Sodium Chloride** over 12 hours. Where possible IV aminophylline should be given when patient has not responded to salbutamol nebulization and magnesium sulphate
- If no response to above medication can give Adrenaline 0.5-1.0ml of 1:1000 slowly nebulized or IM
- When patient is already on maintenance oral Aminophylline avoid giving loading dose of IV Aminophylline
- Antibiotic only indicated if patient has signs of pneumonia
- Salbutamol tablets not ideal for asthmatic attack/asthma maintenance therapy (poor bioavailability and high risk of side effects e.g., heart palpitation/tremor). Salbutamol inhaler preferred.
- If patient asthmatic attack not improving consider escalating treatment facility level, exclude pneumothorax, mimics of asthmatic attack (e.g., Pulmonary embolism, pulmonary edema)

MAINTENANCE AND PREVENTIVE TREATMENT OF ASTHMA - THE STEPWISE APPROACH

- An environment free from cigarette and wood smoke can reduce attacks
- Check compliance and inhaler technique at
  - each step before progressing
- Step up where required due to frequency of
  - exacerbations
- Step down where possible:
  - ***STEP 1****: if symptoms less than twice a week* Initial treatment should be with **Salbutamol** inhaled via a spacer device (see above) as required
  - ***STEP 2****:* If symptoms more than twice a week add preventive therapy-inhaled steroid e.g. **Beclomethasone** 2 puffs (200mcg) 12 hourly via a spacer. Increasing to 4 puffs twice a day as required
  - ***STEP 3:*** Refer for specialist care if no control with steps 1 & 2

Alternatively (to be used only if the above are NOT available)

- Give **Aminophylline** 100mg 12 hourly or 8 hourly.

16.2.3 ASTHMA IN CHILDREN

- Episodic and reversible airway constriction and inflammation.

Life threatening asthma: *1 or more of following features*:

- Cyanosis, O_2 saturation <80%
- Peak Expiratory Flow (PEF) < 33%
- Feeble respiratory effort or silent chest
- Bradycardia, dysrhythmia or hypotension
- Exhaustion, confusion or coma

Severe asthma: 1 or more of following features:

- O_2 saturation <90% or PaO2 < 8 kPa
- Normal or raised PaCO2 (4.6–6.0 kPa)
- Marked tachycardia or pulsus paradoxus
- Impaired speech or feeding
- Peak Expiratory Flow (PEF) < 60%
- Reduced air entry
- Previous ICU admission

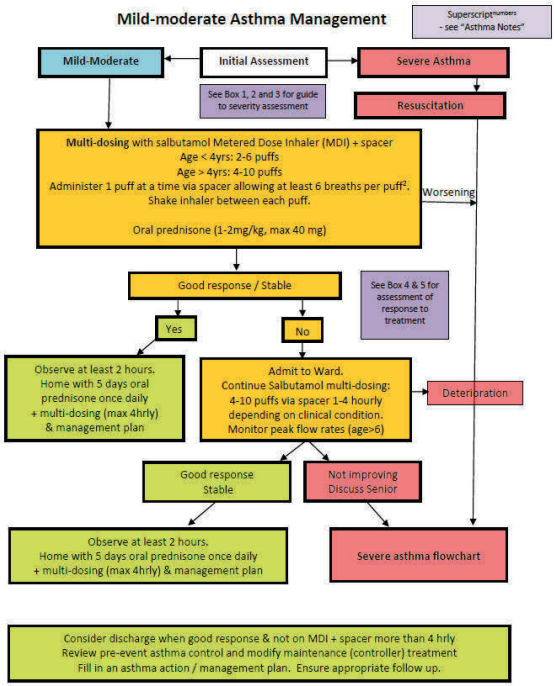
Mild-moderate asthma: *All of the features below*:

- ✓ No cyanosis AND O_2 saturation >90% AND
- ✓ Normal conscious level AND
- ✓ Good air entry AND
- ✓ No marked tachycardia AND
- ✓ No pulsus paradoxus AND
- ✓ Normal speech & feeding AND
- ✓ PEF > 60% AND
- ✓ No previous ICU admission

16.2.4 SEVERE ASTHMA IN CHILDREN

Refer to Severe asthma protocol in emergency chapter

16.2.4.1 MILD TO MODERATE ASTHMA IN CHILDREN

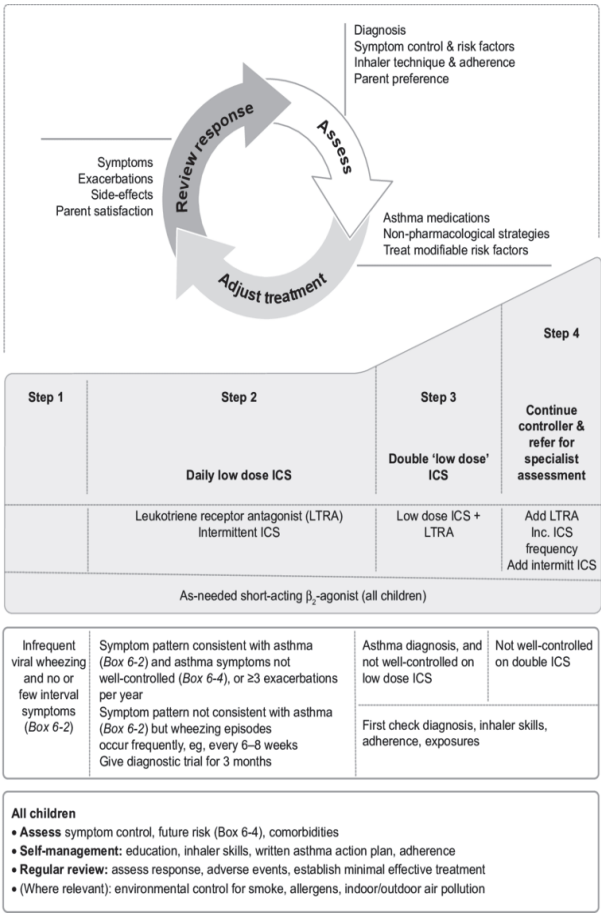


Long term management of asthma in children

1. Assess level of asthma Control

Assessment of symptom control	**Level of Asthma Control**		
In past 4 weeks, has the patient had:	Well Controlled	Partly controlled	Uncontrolled
• daytime symptoms more than twice a week • Any night waking due to asthma • SABA reliever needed more than twice a week? • Any activity limitation due to asthma?	None of these	1 - 2 of these	3-4 of these

2. Asthma treatment strategy


Diagnosis
Symptom control & risk factors
Inhaler technique & adherence
Parent preference
Assess
Asthma medications
Non-pharmacological strategies
Treat modifiable risk factors
Adjust treatment
Review response
Symptoms
Exacerbations
Side-effects
Parent satisfaction
Step 4
Preferred controller choice
Step 1
Step 2
Daily low dose ICS
Step 3
Double 'low dose' ICS
Continue controller & refer for specialist assessment
Other controller options
Leukotriene receptor antagonist (LTRA)
Intermittent ICS
Low dose ICS + LTRA
Add LTRA
Inc. ICS frequency
Add intermitt ICS
Reliever
As-needed short-acting β2-agonist (all children)
Consider this step for children with
Infrequent viral wheezing and no or few interval symptoms (Box 6-2)
Symptom pattern consistent with asthma (Box 6-2) and asthma symptoms not well-controlled (Box 6-4), or ≥3 exacerbations per year
Symptom pattern not consistent with asthma (Box 6-2) but wheezing episodes occur frequently, eg, every 6–8 weeks
Give diagnostic trial for 3 months
Asthma diagnosis, and not well-controlled on low dose ICS
Not well-controlled on double ICS
First check diagnosis, inhaler skills, adherence, exposures
Key issues
All children
• Assess symptom control, future risk (Box 6-4), comorbidities
• Self-management: education, inhaler skills, written asthma action plan, adherence
• Regular review: assess response, adverse events, establish minimal effective treatment
• (Where relevant): environmental control for smoke, allergens, indoor/outdoor air pollution

Guardian Education

- How and when to take inhalers (this will need to be observed)
- How to use a spacer
- When to seek help (e.g., breathlessness not controlled by inhalers, sudden increase in the need for 'relievers')
- Possible precipitating factors
- Follow up monthly

Note:

- Use for the shortest time possible before reverting to preferred Agent
- Exercise induced asthma is usually a sign of poor control. If possible, introduce an extra level of medication according to the stepwise approach above
- If asthma is brought on by exercise, older children and adults can take 2 puffs of **Salbutamol** inhaler via a spacer device 30-60 minutes before games or sports

16.2.5 BRONCHIOLITIS

CLINICAL DESCRIPTION

Airway inflammation and obstruction of the lower respiratory tract and is caused almost exclusively by viral infection in children younger than 2 years

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Preceding history of nasal discharge
- Fever
- Cough
- Shortness of breath
- Tachypnoea
- Wheezing
- Signs of respiratory distress (intercostal recessions, head bobbing, grunting)
- Apnoea
- Hypoxaemia

TREATMENT

SUPPORTIVE

- Give oxygen
- Ensure adequate hydration,
- Use NGT if poor feeding or IV fluids if severe respiratory distress

- Nasal suctioning to clear secretions
- Antipyretics
- Consider CPAP if severe respiratory distress
- **Do not give antibiotics**
- **Bronchodilators e.g., salbutamol have no benefit in bronchiolitis**

COMPLICATIONS

- Pneumothorax
- Respiratory failure

16.2.6 PNEUMONIA IN CHILDREN

CLINICAL DESCRIPTION

WHO Classification of pneumonia

No Pneumonia: cough and cold

Pneumonia: fast breathing and/or chest indrawing

Severe Pneumonia: Pneumonia plus General danger sign (not able to drink, persistent vomiting, convulsions, lethargic or unconscious, stridor in a calm child or severe malnutrition)

CLINICAL FEATURES

- Cough
- Fever
- Tachypnoea
- Signs of respiratory distress
- Bronchial breathing, crackles

TREATMENT

- No pneumonia: home care advice
- Pneumonia: Oral **amoxicillin** 15mg/kg 8 hourly for 5 days

HOME CARE ADVICE

Severe Pneumonia:

- Assess and manage ABCCCD
- Give Oxygen

- Consider CPAP if severe respiratory distress
- **Benzyl Penicillin** 50,000 IU IV 6 hourly and
- **Gentamicin** 7.5mg IV 24 hourly
- Change to oral antibiotics once tolerating orally
- Antipyretics

Complications

- Pleural effusion and Empyema
  - Investigate for TB
- Continue IV antibiotics and insert chest drain
  - Refer patients with complicated empyema
- Lung abscess
  - Refer for surgical drainage
- Septicaemia

Refer all patients with complications

16.2.7 COMMUNITY ACQUIRED PNEUMONIA (CAP)

CLINICAL DESCRIPTION

Pneumonia is inflammation of the lungs caused by infection. Causative organisms can be bacterial, viral or fungal. Community acquired pneumonia (CAP) is mostly caused by *streptococcus pneumoniae. Other causes include Haemophilus influenza, staphylococcus aureus (in diabetes,in children after viral illness like measles),*

Atypical organisms: Mycoplasma pneumonia, chlamydia pneumoniae, Legionella pneumophila.

People at extra risk of CAP: HIV infected, elderly, diabetics, malnourished, smokers and alcoholics. Underlying bronchiectasis – increase risk of S. aureus or gram negative organisms (e.g. H. influenzae or Pseudomonas sp.) For all forms of pneumonia HIV testing is required.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Cough
- shortness of breath
- fever,
- chest pain (can be pleuritic pain)

- Depends on severity, tachypnea, consolidation signs. Herpes labialis presence (suggests streptococcal pneumonia as cause of pneumonia)
- CAP Severity assessment important: determines management either as in patient or outpatient

CAP severity assessment score (CURB-65) in adult

Assign one point to each of the following factors (maximum 5 points):

- -Confusion, restlessness, or excessive
  - Blood Urea Nitrogen (> 7 mmol/L)
- -Respiratory rate (≥ 30 per minute in adults)
  - BP low (Systolic BP < 90 and/or diastolic BP < 60 mmHg)
  - Age (extreme) ≥ 65yr
- 0-1:(Mild CAP): consider home treatment
- 2-3 (moderate CAP) consider short inpatient hospitalization
- 3 (severe CAP): admit and consider HDU/intensive care

Note: multilobar pneumonia, hypoxia, CAP with complications and presence comorbidities e.g. heart failure, CKD, diabetes mellitus necessitate in hospital treatment

INVESTIGATIONS:

- FBC
- Urea, creatinine and electrolytes
- HIV test
- C-reactive protein (CRP)
- Blood culture
- Sputum gram stain and culture and sensitivity, Ziehl-Neelsen stain for acid-fast bacilli or MTB-RIF GeneXpert (to exclude TB)
- Chest X-ray
- FASH, CD4 and Urine TB LAM (if TB suspected)

TREATMENT

- Identify patients at greater risk who require in-hospital management
- Treat the infection and alleviate symptoms
- Prevent and management complications

NON-PHARMACOLOGICAL TREATMENT

- Nurse in comfortable position
- Adequate oral hydration (if tolerated)
- Chest physiotherapy if CAP is complicated by lung abscess

- Pharmacological treatment (depends on severity)

PHARMACOLOGICAL TREATMENT

COMPLICATIONS OF CAP

- Pleural effusion
- Empyema
- Lung abscess
- Pneumothorox (especially with staphylococcus aereus infection and Pneumocystis jiroveci pneumonia)
- Cavitating lesions (staphylococcal aereus, TB, klebsiella)
- Pericardial effusion/pericarditis
- Meningitis
- Septicaemia with shock/multi organ failure
- Adult respiratory distress syndrome (ARDS)

16.2.8 MILD TO MODERATE PNEUMONIA

- Usually caused by pneumococcus (sudden onset)
- Mild symptoms.
- Mild CURB-65 score: 0-1
- Moderate: CURB-65 score: 2-3

TREATMENT

- Give **Amoxycillin** 500mg 8 hourly for 5-7 days

If Penicillin allergic

- Give **Erythromycin** 500mg 6 hourly for 5-7 days
- Give **Doxycycline** 100mg 12 hourly for 5 – 7 days

Note: If the patient does not improve, consider alternative diagnoses.

16.2.9 ATYPICAL PNEUMONIA

Caused by Mycoplasma pneumoniae and Chlamydia pneumoniae Suspect in previously healthy young adult not responding to treatment and also with extrapulmonary symptoms (GIT symptoms)

TREATMENT

- Give **Erythromycin** 500mg or 10mg/kg in children 6 hourly for 5 days

Or

- For children **Azithromycin** 10mg/kg PO daily for 5 days

16.2.10 SEVERE PNEUMONIA

CLINICAL DESCRIPTION

Severe pneumonia with CURB-65 >3 +/- complications as mentioned as above

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Respiratory rate > 30/min, shock (- BP <90/60mmHg), confusion / drowsiness central cyanosis
- Refer to district hospital

TREATMENT

- IV fluids
- Oxygen therapy if hypoxic
- Give **Ceftriaxone** 2g IV 12 hourly

plus

- **Azithromycin** 500mg od or Erythromycin 500mg 6 hourly

Alternatively

- Give **Amoxicillin + Clavulanic acid** 1.2g IV 8 hourly

16.2.11 NOSOCOMIAL PNEUMONIAS

CLINICAL DESCRIPTION

Caused by Staphylococcus aureus, gram negative rods (pseudomonas, klebsiella) and Pneumococcus

Fever, cough, shortness of breath, chest pain developing after 48hrs of admission in health facility

TREATMENT

- Give **Amoxicillin + Clavulanic acid** 1.2g IV 8 hourly or **Ceftriaxone**2g IV daily or **Ciprofloxacin** 400mg 12 hourly IV or **Gentamicin**240mg IV daily
- Followed by oral **Amoxicillin + Clavulanic acid** 8 hourlyfor 7 days

If aspiration

- Add **Clindamycin** 600mg 6 hourly or **Metronidazole** 400mg 8 hourly or **ceftriaxone** 2g IV daily for 5-7 days
- **Erythromycin** 500mg 6 hourly for 7 days

  Or

- Give **Doxycycline** 100mg daily for 7 days

Also think of Pneumocystis jirovecii pneumonia if

- Patient not improving on cap treatment and treat appropriately with high dose **Cotrimoxazole** and steroids
- Hypoxic yet clear chest/minimal chest signs
- Immunosuppressed (HIV, malignancy, immunosuppressants)

16.2.12 LUNG ABSCESS

CLINICAL DESCRIPTION

A lung abscess is defined as necrosis of the pulmonary parenchyma and formation of cavities containing necrotic tissue or purulent fluid, usually caused by microbial infection.

*Causative organisms: A*erobic bacteria (e.g., staphylococcus aureus, streptococcus pyogens, streptococcus pneumonia, Klebsiella pneumonia, Pseudomonas aeruginosa, Haemophilus influenza, Nocardia species), anaerobic bacteria (e.g., Bacteroides species, Fusobacterium species, Pepto streptococcus species), Mycobacterium species (e.g., MTB, NTM), Fungal organisms (e.g., Aspergillus, Cryptococcus, Histoplasma, Blastomyces and Coccidioides species).

Risk factors:

- Most common is aspiration of infected orophangeal secretions e.g., in semi-conscious/unconscious alcoholics, epileptics, stroke, anaesthetised or dental disease patients.
- Foreign body aspiration e.g., inhaled peanut, dentures, fish bone

- Inadequately treated bacterial pneumonia especially, gram negative bacteria like Klebsiella pneumoniae, and beta-haemolytic streptococci, Staphylococcus aureus causing multiple lung abscesses.
- Penetrative lung injury
- Partial obstruction of an airway by tumour or lymph node.
- Septic emboli from other infected areas of the body e.g., right sided bacterial endocarditis
- Bronchiectasis
- Infected bullae in chronic lung disease

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Fever with swinging temperatures
- Cough
- Productive of copious amounts of purulent foul-smelling sputum
- Haemoptysis
- Chest pain
- Breathlessness
- Fatigue
- Anorexia
- Night sweats
- Weight loss
- Fever
- Tachycardia
- Tachypnoea
- Finger clubbing
- Chest wall tenderness
- Dull percussion note
- Diminished breath sounds or bronchial breath sounds with increased vocal resonance or amphoric breath sound.

COMPLICATIONS OF LUNG ABSCESS:

- Rupture into pleural space causing empyema
- Bronchopleural fistula
- Pleural cutaneous fistula
- Respiratory failure

INVESTIGATIONS

- Full blood count
- Urea, Creatinine and Electrolytes
- Blood culture
- Sputum gram stain, culture and sensitivity, ZN stain, GeneXpert MTB/RIF
- Chest X-ray

TREATMENT

- Treat underlying infection
- Treat predisposing conditions
- Ensure at least 4 weeks of antibiotics

NON-PHARMACOLOGICAL TREATMENT

- Chest physiotherapy: aid postural drainage of sputum
- Improve nutritional status
- Ensure adequate fluid intake

PHARMACOLOGICAL TREATMENT.

- **Amoxicillin-Clavulanic acid** IV 1.2g 8 hourly or oral 1g 12
    - Alternative - C**eftriaxone** IV 2g daily plus **Metronidazole** 500mg IV 8 hourly
- Or **Cloxacillin** or **flucloxacillin** 500mg 6 hourly IV or orally
- Adjust treatment as per microbiological sputum results

16.2.13 EMPYEMA

CLINICAL DESCRIPTION

Due to infective process

Causes: bacterial and mycobacterial organism

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Fever, pleuritic chest pain, shortness of breath
- Signs of pleural effusion on physical examination +/-finger clubbing

INVESTIGATIONS

- Full blood count
- Blood culture
- HIV test
- Urea and creatinine
- Pleural tap: gram stain, ZN stain, GeneXpert, WBC and differential, culture and sensitivity
- CXR

TREATMENT

- Carry out surgical drainage (chest drain)
- Continue antibiotic therapy as for CAP for 21 to 28 days
- Rule out TB

16.2.14 BRONCHIECTASIS

CLINICAL DESCRIPTION

In bronchiectasis, the medium and smaller sized bronchi and bronchioles are damaged. Their ciliated epithelium is destroyed by inflammation and scarring, which in a vicious cycle of infection and further scarring leads to permanent dilatation and bronchial wall thickening. The mucus lining of these airways become colonized by bacteria and generate copious amounts of purulent and often offensive sputum.

The disease, if not treated is characterized by frequent infective exacerbations with progressively worsening lung function.

Causes

- Childhood pneumonia e.g., whooping cough, post *measles*
- Post-pulmonary tuberculosis
- Chronic rhinosinusitis with post-nasal drip
- Asthma and COPD
- Fibrosing lung disease of any cause e.g., rheumatoid lung disease Immune deficiency states e.g., HIV infection, agammaglobulinemia.
- Inherited disorders e.g., cystic fibrosis, primary ciliary dyskinesia
- Allergic bronchopulmonary aspergillosis (ABPA)

COMPLICATIONS

- Frequent infective exacerbations
- Hemoptysis

- COPD

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Persistent cough over many months.
- Copious purulent sputum (offensive)
- Hemoptysis
- Fever, night sweats and weight loss
- Chest pain
- Clubbing
- Dull percussion note
- Bronchial breath sounds + Coarse crepitations

INVESTIGATIONS

- FBC, ESR
- Sputum: gram stain, ZN stain, GeneXpert, culture and sensitivity
- Chest X-ray
- CT scan of the chest
- Pulse oximetry

TREATMENT

Treatment objectives

- To treat infection.
- To aid sputum clearance
- To minimize cough and sputum production.
- To prevent exacerbations.
- To diagnose and treat underlying disorders

NON-PHARMACOLOGICAL TREATMENT

- Chest physiotherapy - Postural drainage, Sputum clearance technique
- Breathing exercises
- Improve nutrition
- Encourage adequate fluid intake.
- Encourage physical exercise

PHARMACOLOGICAL TREATMENT.

- Acute infective exacerbation
  - -1st Line Treatment **Amoxicillin + Clavulanic Acid**, oral, 625mg 8 hourly or Adults 1 g 12 hourly for 14 – 21 days or alternatively **doxycycline** 200mg stat then 100mg 12 hourly PO and **metronidazole** 400mg 8 hourly PO for 14 days

16.2.15 BRONCHIECTASIS IN CHILDREN

CLINICAL DESCRIPTION

It is long term condition where widening of the airways leads to build up of excess mucus which makes the lungs more vulnerable to infection

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Chronic productive cough
- Finger clubbing
- Dyspnea
- Wheezing
- Failure to thrive
- Hemoptysis
- Chest pain
- Recurrent respiratory infections

INVESTIGATIONS

- HIV test
- Chest Xray
- Sputum microscopy and culture
- CT chest if available
- Lung function tests

TREATMENT

- Treat respiratory infections aggressively
- Prevent respiratory infections
- Immunizations
- Chest physiotherapy
- Bronchodilator therapy

- **Azithromycin** 10mg/kg PO 3 times a week
- Nutritional support
    - Treat underlying cause

Complications

- Corpulmonale
- Pneumothorax
- Recurrent infections
- Respiratory failure

Referral criteria

- Suspected bronchiectasis to a tertiary facility for diagnostic work up.
- Refer all bronchiectasis patients for further investigations and specialist care if new case

16.2.16 CHRONIC LUNG DISEASE / COPD

CLINICAL DESCRIPTION

A ccommon disease that is preventable, treatable, and progressive and that is characterized by:

- Persistent respiratory symptoms
- Frequent exacerbations - infective and non-infective
- Airflow limitation that is not fully reversible
- Associated with abnormal inflammatory response of the airways / alveoli to noxious particles or gases
- Pulmonary and systemic effects

Risk factors

- Indoor cooking of solid fuels (biomass fuel exposure to firewood, charcoal, dung, crop residues, stove) – main risk factor in malawi
- Cigarette smoking (tobacco / cannabis, active or passive): Main risk factor globally
- Urban air pollution destructive lung disease (e.g., Tb, bronchiectasis)
- Low socioeconomic status
- aging population (longevity ↑ exposure time to risk factors)
- Poorly controlled asthma
- Impaired foetal and childhood lung growth (prematurity, childhood infections, hiv infection, maternal smoking)
- Genetic (e.g., A_1-antitrypsin deficiency).

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Chronic dyspnea/shortness of breath (common symptom)
- Sputum production
- Pursed lip breathing
- Prolonged expiration
- Cyanosis
- Paradoxical retraction of lower intercostal spaces during inspiration
- Decreased crico-sternal distance
- Barrel chest (hyper-inflated chest)
- Mild wheezing, even when they are not under acute distress
- Hyperresonance percussion note
- Coarse basal crackles
- Apex beat difficult to localize
- Loss of cardiac dullness
- Distant heart sounds
- Liver displaced inferiorly
- Raised Jugular Vein Pressure, hepatomegaly and pedal oedema if right heart failure (in severe COPD)

Complications of COPD

- Acute exacerbations
- Spontaneous pneumothorax
- Cor pulmonale and right heart failure
- Arrhythmias
- Polycythaemia
- Skeletal muscle wasting/cachexia
- Worsening of comorbidities (heart failure, obstructive sleep apnoea)
- Osteoporosis (recurrent use of oral steroids)
- Diabetes mellitus (recurrent use of oral steroids)
- Metabolic syndrome (multiple use of oral steroids and inactivity)
- Normocytic anaemia
- Depression / anxiety
- Lung cancer (if smoker)
- Death

INVESTIGATIONS

- Oxygen saturation: hypoxia (if severe COPD)
- CXR can reveal hyper-inflated lungs
- flattened diaphragms
- small heart shadow
- teardrop shaped heart shadow
- increased retrosternal air space
- Spirometry is needed to confirm the diagnosis of COPD
- Post-bronchodilator FEV1 / FVC < 70%

TREATMENT

Treatment objectives

- Advise patients to stop smoking if they are smokers.
- Avoid indoor cooking in poorly ventilated kitchen / homes if possible

NON-PHARMACOLOGICAL TREATMENT

- Advise to stop smoking and exposure to biomass fuel

PHARMACOLOGICAL TREATMENT

- Step 1: Inhaled **salbutamol** 2puffs prn or ipratropium bromide inhaler
- Step 2: if not improving on step 1 treatment: add **aminophylline** 100mg 8 hourly PO or long-acting beta –agonists inhaler (**salmeterol** or **formoterol**) or long-acting muscarinic antagonists (**tiotropium inhaler**) if available. Refer to specialist clinic
- Step 3: add inhaled corticosteroid (e.g., **beclomethasone**, **fluticasone**) if frequent exacerbator- ≥ 2 exacerbations in past 12 months or FEV1 <50% predicted

Note:

- If COPD patient requires surgery, please stabilize the COPD first before surgery and refer to specialist if need be.
- Refer to specialist if COPD patient has chronic hypoxia for further evaluation

16.2.17 ACUTE EXACERBATION OF COPD

CLINICAL DESCRIPTION

Acute worsening of dyspnoea, increased sputum volume, purulent sputum (+ / -fever) that requires additional treatment

- Exacerbations → progression and result in loss of lung function and poor quality of life
- can be mild, moderate, or severe

Causes of exacerbations

- tracheobronchial infections main trigger - viral (rhinovirus) > bacterial (S. pneumoniae, H. influenzae, Moraxella catarrhalis. Consider Pseudomonas aeruginosa if frequent exacerbator and recent hospital admission)
- environmental exposure / air pollution (respirable particles, ozone)
- allergens
- aspiration and GORD
- weather changes
- discontinuation of maintenance treatment

Differential diagnosis of exacerbations

- non-pulmonary infections
- pulmonary embolism
- pneumothorax
- pleural effusion
- CCF with pulmonary oedema

CLINICAL FEATURES

INVESTIGATIONS

- FBC, blood culture, sputum analysis, CXR

TREATMENT

- Exacerbations need bronchodilators, antibiotics, and steroids
  - **Nebulized salbutamol** 5mg / **ipratroprium** bromide and oral **aminophylline** 100 mg *8 hourly PO*. Can use salbutamol inhaler with spacer if no nebulised salbutamol
  - **Prednisolone** 40 mg *daily* PO for 5 days (**5 days course is enough**). Steroids shorten hospital stay / recovery time and improve lung function oxygenation and clinical outcome.
  - Antibiotics (if bacterial infection trigger suspected)
    - Amoxicillin 1g 8 hourly PO for 7 days. Alternative **Amoxicillin + Clavulanic acid (Augmentin^{R})** 625mg 8 hourly PO or **doxycycline** 100mg 12 hourly or **azithromycin** 500mg daily. **ceftriaxone** 2g daily IV (if severe exacerbation)

        - if frequent exacerbation with recent hospital admission and antibiotic use: cover for *Pseudomonas spp* e.g., with **ciprofloxacin** 500mg 12 hourly for 7 days
- oxygen saturation and the use of oxygen
    - COPD patients often have lower SpO_2 than asthma patients, even when stable.
        - in asthma, if SpO_2 drops below 95%, it is worrisome.
        - a COPD patient may be stable with SpO_2 as low as 87%.
    - avoid the use of high flow oxygen in COPD patients wherever possible (as oxygen may remove their hypoxia dependent respiratory drive and cause hypoventilation→ CO_2 retention, narcosis → coma).
    - use 2 L / min oxygen as treatment or less, or to target SpO_2 to 88 - 92 %.

NIV (non-invasive ventilation) for severe exacerbation: CPAP is preferred if no contraindications

- Improves oxygenation / gas exchange / survival
- Reduce work of breathing and need for intubation
- Reduce hospital stay
- Improves respiratory acidosis

Before discharge

- start inhaled bronchodilators asap when stable before hospital discharge
- if frequent exacerbator: regular salbutal 2 puffs 6hrly through spacer
- long term use of oral steroid is not required
- plan for follow-up within 1 month: 20% of patients may not recover at 8 weeks

16.2.18 DEEP VEIN THROMBOSIS (DVT)

CLINICAL DESCRIPTION

DVT in lower limbs are the most common. Other sites include upper limbs, intracranial and splanchnic veins

Risk factors:

- Obesity,
- Smoking,
- Prolonged immobility (long haul flights, long road trip, bed rest due to sickness),
- Major surgery (e.g. Orthopaedic,abdominal and pelvic surgery),
- Pregnancy and the puerperium, after caesarean section,
- Malignancies,
- Inherited blood disorders,
- Oestrogen therapy (oral contraceptives)

- Medical conditions (e.g., HIV infection, congestive cardiac failure, myocardial infarction, nephrotic syndrome, stroke, systemic lupus erythematosus, antiphospholipid syndrome).

POSSIBLE COMPLICATION OF DVT

- Pulmonary embolism

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Unilateral swelling of affected limb
- Pain on affected limb
- Pitting edema, warm and tenderness of affected limb

Well's score calculation for DVT (provides clinical likelihood of DVT)

- Paralysis, paresis or recent orthopedic casting of lower extremity (1 point)
- Recently bedridden (more than 3 days) or major surgery within past 4 weeks (1 point)
- Localized tenderness in deep vein system (1 point)
- Swelling of entire leg (1 point)
- Calf swelling 3 cm greater than other leg (measured 10 cm below the tibial tuberosity) (1 point)
- Pitting oedema greater in the symptomatic leg (1 point)
- Collateral non varicose superficial veins (1 point)
- Active cancer or cancer treated within 6 months (1 point)
- Alternative diagnosis more likely than DVT (Baker's cyst, cellulitis, muscle damage, superficial venous thrombosis, post phlebitic syndrome, inguinal lymphadenopathy, xternal venous compression) (-2 points).

Well's Score Interpretation for DVT

- 3-8 Points: High probability of DVT
- 1-2 Points: Moderate probability
- -2-0 Points: Low Probability Low probability: D-Dimer test is recommended. Low pre-test probability combined with a negative D-Dimer test essentially rules out a DVT.
- Moderate or High Probability: Doppler/compression ultra sound scan is recommended (plus D-dimer test if available).

INVESTIGATIONS

- FBC
- HIV test
- In patients with recurrent DVT and tests available: thrombophilia screen e.g. protein C, protein S levels;
- SLE/antiphospholipid screen tests

TREATMENT

Treatment objectives of DVT

- Initiate treatment (anticoagulation) as soon as possible without delay to prevent further extension of the thrombus and complication of DVT (e.g., pulmonary embolism)
- Treat/modify risk factors where possible to prevent recurrence:

NON-PHARMACOLOGICAL TREATMENT

- Prevention of DVT/ DVT recurrence: Regular exercise during long journeys e.g., stopping on road journeys to take a walk or moving about on a plane during long flights and leg flexing exercises while seated.
- Avoid crossing legs for long periods on long journeys
- Use of elastic compression stockings
- Change of oral contraceptives to alternative contraceptive

PHARMACOLOGICAL TREATMENT

- Exclude contraindications for anticoagulants: severe liver disease, active bleeding PUD, recent haemorrhagic stroke, severe thrombocytopenia
- Anticoagulation:
    - Low molecular weight heparin e.g., **Enoxaparin** 1mg/kg 12 hourly SC or **Unfractionated heparin** (UFH) 15 000 IU 12 hourly SC Plus
    - Adult loading dose **Warfarin** 10mg daily on Day 1, Day 2 and then 5mg daily on Day 3 and check INR. Aim at achieving INR target 2 -3.
    - When INR is therapeutic (2-3) stop **heparin** and continue with **warfarin** 5mg (adjust dose as per INR) for minimum of 3 months if risk is temporary or unknown.

Note:

- Warfarin should ONLY be prescribed if INR can be monitored. Warfarin is contraindicated in pregnancy (teratogenicity risk).
- Therefore, heparin is recommended anticoagulant in pregnancy

- Monitor platelet level when patient is on Heparin (risk of heparin induced thrombocytopenia)
- Some patients may require longer period of anticoagulation (active risk factor: ongoing active cancer, SLE, antiphospholipid syndrome).
- Where available can use new oral anticoagulant e.g., rivaroxaban or dabigatran

DVT prophylaxis for immobile in-hospital patients

- **Unfractionated heparin**: adults 5000 Units 8-12 hourly SC Or **Enoxaparin** 40mg daily SC

Criteria for referral of DVT patient for specialist care

- If not possible to confirm it
- No anticoagulant drugs available
- Possibility of pulmonary embolism complication

16.2.19 PULMONARY EMBOLISM (PE)

CLINICAL DESCRIPTION

Pulmonary Embolism often results from thrombi from the deep veins of the lower limbs or pelvis, which are transported via the right heart into the pulmonary vasculature.

Large emboli may cause obstruction to blood flow and result in life-threatening hypoxia, hypotension and high mortality.

PE should therefore be managed as a medical emergency.

The risk factors and management for PE are similar to those for DVT. (See section on 'DVT' above).

CLINICAL FEATURES

SIGNS AND SYMPTOMS:

- Sudden pleuritic chest pain
- Shortness of breath (dyspnea)
- Cough
- Haemoptysis (due to pulmonary infarction)
- Syncope (if massive PE)
- Tachycardia
- Tachypnea
- Low oxygen saturation and low blood pressure (if massive pe)
- Clear chest or signs of pleural effusion/pleural rub

- Dvt signs (tender calf or unilateral leg swelling.

Calculate Well's scoring for PE probability (clinical likelihood)

- Symptoms of DVT (3 points)
- No alternative diagnosis better explains the illness (3 points)
- Tachycardia with pulse > 100 (1.5 points
- Immobilization (≥ 3 days) or surgery in the previous 4 weeks (1.5 points)
- Prior history of DVT or pulmonary embolism (1.5 points)
- Presence of hemoptysis (1 point)
- Presence of malignancy (1 point)

Well's Score Interpretation for PE

Score > 6: High probability

Score >= 2 and <= 6: Moderate probability

Score < 2: Low Probability Low probability: D-Dimer test is recommended (if available).

Moderate or High Probability: D-Dimer test with additional CT Pulmonary angiogram is recommended.

INVESTIGATIONS

- Full blood count and urea and creatinine
- D-dimer: high
- Chest X-ray: normal or may show area of oligaemia (loss of vascular markings), peripheral wedge-shaped opacity, small pleural effusion, plate atelectasis (linear opacity-atelectasis)
- ECG: sinus tachycardia (common finding), S1Q3T3 patter
- Echocardiogram: may see thrombus in pulmonary trunk and strained right heart in Massive PE
- Compression or Doppler USS of the swollen leg: DVT presence
- CT Pulmonary angiogram: confirms PE

TREATMENT

Treatment objectives

- To stabilize cardio-respiratory function
- To prevent further clot formation and embolization
- To prevent recurrence and development of pulmonary hypertension

NON-PHARMACOLOGICAL TREATMENT

- Elevate affected leg on a pillow if DVT present
- Apply compression stockings - after pain subsides if DVT present

PHARMACOLOGICAL TREATMENT

- Clinical suspicion of pulmonary embolus/confirmed
  - **Oxygen** therapy by face mask or nasal prongs or via non-rebreather mask (keep oxygen saturation > 95%).
  - Anticoagulation (as in DVT section above) and aim INR target 2 to 3 when patient on warfarin
  - When target INR is achieved continue warfarin and stop low molecular weight heparin. Maintenance **warfarin** dose of 2.5 mg to 5 mg (some may require higher dose to maintain target INR.
  - Anti-coagulate for a minimum of 3 months and then reevaluate if PE still present and need to continue anticoagulation

Note: Recurrent embolisms and permanent risk factors such as thrombophilia, chronic thromboembolic pulmonary hypertension requires long term anticoagulation.

COMPLICATIONS OF PULMONARY EMBOLISM

- Obstructive shock (severe hypotension)
- Hypoxia
- Chronic thromboembolic pulmonary hypertension (CTEPH)

REFERRAL CRITERIA:

- Refer all patients with suspected pulmonary embolism, where facilities are unavailable for confirmation of PE
- PE requires a physician specialist or cardiologist expert management after stabilization.
- Massive PE can cause Obstructive Shock (systolic BP <90mmHg) which needs thrombolysis under specialist car

CHAPTER 17: SEXUALLY TRANSMITTED INFECTIONS (STI'S)

OVERVIEW

- Refer to the Management of Sexually Transmitted Infection using Syndromic Management Approach, Guidelines for Service Providers.
- All patients who present with STI symptoms should be offered HIV Testing and Counselling.
- Women with abnormal vaginal discharge or symptoms of an STI **MUST** have a vaginal speculum examination as part of their evaluation

Note: Prompt and effective treatment of STIs helps prevent spread of HIV infection.

GENERAL MANAGEMENT

- Ensure adequate privacy in patient management.
- Establish a correct diagnosis whenever possible. This involves doing blood tests and obtaining tissue samples for laboratory analysis to identify the specific causative agent and institute specific treatment (in the hospital setting).
- Make efforts to trace, treat and counsel all sexual contacts.
- Provide health education and counselling on each return visit.
- Advice on 'safer sex' practices to prevent re- infection, i.e. abstinence, correct use and storage of condoms, mutual faithfulness of uninfected partners, decrease in number of sexual partners, use of non-penetrative sexual techniques and the importance of partner notification and treatment.
- Offer a supply of condoms at each patient's visit; if client is HIV negative, offer r HIV Pre-exposure Prophylaxis and Voluntary Medical male Circmcision

Note: Periodically check the patient's understanding of the above issues by asking him/her to repeat the information given

17.1. SYNDROMIC MANAGEMENT OF STIS

OVERVIEW

The syndromic approach is based on the fact that most common causes of an STI generally present with certain groups of signs and symptoms (syndrome) and treatment given is supposed to target the commonest possible causes of that syndrome. It should be noted, however, that these signs and symptoms only point to certain diagnoses. The caregiver should ALWAYS seek to establish the definitive diagnosis whenever possible as stated above. This may necessitate a speculum examination.

COMMON STI SYNDROMES:

Genital ulcer disease (GUD)	**Acute scrotal swelling**
Urethral discharge (UD)	Enlarged inguinal lymph nodes (bubo)
Genital-urinary symptoms in women (GUS)	Balanitis/balanoprostitis
Lower abdominal pain (women) (LAP)	

17.1.1 GENITAL ULCER DISEASE (GUD)

CLINICAL DESCRIPTION:

Common Causes

- Genital herpes, Chancroid and Syphilis may be present concurrently.
- Genital herpes is the most prevalent amongst the three.
- Treat patients with GUD for the above three infections

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Genital ulcer (painful or painless)
- Urethral discharge
- Inguinal swelling (lymphadenopathy)

INVESTIGATIONS

- VDRL
- TPHA

TREATMENT

NON-PHARMACOLOGICAL

- Keep lesions dry and clean

PHARMACOLOGICAL

- *Treatment* Give **Ciprofloxacin** 500mg PO 12 hourly for 3 days and
- Give **Benzathine penicillin** 2.4 MU IM STAT
- Give **Acyclovir 400mg** 8 hourly for 7 - 10 days
- Tell patient to return for follow-up care in 7-10 days, *see below*
- **If bubo present,** use Azithromycin 1g orally STAT and 1g after 1 week

Note: Acyclovir is indicated only in symptomatic GUD clients. If genital herpes infection is suspected and this is the first episode, treat with acyclovir for 7-10 days. If it is a recurrent genital herpes infection, lower the dose frequency to twice a day and treat for a shorter duration – 3 days. Offer analgesia if indicated, particularly in GUD with pain.

If patient allergic to penicillin/Ciprofloxacin and pregnant or lactating:

- Give **Erythromycin** 500mg 6 hourly for 15 days' plus
- Give **Acyclovir** 400 mg 8 hourly for 7 – 10 days

***Infants born to mothers treated for GUD with Erythromycin alone*:**

- Give **Benzathine Penicillin** 500,000 IU/kg as a single dose

- *Follow-up care of GUD*
- Inform the patient to return 7-10 days after starting treatment.
- *If the ulcers have not healed or are getting worse*, repeat GUD treatment if there is evidence of noncompliance.
- If the client complied fully and there is no improvement:
  - Give **Azithromycin** 2g STAT.
  - Review in further 7-10 days
  - If no improvement after 14 days, ***refer for specialist opinion (patient may need a tissue biopsy)***
  - If improved, *follow patient's progress until completely healed*
  - No further antibiotics are required at this time
- *If the ulcers have improved but not completely healed:*
  - Repeat chancroid treatment

Ciprofloxacin 500mg single dose

  - Review in further 7-10 days
  - Subsequent action as above
- *If the ulcers have completely healed:*
  - Reinforce counselling and patient education
  - Promote/provide condoms

17.1.2 ABNORMAL VAGINAL DISCHARGE (AVD)

CLINICAL DESCRIPTION:

- While a vaginal discharge is a notable clinical feature of a Sexually Transmitted Infection (STI), not all forms of vaginal discharge are abnormal or indicative of an STI. Vaginal discharge may be associated with normal physiological changes such as the menstrual cycle or pregnancy. Increased discharge may also occur with the presence or use of foreign substances such as the Intra Uterine Contraceptive Device (IUCD).
- Abnormal vaginal discharge due to STIs may result in serious pelvic inflammation with sequelae such as ectopic pregnancy and infertility. Careful risk assessment is therefore required (see note below) of women presenting with a vaginal discharge in order to identify the possible causes and provide appropriate treatment regimens based on the most likely aetiology of the vaginal discharge.

Causes

- Vaginal infection
- Cervical infection
- Endometrial infection
- pelvic inflammatory disease (PID)

Common causes of vaginal infections	***Common Causes of cervical infections***
Trichomonas vaginalis	*Neisseria*
candida albicans	*gonorrhoea*
bacterial vaginosis	*chlamydia trachomatis*

Note: Vaginal discharge is normal during and after sexual activity; at various points through-out the menstrual period; and during pregnancy and lactation.

NB: it is mandatory to perform a pelvic examination which includes a speculum examination for all women presenting with abnormal vaginal discharge.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Abnormal vaginal discharge - change in colour, odour, consistency or amount
- Vulval itching and swelling
- Pain on urination
- Lower abdominal or back pain and tenderness
- Cervical excitation tenderness
- Cervical mucopus or erosions (on speculum examination)

INVESTIGATION

- High vaginal swab for microscopy, culture and sensitivity

TREATMENT

NON-PHARMACOLOGICAL

- Do risk assessment to identify women at risk of cervical infection
- Promote good peri-anal and genital hygiene
- Encourage use of loose cotton underwear
- Dry underwear out in the sun
- Keep underwear dry
- Avoid douching with herbal or chemical preparations
- Avoid use of medicated soaps

PHARMACOLOGICAL

GENERAL MANAGEMENT

- Treat all women with vaginal discharge and a positive risk assessment for *gonococcus* and *Chlamydia infection*, plus *trichomoniasis* and
  - If the discharge is white and curd-like also treat for *candidiasis*.
- Treat all women with vaginal discharge and a negative risk assessment for *trichomoniasis* and *bacterial vaginosis*
  - If the discharge is white and curd-like, also treat for *candidiasis*.

TREATMENT

- If vaginal discharge is present and the risk assessment is positive:
  - Give**Ceftriaxone** 250mg IM STAT *plus*
  - Give **Azithromycin** 1g orally as single dose, *plus*
  - Give **Metronidazole** 2g orally single dose

- If the discharge is white or curd-like add 1 **Clotrimazole pessary** 500mg inserted intra- vaginally stat

- If vaginal discharge is present and risk assessment is negative:
  - Give **Metronidazole** 2g orally single dose stat ONLY

- If no discharge is found and risk assessment is positive:
  - Give **Ceftriaxone** 250mg IM STAT plus
  - Give **Azithromycin** g orally as a single dose.

- If no discharge is found and risk assessment is negative:
- Reassure client, counsel, educate and provide condoms.
- Advise client to come back if symptoms persist.
- Offer HIV testing after providing information and counselling
- Offer cervical cancer screening

Note: Examination of GUS in women should *never* be omitted only for convenience of the health worker

17.1.3 LOWER ABDOMINAL PAIN IN WOMEN

CLINICAL DESCRIPTION

It may be a serious condition

Notes:

- Not every woman with lower abdominal pain has PID.
- Be sure to exclude any conditions which require immediate surgical or gynecological treatment

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Fever, abnormal vaginal discharge, cervical motion tenderness, and often adnexal tenderness or masses on bimanual examination.
- *Signs and symptoms of acute illness requiring immediate gynaecological/surgical attention*:
  - Missed or overdue or delayed period; delivery or miscarriage; abnormal uterine bleeding; abdominal guarding or rebound tenderness; active vaginal bleeding.

INVESTIGATIONS

- High vaginal swab culture and sensitivity

TREATMENT

NON-PHARMACOLOGICAL

- *If the patient has a missed/overdue period or abnormal vaginal bleeding:*
  - *Check vital signs*
    - Do a urine pregnancy test
    - Offer analgesia
    - Consider admission and/or referral if necessary

N.B. When referring, ensure patient's general condition is stable

- *If the patient is very ill, bleeding heavily or in shock*:
  - Set up an iv drip and commence resuscitation
- *If the patient does not have missed/overdue period or abnormal vaginal bleeding but does have any of the following:*
  - Recent delivery; Recent/suspected miscarriage; Rebound tenderness; Abdominal guarding
- If at the health centre Give first dose of treatment for PID.
- Refer immediately for hospital admission after resuscitating the patient should this be required.

PHARMACOLOGICAL

If at the hospital, admit if the patient: **is obviously sick; is pregnant; vomits oral medication or if adequate follow-up care cannot be provided.**

- *If the patient does not have missed/overdue period or abnormal vaginal bleeding and does not have any of the signs/symptoms listed above but does have cervical excitation tenderness or fever:*
  - Give **Ceftriaxone** 250mg IM stat,

- Give **Azithromycin 1g orally as single dose** and
- Give **Metronidazole** 400mg 12 hourly for 10 days.
- Remove IUCD if any and offer other means of contraception
- Treat partner for gonococcal and chlamydial infection as described above
- Review patient after 72 hours:

- *If improved*, complete 10-day course of treatment for PID
- *If not improved*, refer for gynaecological or surgical consultation
- *If the patient does not have missed/overdue period or abnormal vaginal bleeding and does not have any of the signs/symptoms listed above, and does not have cervical motion tenderness or fever:*
  - Determine whether the patient has any other genitourinary complaint/syndrome and manage as per appropriate syndrome:
  - Ask her to return if the abdominal pain persists

17.1.4 PID: IN-PATIENT TREATMENT

CLINICAL DESCRIPTION:

- A triad of lower abdominal pain, abnormal vital signs (particularly fever and tachycardia) and peritonism (guarding or rebound tenderness with cervical motion and adnexal tenderness).
- Patients additionally have positive risk screen and abnormal vaginal discharge

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Failure to respond to syndromic treatment regime within 72 hours
- Presence of tender pelvic mass which may be an abscess or an ectopic pregnancy
- History or suspicion of recent induced abortion, delivery, or miscarriage
- Active vaginal bleeding
- Missed, overdue or delayed period
- Pregnancy
- Heavy menstrual bleeding
- Vomiting

Note: The patient should be admitted

PHARMACOLOGICAL

If deranged vital signs, dehydration etc.

- Give IV fluids
- Offer analgesia
- Parenteral antibiotics.

1st line	Ceftriaxone 2g IV 24 hourly
	metronidazole 500mg IV 8 hourly
alternative 1st line	Gentamicin 240mg IV 24 hourly
	Metronidazole 500mg IV 8 hourly
	Ampicillin 1g IV 8 hourly

- *When improved and able to swallow switch to oral antibiotics:*
  - **Doxycycline** 100mg 12 hourly and
  - **Metronidazole** 400mg 8 hourly for 10 days
  - Analgesic
- *If pain is severe:*
  - Give **Pethidine** 100 mg IM then PRN

Notes:

- Post abortal sepsis and puerperal sepsis may present as acute PID. If these are recognized, the following must be done:
- Admit and treat with parenteral antibiotic therapy.
- **If retained products of conception suspected, *evacuate the uterus*** within 12 hours of antibiotic therapy regardless of the patient's temperature
- Provide supportive care such as blood transfusion, iv fluids and closely monitor vital signs.

17.1.5 ACUTE SCROTAL SWELLING OR PAIN

CLINICAL DESCRIPTION

CAUSES

- Chlamydia trachomatis
- Neisseria gonorrhea

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Scrotal swelling
- Scrotal pain
- Urethral discharge
- Dysuria
- Frequency of micturition
- Fever

Distinguish from scrotal swelling/pain due to:

- *Other long-standing causes*, e.g. Scrotal hydrocele, varicocele, inguinal hernia
- *Recent/acute illness,* e.g. Testicular torsion or trauma, inguinal hernia

INVESTIGATIONS

- Urethral swab for culture
- Urine culture and sensitivity
- Ultrasound scan of the scrotum

Note: Thorough history and physical examination are necessary to exclude potentially life-threatening conditions and to determine whether immediate surgical attention is required

TREATMENT

NON-PHARMACOLOGICAL

- Bed rest
- Cold compress *If there is no evidence of painful and/or swollen scrotum*, look for signs of another STI and if present treat appropriately
- Scrotal support until inflammation and fever subsides

PHARMACOLOGICAL

- *Even if the presumptive diagnosis is an STI,* treat all patients and partners for gonorrhea and chlamydia infection:
    - Give **Ceftriaxone** 250mg IM STAT and
    - Give **Azithromycin** 1g orally as single dose.
    -
    - Additional therapy for the patient

17.1.6 ENLARGED INGUINAL NODES (BUBO)

CLINICAL DESCRIPTION

CAUSES:

- Both chancroid and lymphogranuloma venereum (LGV) can cause bubo.
- Exclude the following conditions which may also cause enlarged inguinal lymph nodes: septic skin lesions on thigh, foot, leg, toes, buttock, anus, perineum, scrotum, penis, labia, vulva and vagina, systemic infections e.g. Hepatitis B, HIV, infectious mononucleosis, syphilis, TB, bubonic plague, cat scratch fever, trypanosomiasis, lymphoma, leukemia, Kaposi's sarcoma.
- Exclude other conditions which may cause groin swelling unrelated to enlarged lymph nodes including: inguinal hernia, lipoma, a boil in overlying skin.
- Confirm presence of bubo by careful examination

Note: All patients with bubo should be carefully examined for signs of other STIs

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Painful or painless inguinal swelling(s)
- Inguinal swellings:
    - unilateral or bilateral
    - tender or non-tender
    - STI-related Genital Warts
    - fluctuant suppurating
- Genital ulcer

INVESTIGATIONS

- No investigations required, in view of the syndromic approach
- Recommended in managing STIs

TREATMENT

NON-PHARMACOLOGICAL

- Aspiration of fluctuant buboes using a wide bore needle through adjacent healthy skin every second or third day. An incision and drainage should not be attempted. If buboes persist, the patient should be referred.
- Sequelae such as strictures and/or fistula may require surgery.
- *If bubo not present and other signs of STI not found*, reassure, educate/counsel the patient
- Promote/provide condoms

PHARMACOLOGICAL

- *If bubo present andgenital ulcer present:* treat as for genital ulcer disease syndrome
- *If bubo present, and painful, fluctuant or recent onset (under 2 weeks) and no genital ulcer present:* treat patient and partner for LGV.

- Give **Doxycycline** 100mg 12 hourly with food for 14 days. If pregnant/ lactating, give **Erythromycin** 500mg 6 hourly for 14 days

- If bubo fluctuant, aspirate through adjacent normal skin (do not incise)
- *If enlarged inguinal lymph node present, but not painful, fluctuant or of recent onset (under 2 weeks) and no genital ulcer present:* look for other causes of inguinal swelling: e.g. generalized lymphadenopathy (rule out secondary syphilis and HIV), hernia, tumour.
- Refer for biopsy if indicated
- *If bubo not present but other signs of STI found,* treat accordingly

17.1. 7 GENITAL WARTS

CLINICAL DESCRIPTION

- These must be distinguished from *condyloma* of secondary syphills, *molluscum contagioum and vulva cancer*
- Besides local caustic applications, surgical removal or electrocautery may be used for treatment:
  - For more extensive growth
  - When topical applications have failed
  - When topical application is contra-indicated

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Small, flat, papular, pedunculated, flesh-colored swellings on the skin and mucous membranes of the genitals (penis, vulva, vagina, cervix, urethra, perianal region)
- Usually no symptoms
- Small painless swellings in the ano-genital region
- Itching or discomfort in the genital area
- May cause increased vaginal discharge
- Anal or vaginal bleeding during or after sex

INVESTIGATIONS

- Acetic acid solution (vinegar) test

TREATMENT

NON-PHARMACOLOGICAL

- Apply **Compound Podophyllin Paint** to the lesions once a week for 6 weeks
- Apply **petroleum jelly** to avoid normal tissue damage
- Use only for scattered growth
- When applied to vulval mucosa or urethral meatus warts, allow to dry before coming back into contact with normal epithelium
- Remove the paint by washing off after 4 hours

Note: Do not use this therapy during pregnancy

- If no effect after 4-6 weeks, stop treatment and consider alternative methods of removal
- *Alternative to Podophyllin Paint, and for treating vulvar warts*:
- Apply **Silver Nitrate Stick (pencil)** 24 hourly

17.1.8 NEONATAL CONJUNCTIVITIS

CLINICAL DESCRIPTION

Neonatal conjunctivitis or ophthalmia neonatorum is an acute purulent conjunctivitis during the first month of life. It is usually contracted from infected genital secretions of the mother. These serious conditions rapidly progress and threaten sight

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Swelling of the eye lids
- Eye discharge, which may be purulent
- Redness and swelling of the conjunctivae
- Oedema and redness of the eyelids

Note: At birth give all neonates a single prophylactic application of tetracycline eye ointment

INVESTIGATIONS

- Conjunctival swabs for Gram staining and culture

TREATMENT

NON-PHARMACOLOGICAL

- Clean the eyelids frequently (every 2 hours) with cotton wool dipped in sterile saline solution. In the absence of sterile saline solution, use boiled water that has been left to cool until the purulent discharge is cleared.
- Admit patient to hospital
- Closely monitor until the infection has resolved

PHARMACOLOGICAL

All parents of infected babies:

- **Ceftriaxone**250 mg IM single dose,plus
- **Azithromycin 1g orally as single dose**

Infants with signs of conjunctivitis:

- Isolate immediately
- Institute a rigorous system of barrier nursing with careful attention to hygiene
- Give **Ceftriaxone** 50mg/kg IM once and **Azithromycin** 20mg/kg once aday for 3 days..

Alternatively, for Ceftriaxone,

- Give **Cefotaxime** 50mg/kg IM as a single dose (maximum 125mg)
- Give **Tetracycline eye ointment 1%** 6 hourly for 3 days applied in each eye every 6 hours for 3

days

- Clean away any discharge before application
- *Treat Father with*
  - **Ceftriaxone** 250mg IM STAT, and
  - **Azithromycin**1g as a single dose orally.

- *Treat Mother with:*
  - **Ceftriaxone** 250mg IM STAT, and
  - Azithromycin 1g orally as single dose.

***Alternative topical agent**:*

- **Gentamycin eye drops 0.3%**, 1.2 drops into each eye every 2 hours
- Reduce dose frequency as the infection is controlled
- Continue for 48 hours after healing

17.1.9 SYPHILIS

CLINICAL DESCRIPTION

Syphilis is **a bacterial infection usually spread by sexual contact**. The disease starts as a painless sore — typically on the genitals, rectum or mouth. Syphilis spreads from person to person via skin or mucous membrane contact with these sores.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Rash is usually not itchy
- Wartlike sores in your mouth or genital area
- Some people also experience hair loss
- muscle aches
- Fever
- Sore throat
- Swollen lymph nodes

INVESTIGATION

- The VDRL test is a screening test for syphilis

TREATMENT

- Pharmacological
- Use this regime for patients with syphilis confirmed by laboratory testing.
- In treatment of secondary syphilis, a Herxheimer reaction (malaise, fever, headache, rigors) may sometimes occur within 6-12 hours of initial treatment. This is treated with **Aspirin** 600mg 6 hourly.

19.1.9 ALL SYPHILIS EXCEPT NEUROSYPHILIS

17.1.9.1. EARLY SYPHILIS

CLINICAL DESCRIPTION

Primary (ulcer), secondary (generalized skin rashes, condylomatalata) or latent syphilis of not more than 2 years' duration.

INVESTIGATION

- The VDRL test is a screening test for syphilis

Note: Treat as late syphilis all patients with a positive RPR or VDRL and no documented syphilis serology in the last 2 years.

TREATMENT

PHARMACOLOGICAL

- **Benzathine Penicillin** one dose of 2.4 MU IM
  - ✓ *Divide as 1.2 MU into each buttock Alternatively, if allergic to penicillin*:
- **Doxycycline** 100mg 12 hourly for 14 days

Note: In pregnancy/lactation, substitute **Doxycycline** with **Erythromycin** 500mg every 6hrs for 15 days.

17.1.9.1.2 LATE SYPHILIS

CLINICAL DESCRIPTION

Late syphilis: benign, cardiovascular and latent syphilis of more than 2 years; syphilis of indeterminate duration congenital syphilis in children.

TREATMENT

PHARMACOLOGICAL

- **Benzathine Penicillin** 3 doses of 2.4 MU IM at weekly intervals
  - ✓ Divide each weekly dose 1.2 MU into each buttock: total (3 doses) is 7.2 MU

Alternatively, if allergic to penicillin:

- **Doxycycline** 100mg PO 12 hourly for 30 days

Note: In pregnancy/lactation, substitute **Doxycycline** with **Erythromycin** 500 mg 6 hourly 30 days

Notes for pregnant patients

- Any history of penicillin hypersensitivity (e.g fever, erythema, hives, rash, SOB, wheezy, red eyes, runny nose) must be reliable as these patients are put at serious disadvantage because they cannot be given tetracycline's
- The child must be treated for congenital syphilis at birth as Erythromycin does not readily cross the placenta

17.1.9.1.2 CONGENITAL SYPHILIS IN CHILDREN

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Thoroughly examine for congenital syphilis all infants born to women with reactive serologic tests: look for ascites, oedema, jaundice, hepatosplenomegaly, rhinitis, nasal discharge, hoarse cry, skin rash, and/or pseudoparalysis of any extremity.

TREATMENT

NON-PHARMACOLOGICAL

PHARMACOLOGICAL

- Treat with a single dose of **Benzathine penicillin** 50 000 IU/kg IM in all infants born to syphilis sero-positive mothers whether or not the mothers were treated during pregnancy (with or without penicillin) unless they have features of congenital syphilis.
- Treat infants with these symptoms as early congenital syphilis:
  - ➢ Give **Benzylpenicillin** 50 000 IU/kg**/**dose IV 12 hourly, during the first 7 days of life and 8n hourly thereafter for a total of 10 days,

- *Children with late congenital syphilis (more than 2 years) are treated as follows:*
  - ✓ Give **Benzylpenicillin** 50 000 IU/kg/doses 4 hourly – 6 hourly 10 to 14 days,

Alternatively, in penicillin allergic children

- Give **Erythromycin syrup** 12.5mg 6 hourly for 30 days.

Note: The risk of penicillin hypersensitivity in the 1st month of life can be safely discount

17.1.10 NEUROSYPHILIS

PHARMACOLOGICAL

- Higher penicillin doses are necessary to ensure that levels in the CSF do not fall below required amount throughout the course of treatment

Treatme
nt
Adults:

- Give **Benzylpenicillin** 4MU IV 6 hourly for 14 days then
- Give **Benzathine Penicillin** 2.4 MU IM once weekly for 3 consecutive weeks

Alternatively, if confirmed hypersensitivity to penicillin:

- **Doxycycline** 200mg every 12 hours for 30 days N**ote:** In pregnancy: substitute Doxycycline with **Erythromycin** 500mg 6 hourly for 30 days

17.1.11 VAGINAL TRICHOMONIASIS

PHARMACOLOGICAL

- Coincident bacterial vaginosis reduces the effectiveness of single dose **Metronidazole** treatment
- Asymptomatic male partners should also be treated

Treatme
nt
Adults:

See AVD Syndrome

- *Infants with symptomatic trichomoniasis or urogenital colonization persisting after the 4th month*
- Give **Metronidazole 5 mg/kg** 8 hourly for 5days

CHAPTER 18: SKIN CONDITIONS

18.1 BACTERIAL SKIN INFECTIONS

18.1.1 IMPETIGO

CLINICAL DESCRIPTION

Bacterial infection affecting the uppermost layer of the epidermis (stratum corneum).

Risks factors:

- Young age
- Immunosuppression
- Presence of underlying skin disease which compromise the integrity of the skin e.g., atopic dermatitis, tinea corporis, ulcers.

Cause

- Staphylococcal aureus and Streptococcal pyogenes

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Blisters, vesicles, or pustules that break easily
- Honey coloured/yellowish crusts
- Skin erosions
- Itch may or may not be present

INVESTIGATIONS

- Diagnosis usually clinical
- Pus Swab to confirm diagnosis where necessary or if not responsive to therapy

TREATMENT

General management

- Keep infected areas clean:
- wash daily with soap and clean water
- Wash off crusts with clean water to expose clean raw base

Prevent spread to others -

- Frequently wash towels, beddings and clothes used and stained by the patient

Treatment

- Localised/small area involved:
- **Fusidic acid** 20mg/g cream 12hourly for 7 days
- Apply **Gentian Violet paint 0.5 %** after crusts have been removed from the affected area
- treat underlying skin disease e.g., eczema or tinea if present to remove source of infection
- If extensive give oral antibiotics
- For children:
    - **Flucloxacillin** 12.5mg/kg body weight 6 hourly for 5-7
- Children if allergic to penicillin:
    - Give **Erythromycin** 125-500mg P.O 6 hourly for 5-7 days

Adults:

- **Flucloxacillin** 500 mg P.O 6 hourly for 5 – 7 days

if allergic to penicillin

- Adults:
    - **Erythromycin** 500 mg P.O 6 hourly for 7 days

18.1.2 FOLLICULITIS

CLINICAL DESCRIPTION:

Bacterial infection of the hair follicle

Causes

- staphylococcus aureus
- Streptococcus pyogenes

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Pain on affected area,
- Itch may or may not be present
- Erythematous pustules around hair follicles
- Surrounding skin may be swollen and tender

INVESTIGATIONS

- Diagnosis is usually clinical, but if not responding to presumptive therapy
  - Gram staining
  - Bacterial culture

TREATMENT

- Clean the affected area with soap and clean water
- Give antibiotics as in impetigo

18.1.3 FURUNCULOSIS AND CARBUNCLES

CLINICAL DESCRIPTION:

Furuncle (boil): acute inflammatory of hair follicles and surrounding tissues. A collection of furuncles is called carbuncle.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Hard, tender, red nodule, or plaque around a hair follicle
- The area may be painful and fluctuant
- Systemic symptoms if present may include fever, general malaise

INVESTIGATION

- Guide as under impetigo

Treatment

- As under impetigo
- If affected area or abscess is suspected, consider incision and drainage (I & D)

18.1.4 ECTHYMA

CLINICAL DESCRIPTION:

- Is a bacterial infection involving the entire epidermis.
- Cause: Group A streptococuss pyogens

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Punched out ulcers with peripheral erythema
- Pain on affected area
- Formation of crust

INVESTIGATIONS

- Generally, none required
- If not improving, a pus swab for gram staining, culture and sensitivity

TREATMENT

General Management

- Same as impetigo

18.1.5 ERYSIPELAS

CLINICAL DESCRIPTION

A bacterial infection of the upper section of the dermis

Cause: As impetigo

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Sign Sharply demarcated, rapidly spreading erythema on the affected area
- Pustules, vesicles, bullae and small areas of haemorrhagic necrosis may form
- Fever, chills, malaise and nausea
- Pain on affected area
- Regional lymphadenopathy

INVESTIGATIONS

- As under impetigo

TREATMENT

- Limb elevation
- Cold compresses
- If not complicated (no ulceration, no blistering, no severe systemic complications eg septic shock)

- As oral therapy for impetigo

- Complicated disease
  - **Ceftriaxone** 50mg/kg/day IV daily in children for 5 days
  - Adults: **Ceftriaxone** 1g IV daily for 5 to 7 days
  - Switch to oral treatment as soon as the patient improves

18.1.6 CELLULITIS

CLINICAL DESCRIPTION:

Bacterial infection involving the dermis with or without extension to subcutaneous fat, muscles or bones. Predisposing factors include diabetes mellitus, lymphedema, alcoholism, intravenous drug abuse, peripheral vascular disease.

Cause: As in impetigo

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- As under erysipelas but the affected area is less well defined

INVESTIGATIONS

- As under impetigo

TREATMENT

- As under erysipelas
- Refer if not improving or recurrent

18.1.7 STAPHYLOCOCCAL SCALDED SKIN SYNDROME

CLINICAL DESCRIPTION:

Skin disease characterized by exfoliation or erosion of the skin as a result of its cleavage by toxins released from infecting bacteria. Lacks mucosal involvement and is not secondary to drugs.

Cause: Staph. Aureus

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Malaise, fever, irritability, sore throat
- Sloughing of skin leaving moist skin and varnish-like crusts
- Severe skin tenderness and erythema
- Skin wrinkling with flaccid bullae
- Scaling and desquamation

INVESTIGATIONS

- Diagnosis is usually clinical
- Blood culture to isolate offending bacteria

TREATMENT

- Replace fluids
- Analgesics
- Give **Flucloxacillin or Cloxacillin** 250 - 500 mg 6 hourly for 7days
  or
- **Ceftriaxone** 1g IV daily for 5-7days

18.2 ERYTHEMA MULTIFORM, STEVEN JOHNSON'S SYNDROME AND TOXIC EPIDERMAL NECROLYSIS

18.2.1 ERYTHEMA MULTIFORME

CLINICAL DESCRIPTION:

Acute, inflammatory reaction which manifests with papular lesions which are classically multicolored. These lesions are described as typical targets. The majority of cases are caused by herpes simplex but bacteria, fungi and occasionally drugs may induce EM.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- The classic lesion is a target lesion found on the distal extremities and palms with relative sparing of the trunk.
- Usually asymptomatic but may be painful
- Spares mucosa in mild disease (erythema multiforme minor) but severe disease may involve mucosa (erythema multiforme major)

INVESTIGATIONS

- Usually a clinical diagnosis. Tzanck smear maybe done

TREATMENT

- Identify the cause and treat. If the cause is medicine, stop the medicine
- **Acyclovir** 400mg P.O 8 hourly for 7 to 10 days for all cases as herpes simplex is most common cause.
- Short course of cortico-steroids e.g., **Prednisolone** 1mg/kg for 3-5 days of severe with painful mucosal erosions

Recurrence

- Give suppressive **Acyclovir** 400 mg 12 hourly for 2 to 3 days

18.2.2 STEVEN JOHNSON'S SYNDROME

CLINICAL DESCRIPTION:

A hypersensitivity reaction to medications leading to necrosis and lysis of the epidermis affecting. Steven Johnson Syndrome (SJS) is in a spectrum with Toxic Epidermal Necrolysis (TEN) at the extreme end as follows:

- SJS: 1 to 10 % body surface area (BSA) involvement.
- TEN/SJS overlap: between 10 and 30 % BSA
- TEN: over 30 % BSA

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Fever
- Stinging, red eyes
- Pain on swallowing
- Pain and burning sensation on affected skin
- Skin lesions tend to appear first on the trunk then spreading to the neck, face and proximal upper extremities
- In the early stage, the skin may have a dusky brown appearance and later may form epidermal (flaccid) blisters which later break into painful erosions in areas of friction and of pressure
- The affected skin is easily shorn off with minimal horizontal pressure (Nikolsky's sign)
- Mucous membrane involvement: red eyes, painful swallowing, dysuria, cough, erosions.

Treatment

- Stop offending drugs immediately
- Aim of treatment is to stop disease progression and to relieve symptoms.
- Patients this condition must be managed in the hospital even if looking stable on first contact as the subsequent disease is unpredictable.
- Appropriate analgesics
- Fluid replacement
- Give **Ceftriaxone** 2g IV daily for 5days to minimize risk of infection
- Short course steroids 1-2mg per kg daily for a maximum of 5 days
- Refer for management at the hospital

Adjuvant Care

- High protein diet is recommended
- Ophthalmology management
- Counselling to never take offending drug again

18.3 FIXED DRUG ERUPTION

CLINICAL DESCRIPTION:

An adverse cutaneous drug reaction that recurs at the same site with repeated exposure to the same agent though new areas may be involved in subsequent attacks.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Itching and/or pain on affected area
- Typically, round sharply demarcated red-brown patch or plaque
- Occasionally may be bullous
- Later becomes darker
- Lesions can be found anywhere on the body but favours the lips, face, hands, feet and genitalia

INVESTIGATIONS

- Clinical and in relation to history

Drugs most frequently associated with FDE

- Sulphonamides
- NSAIDS
- Tetracyclines
- Barbiturates

- Carbamazepine
- Stop the offending medicine

TREATMENT

- Avoid triggering agent
- Use potent topical steroids e.g., **Betamethasone** 0.05% cream 12 hourly

If severe:

- Give **Chlorpheniramine** 4-8mg PO 12 hourly for 7 -14 days

18.4. URTICARIA

CLINICAL DESCRIPTION

A very itchy skin disease characterized by pruritic wheals or hives. It is due to extravasation of fluid in the upper dermis. It is called angioedema if deep dermis and subcutaneous tissues are involved leading to massive swelling.

Classification of urticaria

- Idiopathic
  - Can be acute: having symptoms lasting up to 6 weeks
  - Chronic: having symptoms lasting beyond 6 weeks
- Physical
  - Urticaria that occur secondary to and external trigger e.g., heat, cold, pressure

Note: Identifying a specific cause of urticaria is usually a challenge and often a futile task. Empirical treatment is encouraged in all cases

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Wheals are the hall mark of the disease
- Extreme pruritus but no excoriations are seen
- Transitory nature with individual lesions lasting 1–24 hours

INVESTIGATIONS

- Explain the condition to the patient

- Remove the cause if known
- Desist from giving medications for the duration of symptoms only and stopping immediately after they disappear.
- Give antihistamines for a set period as outlined below:
    - Give **Promethazine** 25mg orally at night till 2 weeks after submission of the wheals.
    - In so doing, antihistamines may need to be given for several months to effectively control the disease.
- Alternatively
    - Give **Chlorpheniramine** 4-8mg at night or 8 hourly until two weeks after eruption of wheals.
    - Give (alternatively) **Cetirizine** 5-10mg daily until two weeks after lesions clear.
    - Apply **Calamine lotion** at night or 12 hourly

For tracheal angioedema

- Give **Adrenaline** 0.5mg stat dose sub- cutaneously in severe urticaria with tracheal angioedema

Red Flags

- If it is angioedema, refer.

18.5 ECZEMA (DERMATITIS)

CLINICAL DESCRIPTION

A chronic inflammatory skin condition characterised by episodes of intense itch

Classification:

Depends on causes whether intrinsic (endogenous) to the individual or from external environment (exogenous)

- Endogenous
    - Atopic eczema
    - Seborrheic eczema
    - Nummular eczema
    - Stasis eczema
    - Asteatosis eczema
- Exogenous
    - Contact eczema
        - Due to scratching, the skin in eczema may become secondarily infected by bacteria, fungi or viruses.

    - Therapy must therefore include of the superinfection as well as of the eczema if indicated.
- Underlying medical conditions may influence clinical appearance of various eczemas e.g., seborrhoeic eczema may be severe in the immunosuppressed and people with history of atopic diseases are more likely to develop atopic eczema.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Manifests with an erythematous skin rash, excoriations, oozing, vesicles, bullae, crusts, lichenification depending on duration and cause.

INVESTIGATIONS

- Usually a clinical diagnosis after history and examination.

TREATMENT

- Counsel the patient on the condition
- atopic eczema is chronic and may come and go. It is not curable but requires good skin care to prevent flares.
- Remove any obvious precipitating factors e.g., contact and atopic eczema) like soaps, detergents, cosmetics, clothing etc.
- Food allergies are generally rare as a cause of eczema. Avoid unnecessary exclusion of foods in the diet with an aim of controlling eczema
- Moisturisers must be used liberally
- All treatments for eczema must be used together with and not instead of emollients.
- Treatment aims to control symptoms and to prevent disease activity

Topical Steroids:

- Give **Betamethasone** 0.05 % 12 hourly until symptoms improve.
- Whether to use the medicine in a cream or ointment form will depend on if it is acute, subacute or chronic (see below).
- For children and on other parts of the body like the face, genitalia and skin folds, weaker strength steroids like **Hydrocortisone** 1 % 12 hourly may be tried first and upgrade if there is unsatisfactory progress.
- If superinfected e.g., with bacteria or viruses, treat the infection as well as stated under the relevant sections

Antihistamines

- Must only be used to help sedate a patent who is failing to sleep due to severe itch.

- They therefore complement the role of steroids and emollients and must not be used as a sole treatment modality. Their use should be reviewed after a week.
- **Promethazine** 25 mg orally at night for a maximum of 7 days (for children prescribe according to body weight)

Alternatively

- Give **Chlorpheniramine** 4 mg at night for a maximum of seven days (for children prescribe according to body weight)

18.5.1 ACUTE ECZEMA

Manifested by an eruption comprising one or more of the following features: erythema, vesicles, bullae, erosions and crusts.

General Management

- Wet or oozing lesions - use the above stated medicines in creams form to keep them dry

18.5.2 SUBACUTE ECZEMA

Manifests with more scaling and fissures mixed with some erythema.

General Management

- Use ointment form.

18.6.3 CHRONIC ECZEMA

Manifests with more dryness and scaling with lichenification (skin thickening).

Severe itch a constant feature

General Management

- Advise to stop scratching.
- Liberal use of moisturisers
- Use ointment form

Alternative

- Give topical steroid e.g., **Betamethasone** 0.1%

18.6 FUNGAL SKIN INFECTIONS

18.6.1 SUPERFICIAL FUNGAL INFECTIONS ('TINEAS')

CLINICAL DESCRIPTION

Infection with fungi species that are able to invade keratin containing tissues e.g., skin, hair and nails. Such species also known as dermatophytes. Skin manifestation due to dermatophytes are described by anatomical site where the infection has occurred e.g., tinea capitis is the infection on the scalp. Other infections include tinea unguium/onychomycosis (nails), tinea pedis (plantar aspect), tinea cruris (groins) and tinea corporis (rest of the body except those specified).

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Pruritus
- For non-bearing areas: well-defined plaques with active borders
- Hair bearing areas: hair loss in tinea capitis
- Scaling and ulceration may occur inter-digitally in tinea pedis.

INVESTIGATIONS

- Mainly clinical
- Examination of scales treated with Potassium hydroxide (KOH) can be done when necessary, e.g., when the clinical features are not characteristic.

TREATMENT

- Instruct patients on the importance of treatment compliance in order to eradicate the infection
- For localized lesions on non-hair bearing areas:
  - Topical antimycotics e.g., **Clotrimazole** cream 1 % 12 hourly for until lesions clear and then continue for another week after that to ensure clearance of the fungal spores
- In extensive cases and those involving hairy areas:
  - **Griseofulvin** 500mg orally daily taken after a meal for 6 to 8 weeks
  - In Children: **Griseofulvin** 20mg/kg/dose for 6 to 8 weeks (maximum of 500 mg)

Notes:

- Tinea corporis, cruris, pedis treat for 4 weeks
- Tinea capitis treat for 6 weeks

- Tinea unguium: (only if desired): requires longer duration. Refer
  - Fingernails: treat for 12 months
  - Toe nails: treat for 2 years
  - Clean footwear that may harbour fungal elements like sports shoes and stockings to get rid of spores

Alternative systemic antifungals

- Give **Ketoconazole** 100mg PO daily for 2 weeks OR
- **Fluconazole** 200mg PO daily for 2 weeks
- **Terbinafine** 250mg PO daily for 2 weeks in adults and based on weight in children
- **Itraconazole** 200mg PO daily for 2 -3 weeks

Red Flag

- Ketoconazole may cause liver toxicity when used for prolonged periods
- In HIV (+) patients big and extensive lesions (giant tinea) may appear and often require systemic treatment.

18.7 VIRAL SKIN INFECTIONS

18.7.1 HERPES SIMPLEX

CLINICAL DESCRIPTION

Viral infection cause by herpes simplex virus

CLINICAL FEATURES

There are two types. Type 1 affects lips; type 2 affects genitals but can interchange due to oral sex.

SIGNS AND SYMPTOMS

- Burning sensations or pain and/or pruritus on affected area
- Grouped vesicles

INVESTIGATIONS

Treatment

- **Acyclovir** 200 to 400 mg po 8 hourly for 1 week.
- In case of bacterial superinfection, treat accordingly (refer to bacterial infection section)

18.7.2 VARICELLA (CHICKEN POX)

Refer to Section 9.8

18.7.3 HERPES ZOSTER (SHINGLES)

CLINICAL DESCRIPTION

After an episode of chicken pox, the varicella zoster virus will remain in the body within nerves but kept inactive by one's immune system. A reactivation of this varicella zoster virus may occur at any time later on, leading to inflammation of the dermatome supplied by the nerve.

Causes: varicella zoster virus

- Populations at risk are those immunosuppressed due to HIV infection, old age, other immunosuppressive medication, diabetes and many others.
- Any dermatome may be affected by commonly affected ones include thoracic, trigeminal, cervical and sacral dermatomes.

CLINICAL FEATURES

SIGN AND SYMPTOMS

- Tingling burning sensation or painful skin along a dermatome.
- Painful vesicles, on an erythematous base, which later develop blisters or erosions.

TREATMENT

- Give **Acyclovir** 800mg 5 times a day for 5-7 days; best clinical outcome is if initiated within 24 -72 hours from onset of the lesions.
- Apply calamine lotion on intact lesions for their fast drying.
- Give analgesics and carbamazepine for pain relief
- For ophthalmic herpes zoster treat as above and refer to eye department urgently.
- If status not known, refer for HIV testing for any patient regardless of age and underlying medical risk factors.

NOTE: In the HIV immunosuppressed patients, continue treatment with acyclovir until all lesions have healed.

18.8 SCABIES

CLINICAL DESCRIPTION

Intensely pruritic skin condition caused by the mite Sarcoptes scabiei. Humans are the only hosts of this mite and therefore infection is from human to human. Transmission is common among overcrowded populations e.g., schools and among those that may have close body contact like household members, children during playing and sexually active adults.

Symptoms are due to delayed type hypersensitivity reaction to the mites, their eggs and their excreta. The hypersensitivity reaction may take several weeks to develop hence patients may

become symptomatic only later on after their primary infection. This period may be shorter during reinfection. Untreated contacts will keep the transmission going in the population and hence all contacts of scabies patients must be treated alongside the patients.

Sites of predilection of scabies

- Interdigital web spaces of hands
- Flexor surfaces of wrists
- Extensor surfaces of elbows
- Periumbilical skin
- Genitalia
- Buttocks

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Intense Pruritus in the patient and their contacts or family members.
- Vesicles, papules, excoriations, burrows and on affected areas
- Secondary infection may be found due to bacterial colonization of excoriated areas.
- In babies, lesions may also be found on the palmar and plantar skin.

INVESTIGATIONS

- KOH exam can detect eggs and mites but not necessary. It is mostly difficult to find the eggs and mite except in crusted scabies where there are many mites

TREATMENT

- Apply **Benzyl Benzoate** Emulsion 25% in the evening to the whole body from the neck down
- Ensure all parts of the skin are covered
- Allow the medication to remain on the skin overnight
- Apply on day 1, 2 and 3.
- Next morning wash off the application with Soap and water
- Repeat the above treatment on day 8, 9 and 10

Alternative for Benzyl benzoate application

- **Permethrin** 5% cream apply at night, wash in morning; repeat after 1week.
- Apply **Lindane** 1% lotion, single dose applied as above

Note:

- **Avoid** Lindane in children less than 2 years old
- In children under 1 year, also treat the face (except the area surrounding the eyes)

- For children under 5 years, use 12.5% **benzyl benzoate application**
- Prepare this by diluting 25% **benzyl benzoate** emulsion in equal volumes of water e.g., mix 1ml of BBE and 1 mL of water.

In cases of secondary bacterial infection, treat that too:

- Give a systemic antibiotic see Section 18.1

For itch:

- **Chlorpheniramine** 4-8 mg at night for 2-3 weeks
- Note that even after successful treatment, itching may persist for up to 2-3 weeks.
- There is no need **to repeat** BBE if both index and contact treatment was adequate but rather just continue treating the itch.

18.9 TROPICAL ULCER

CLINICAL DESCRIPTION

Painful rapidly enlarging ulcers usually on the lower limbs of individual living in hot, humid, tropical regions

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Painful ulcers which enlarge rapidly

INVESTIGATIONS

TREATMENT

- Improve nutrition and diet
- Clean ulcer with **Hydrogen peroxide** 3% solution 12 hourly for two weeks

Alternatively

- Wash with **Potassium permanganate** soaks 1ml in 10,000mls of water
- Debride the wound if necrotic
- Daily Potassium permanganate soaks or cleaning
- Dress the wound with Zinc paste with sulphur regularly till healed
- Rest with leg elevated
- Do a skin graft if wound is clean and shows granulation
-

If local infection presents:

- Give **Amoxicillin** 500mg PO 8 hourly for 7 days or
- **Erythromycin** 500mg PO 6 hourly for 7 days
- Children; **Erythromycin** 12.5 mg/kg body weight in 4 divided doses
- If possible, carry out culture and sensitivity testing to determine suitable antibiotic therapy
- Refer the patient to the hospital

18.10 ONCHOCERCIASIS

Refer to Section 15.2

18.11 BURULI ULCER

CLINICAL DESCRIPTION

Chronic debilitating disease caused by an environmental Mycobacterium ulcerans that affects skin and sometimes bone

CLINICAL FEATURES

SIGN AND SYMPTOMS

- Painless ulcers
- Papules, nodules, plaques, ulcers
- This is an ulcerative skin condition caused by Mycobacterium ulcerans

INVESTIGATIONS

TREATMENT

- Depends on stage of condition, but if ulcerated
  - Daily wound dressing with **Normal Saline** 0.9%
  - Medicine therapy doesn't usually work
  - Surgery

18.12 LEPROSY

Refer to section 9.2

CHAPTER 19: VACCINATIONS

19.1 TETANUS DIPTHERIA (TD)

Vaccine is given to women of Childbearing age.

Vaccination Schedule for Td

At first contact: Td 1: 0.5 MLS IM
4 weeks: Td 2: 0.5 MLS IM
6 Months: Td 3: 0.5 MLS IM
I Year: Td 4: 0.5 MLS IM
1 Year: Td 5: 0.5 MLS IM

19.2 VACCINATION SCHEDULE FOR CHILDREN

At birth:	**BCG** 0.05ml intradermally
	Children > 1 year 0.1 ml
	Oral Polio 0: 2 drops orally (= "zero dose")
6 weeks:	**DPT-HeB-Hib** 1: 0.5 mlIM
	OPV 1: 2 drops orally **ROTA** 1: 1ml **PCV** 1: 0.5ml IM
10 weeks:	**DPT-HeB-Hib** 2 : 0.5 ml IM
	OPV2: 2 drops orally ROTA 2: 1ml oral
	PCV 2: 0.5ml IM
14 weeks:	**PENTAVALENT DPT-HeB-Hib** 3 : 0.5 ml IM
	OPV3 : 2 drops
	IPV:0.5ml IM
	PCV 3: 0.5ml IM
5 months:	MV 1: 0.5ml 1M
6 months:	Oral Vitamin A
	MV 2: 0.5ml IM
7 months:	MV 3: 0.5ml IM
9 months:	**MR 1:** 0.5 ml dS/C
12 months:	Oral Vitamin A
	Oral Deworming Tablets
15 months:	MR 2: 0.5ml S/C
18 months:	Oral Vitamin A
	Oral Deworming Tablets
22 months:	MV 4: 0.5ml IM
9 Years:	HPV 1: 0.5 ml IM

9 Years 6 months: HPV 2: 0.5ml IM

19.3 DPT-HEB-HIB

Diphtheria Pertussis Tetanus, Hepatitis B and Hemophilus influenza type B

- PCV = Pneumococcal Conjugate Vaccine
- OPV= Oral Polio Vaccine
- IPV= Inactivated Polio Vaccine
- MR= Measles Rubella
- MV= Malaria Vaccine
- HPV=Human Papilloma Virus

Notes:

- Aim to complete this schedule within the first year of life
- **BCG vaccination**: give this as early as possible
  - in life, preferably at birth – complications are uncommon. BCG is contraindicated in symptomatic HIV infection
- **Measles Rubella vaccination**: normally give this when a full 9 months of age is reached and a repeat dose at 15 months of age
- Can give an extra dose which is recommended for groups at high risk of measles death, such as children in refugee camps, HIV- positive infants and during outbreaks of measles
- **DPT-HeB-HIB/Oral Polio/ROTA/PCV:** the minimum interval between doses is 4 weeks
- **IPV:** Give at 14 weeks of age
- **Malaria Vaccine:** Give 3 doses in the first year of life from 5 months then the last dose at 22 months of age
- **HPV:** Give to girls at 9 Years old and second dose after 6 months
- **Tetanus Diphtheria** vaccination: give a full course of this:
  - To all women see Section 12.3
  - After administration of anti-tetanus serum (ATS) to any previously unimmunized patient
  - If over 10 years has elapsed since the last booster dose.

19.4 COVID-19 VACCINES

- Six vaccine types approved for use in Malawi, namely: AstraZeneca, Johnson & Johnson, Pfizer, Moderna, Sinopharm & Sinovac

Vaccine Type	ASTRAZENECA	JOHNSON & JOHNSON	PFIZER	MODERNA	SINOVAC	SINOPHARM
Route	IM	IM	IM	IM	IM	IM
Recommended Age	≥18 years	≥18 years	≥12 years	≥18 years	18-59 years	≥18 years
Dosage	0.5ml	0.5ml	0.3ml	0.5ml	0.5ml	0.5ml
Recommended Schedule	2 dose series	Single dose series	2 dose series	2 dose series	2 dose series	2 dose series
Recommended Interval	12weeks	N/A	4 weeks	4 weeks	4 weeks	4 weeks

CHAPTER 20: WOUNDS, BITES, STINGS, AND BURNS

20.1 OPEN WOUND

TREATMENT

NON–PHARMACOLOGICAL TREATMENT

- Appropriately suture fresh wound (i.e., < 12 hours old)
- Do not suture penetrating wound to chest or abdomen
- Refer to the next level of care

NOTE:

- Any skin damage overlying a fracture makes it an open fracture
- It is important to ascertain the cause of the wound

PHARMACOLOGICAL TREATMENT

- Always remember to give **Tetanus Toxoid** Vaccination *(Section 12.3)*
- If patient has signs of tetanus, give Tetanus Antitoxin Serum (ATS) 1,500 IU s/c or IM
- If wound is grossly contaminated give Tetanus Antitoxin Serum 3,000 IU s/c or IM (alongside copious washing
- Clean fresh wounds with large volumes of normal saline or sterile water.
- High risk wounds may be irrigated with **Cetrimide 15%+ Chlorhexidine Solution 1.5% (Savlon)** diluted 1 in 20 parts water or diluted iodine.

Wound repair

- For local infiltration or as a peripheral nerve block use **Lignocaine Hydrochloride** injection 1% , maximum dose: adults 4mg/ kg body weight; children 3mg/kg (= 0.3ml/kg of 1%)

Or use **Lignocaine 1%** (10mg per 1ml) + **adrenaline** 1:200,000 injection around the wound

- Maximum dose: *adult*s 7mg/kg, children 7mg/kg

Note*:* Do not use anaesthetics containing adrenaline for anaethesia in digits or appendages due to risk of ischaemic necrosis

20.2 ANIMAL BITES

TREATMENT

NON–PHARMACOLOGICAL

- Thorough cleansing and debridement of the wound is essential
- Avoid suturing most bite wounds
- Large lacerations that are aping or bleeding may require loose approximation

PHARMACOLOGICAL

Adults and Children:

- Give **Tetanus Toxoid Vaccination** (TTV) *see Section 12.3*
- Flush and cleanse (scrub) the wound with **cetrimide 15% (savlon) + chlorhexidine solution** 1.5% diluted 1 part in 20 parts with water

Alternatively:

- Wash with **Hydrogen peroxide solution** 3% OR **Iodine** 10% OR soap or detergent
- Rinse thoroughly with 1-2 liters of **Normal Saline** and dress with a weak **Iodine Solution 10%** or **Iodine Cream**
- Give **Anti-Rabies Vaccine**, only if necessary according to the recommendations in *Section 20.1.2*
- Give **Co-amoxiclav** 625mg 8 hourly plus **Metronidazole** 400mg 8 hourly for 7 days
  - For children use oral **Co-amoxiclav** (dose dependent on the age)

    1-11 months 0.25 ml/kg of oral suspension (125/31)

    1-5 years 5ml of oral suspension (125/31)

    6-11 years 5 ml of oral suspension (250/62)

    12-17 years 250/125 mg tablet

  - If possible, capture and observe the animal for 10 days. If the animal is still alive after this time period, it does not have rabies

Rabies Prevention

- Thorough prompt local treatment of all bite wounds and scratches which may be contaminated with rabies virus is very important as elimination of the rabies virus at the site of infection by chemical and physical means is the most effective method of protection
- Only mammals can transmit rabies (example: dogs, cats, bats)

- The combination of local wound treatment, passive immunization with rabies immunoglobulin (RIG), and vaccination with anti-rabies vaccine is recommended for all severe exposures to rabies (see Table on Section 20.1.2)
- Since prolonged rabies incubation periods are possible, persons who present for evaluation and treatment even months after having been bitten should be treated in the same way as if the contact occurred recently
- Avoid contact with the patient's saliva which is potentially infective. If possible, wear eye protection as patients may spit and infection through the conjunctiva can occur
- Human bites should be managed as animal bites except for the use of anti-rabies vaccine

Post- exposure immunization

- Give A**nti-rabies** vaccines to all patients unvaccinated against rabies, together with local wound treatment, and in severe cases, rabies immunoglobulin *(see recommendation in Section 20.1.2)*

Administration of anti-rabies vaccine

- Use intra-dermal injection regimes for Anti Rabies Vaccine whenever possible
  - Give a 0.1 ml dose of Anti **Rabies Vaccine** intradermally in either the forearm or upper arm, on days 0, 3 and 7 ,14, 21,28

Alternative intramuscular regime

- Give one 1 ml dose of Anti Rabies vaccine IM on days 0, 3, 7, 14 and 28

Suitable injection sites

- In adults: always inject the anti-rabies vaccine into the deltoid area of the arm
- In young children: the anterolateral area of the thigh may also be used
- Never use the gluteal area for vaccination as it is then much less effective

Recommendations for Anti-Rabies Vaccination

NA NATURE OF EXPOSURE	CONDITION OF ANIMAL		RECOMMENDED ACTION
	At the time of exposure	**10 days later**	
Saliva in contact with Skin, but no skin lesion	Healthy	Healthy	Do not vaccinate
		Rabid	Do not vaccinate
	Suspect	Healthy	Do not vaccinate
		Rabid	Do not vaccinate
2. 2. 2. Saliva in contact with skin that has lesions, minor bites on trunk or proximal limbs	Healthy	Healthy	Do not vaccinate
		Rabid	Do not vaccinate
		Healthy	Vaccinate, but stop course if animal healthy
		Rabid	Vaccinate
		Unknown	Vaccinate

3. 3. 3 3. Saliva in contact with mucosae, serious bites (face, head, fingers or multiple bites	Domestic or wild rabid animal or suspect		Vaccinate and give anti rabies serum
	Healthy domestic animal vaccinate, but stop course if animal healthy after 10days		

Post-exposure immunization in previously vaccinated patients

- In persons known to have previously received full pre-or post-exposure treatment with rabies vaccine within the last 3 years
- Give one booster dose of 0.1 ml **Anti Rabies Vaccine** intradermally on days 0 and 3

Alternative intramuscular regime:

- Give one booster dose of 1 ml **Anti Rabies Vaccine** IM as above
- If completely vaccinated more than 3 years before or if incompletely vaccinated, give a complete post-exposure vaccination course

20.3 INSECT STINGS AND BITES

ENVENOMATION BY INSECTS

- Bees, wasps: Usually benign, but may provoke either laryngeal oedema or anaphylactic shock *(see Section 5.1.1)*
- Spiders, scorpions: The majority of spiders are benign. If a truly toxic species is thought to be responsible apply first aid and supportive measures as for snake bite *(see Section below)*

20.3.1 SNAKE BITE

Venom diffuses mainly via the lymphatics, not via Blood vessels, tourniquets are thus of little use

FIRST AID TREATMENT

- Clean the wound with **Cetrimide + Chlorhexidine** solution 15% 1.5% diluted 1 in 20 with water

Alternatively

- Clean with **Hydrogen Peroxide Solution** 3%
- Apply film constant pressure to the site of the bite
- Apply a crepe bandage firmly to the entire limb
- Immobilize the patient for 12 hours observation
- Give reassurance

Note: Not all patients with snakebite should be given Anti-venom Administration of Snake Anti-venom

- Ensure that the **Anti-Venom Solution** is clear
- Give 0.5 ml of **Adrenaline 1/1000** subcutaneously if needed
- Give 100 ml of **t**he **Polyvalent Antivenom** as an iv infusion, diluted in **300 ml** of **Normal Saline**
- Children:
    - Dilute in 0.4 ml/kg of **Saline**
    - Give the infusion slowly for the first 15 minutes (most reactions within this period

Occur Thereafter increase the rate gradually until the whole infusion is completed within 1 hour

If there is a history of allergy:

- The patient may still need to be given anti-venom because of systemic poisoning, but take particular care

If a reaction occurs:

- **Hydrocortisone** may need to be administered in addition to **Adrenaline**
- Give an antihistamine: Give **Promethazine** 25 mg 24 hourly
- *If there is no clinical improvement by the end of the infusion:*
    - Repeat the same dose as above

Note: Reserve Polyvalent Snake Anti – venom (anti-snakebite serum) for patients with one or more of these signs and symptoms:

- Hypotension
- Vomiting
- Neurotoxicity
- Haemotoxicity

SUPPORTIVE THERAPY

Give reassurance - most snake bites are not dangerous

- Treat shock if any *(see Section 5.1.1)*

Children > 6 months:

- manage in accordance to ABCCCD approach
- give adequate analgesia
- give maintainance IV fluids

- Give **Tetanus Toxoid Vaccination** *(Section 12.3) If patient is developing signs of tetanus*:
  - Give **Tetanus Antitoxin (ATS**) 1,500 IU s/c or IM
- Only give antibiotics if evidence of necrosis, no indication for prophylactic antibiotics
- Eventually excise sloughs and graft skin early
  - If evidence of compartment syndrome refer to the surgical team for fasciotomy

20.4 BURNS

EMERGENCY MANAGEMENT OF BURNS: ADULTS

- Remember the ABCs of life support
  - If evidence of inhalation, such as singed nasal hairs, soot in nose, refer to tertiary hospital
  - Pain relief (refer to Palliative Care section)
- Assess the severity of the burn (see table in section 20.2.1)
- Refer patients with burns of more than 15% of body surface area (BSA) to hospital on IV fluid therapy for resuscitation and burns dressing

Refer all deep burns or burns of the face, neck or hands and perineum assessment for further

Burns across joints should be immobilized and later encourage passive movement to prevent from contractures

- I**f** the burn is more than 40%,
  - mortality is almost 100% therefore referral to a tertiary hospital may not be necessary
- *Circumferential* burns of the limbs and trunk require immediate
  - bed side escharotomy (see diagram of the site of incisions)

Burns by nature are usually initially sterile

Treatment

- The Aim of treatment is to speed healing while minimizing the risk of infection
- In the sick burned patient (fever + diarrhoea+/- a rash):
  - Have a high index of suspicion of toxic shock syndrome
  - Nasogastric tube insertion is helpful as gastric dilatation is common
  - Give anti-acids to prevent gastric stress ulcers *(see Section 7.6)*
- Do a blood culture and malarial parasites
  - Start intravenous **Flucloxacillin** 1g IV 6 hourly for 5 days
  - Calculation of Body Surface Area Affected

Adults

- Give IV fluid replacement according to the calculation below
- With mild burns (< 15% adults BSA burned) give oral fluid replacement therapy using as much **ORS** as the patient will tolerate

Adults:

- With 15% or more require IV fluid resuscitation
- Calculate according to **Parkland formula**: - Adults: 4mls per /kg body wt/ TBSA

CALCULATION OF IV FLUID REPLACEMENT

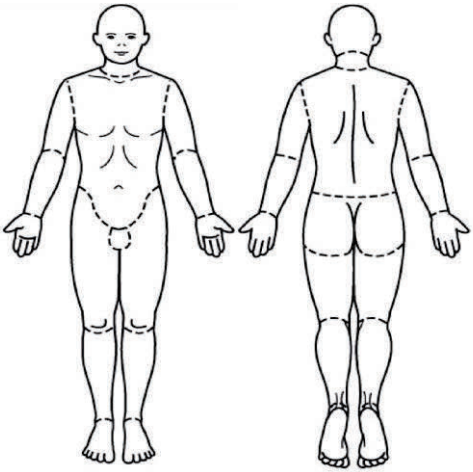
The object is to maintain normal physiology as reflected by urine, vital signs and mental status

Use **Ringer's Lactate** IV infusion or (if this is not available) **Normal Saline**

A general formula and dosage schedule that may be used for the first 24 hours is:

- Total volume of IV infusion required (before above additions) = 4 ml/kg x
- % BSA burned plus normal daily requirement
- Give 50% of this total in the first 8 hours calculated from the time of burn
- Give 50% in the next 16 hours

- Give analgesic treatment *(Section 24.1)*
- Strong analgesia (e.g., Morphine or Pethidine) will be required for the first 48 hours



	Birth 1 yr.	1–4 yrs.	5–9 yrs.	10–14 yrs.	15 yrs.	Adult	Burn size estimate
Head	19	17	13	11	9	7	
Neck	2	2	2	2	2	2	
Anterior trunk	13	13	13	13	13	13	
Posterior trunk	13	13	13	13	13	13	
Right buttock	2.5	2.5	2.5	2.5	2.5	2.5	
Left buttock	2.5	2.5	2.5	2.5	2.5	2.5	
Genitalia	1	1	1	1	1	1	
Right upper arm	4	4	4	4	4	4	
Left upper arm	4	4	4	4	4	4	
Right lower arm	3	3	3	3	3	3	
Left lower arm	3	3	3	3	3	3	
Right hand	2.5	2.5	2.5	2.5	2.5	2.5	
Left hand	2.5	2.5	2.5	2.5	2.5	2.5	
Right thigh	5.5	6.5	8	8.5	9	9.5	
Left thigh	5.5	6.5	8	8.5	9	9.5	
Right leg	5	5	5.5	6	6.5	7	
Left leg	5	5	5.5	6	6.5	7	
Right foot	3.5	3.5	3.5	3.5	3.5	3.5	
Left foot	3.5	3.5	3.5	3.5	3.5	3.5	

Total BSAB _____

EMERGENCY MANAGEMENT OF BURNS: CHILDREN

- Assess the patient using the cAcBCDE approach to identify and manage any life-threatening injuries.
- Assess the % total body surface area using the paediatric Lund-Browder Chart, the palmar surface of the patient's hand or the Wallace's rule of nines chart (as adapted for children).
- Assess the depth of burns.

Treatment

- If there is evidence of an inhalational injury:
  - Discuss with paediatric ICU or anaesthesia,
  - Early intubation is imperative.
  - Refer and transfer safely to a burns unit.
- Children with extensive burns must be given oxygen.
- Those with severe respiratory distress may require intubation and ventilation.
- Circumferential full-thickness burns require urgent escharotomy.
- Keep patients warm.
- Ensure adequate analgesia is given.
- Prophylactic antibiotics are not recommended.

Fluid management

- Children with shock require fluid resuscitation using 10ml/kg over 20 minutes.
  - Note: children with burns rarely present with shock, so a careful assessment should be made to identify the underlying cause of the shock.
- Children with ≥10% TBSA burns need additional intravenous fluid therapy.
  - This fluid requirement is calculated from the time of injury using the Parkland formula: *Total fluid replacement for burn in 24 hours (mls) = 4 mls x %TBSA x weight (kg)*
  - Half this fluid is given within the first 8 hours from the time of the burn. The rest is given over the following 16 hours.
- The child should also receive maintenance fluids, which must contain at least 5% dextrose.
- Patients should be catheterised as urine output guides ongoing fluid requirements.
- Adequate nutrition is crucial for management of burns patients.
- Children with burn injuries >10% TBSA need supplemental nutrition to aid recovery.

Toxic shock syndrome

- Occurs within 48 hours of injury,
- Suspected in children with relatively small burns and fever, rash, and/or vomiting and diarrhoea.
- This is an emergency.

- Management includes:
  - Oxygen
  - If in shock: 10 ml/kg of ringer's lactate or 0.9% saline over 1 hour
  - Antibiotics: flucloxacillin or ceftriaxone
  - Antipyretics: paracetamol
  - Strict fluid balance

Referral

- Children who require referral and transfer to a burns unit

Note: always consider the possibility of child abuse in burn injuries

BURNS WOUND MANAGEMENT

Under aseptic conditions, gently cleanse the lesion with **Cetrimide 15% + Chlorhexidine 1.5%** diluted 1 part in 20 parts water.

Alternative:

- Cleanse with Hydrogen Peroxide Solution 3% or soap and water
- Never use alcohol-based solutions
- Repeat the cleansing each day debriding the lesion and removing necrotic tissue as necessary
- Give tetanus toxoid vaccination (see Section 12.3) If patient is developing signs of tetanus
- Give **Tetanus Antitoxin** (ATS**)** 1,500 units s/c or IM

Once the lesion is clean/clear of necrotic tissue:

- Refer for skin grafting, if necessary, otherwise
- Dress the burn with Paraffin Gauze Dressing
- Cover this with dry gauze dressing thick enough to prevent seepage through to the outer layers
- Change the dressing after 2-3 days, and then as necessary

If the burn becomes infected:

Apply **Silver Sulphadiazine Cream** 1% bd

- Before application, completely remove any old topical medication
- Cover with sterile gauze

If the patient becomes ill after burn infection:

- Carry out culture and sensitivity testing on the exudates
- Treat with systemic antibiotic(s) according to findings

CHAPTER 21: RENAL CONDITIONS

21.1 ACUTE CYSTITIS/URETHRITIS

CLINICAL DESCRIPTION

Acute cystitis is an acute inflammation of the bladder. Women are affected 10 times more than men due to the shortness of their urethra compared to that of men. 40%-50% of all women will develop cystitis in their lifetime.

CLINICAL FEATURES:

SIGNS AND SYMPTOMS

- Dysuria, frequency, urgency, suprapubic discomfort, hematuria, smelly urine.

INVESTIGATIONS

- Full blood count
- Urine dipstick and microscopy
- Urea and creatinine

TREATMENT

Objectives:

- To eradicate infection
- To prevent recurrence and complications
- To relieve pain

Note: Think of Bilharzia; Diabetes Mellitus and cancer of the urinary bladder also in patient with similar presentation and symptoms are recurrent

NON-PHARMACOLOGIC

- Ensure adequate fluid intake of at least 2L in a day
- Encourage frequent voiding, especially patients with recurrent infections

PHARMACOLOGIC

- For acute uncomplicated (all non-pregnant women, symptoms duration less than 1 week, not men or catheterized patients) give **Ciprofloxacin** 500mg 12 hourly for 3 days

Alternatively

- Give **Nitrofurantoin** 100mg 6 hourly with food for 5 days
- **Or Cefuroxime** 500mg 12 hourly for 5 days
- Consider urine microscopy, culture and sensitivity if no response or recurrent infections to guide treatment

COMPLICATED URINARY TRACT INFECTIONS

DESCRIPTION

- Includes men, pregnant women, catheterized patients, patients with abnormal urinary tracts and those with symptoms > 1 week

TREATMENT

- Give **Ciprofloxacin 500mg** orally 12 hourly for 5 days

or

- Give **Co-amoxiclav** 375mg 8 hourly or 625mg 12 hourly for 7 days

Alternatively

- Give **Gentamycin** 240mg IM or IV STAT
- Followed by any of the above oral antibiotics
- Consider urine microscopy, culture and sensitivity to guide treatment if no response to above treatment or recurrent infections

21.2 UPPER URINARY TRACT INFECTIONS

21.2.1 PYELONEPHRITIS

CLINICAL DESCRIPTION:

Acute pyelonephritis is a bacterial infection causing inflammation of the kidneys and is one of the most common diseases of the kidney. Pyelonephritis occurs as a complication of an ascending urinary tract infection (UTI) which spreads from the bladder to the kidneys and their collecting systems

CLINICAL FEATURES:

SIGNS AND SYMPTOMS

- Fevers, costovertebral angle pain, nausea, vomiting

INVESTIGATIONS

- Full blood count
- Urine dipstick, microscopy, culture and sensitivity
- Urea, electrolytes and creatinine
- KUB Ultrasound

TREATMENT

NON-PHARMACOLOGICAL:

PHARMACOLOGICAL):

- Give **Ciprofloxacin 500mg** orally 12 hourly for 10-14 days *or*
- Give **Co-amoxiclav** 375 mg 8 hourly for 10-14 days
- IV fluids if clinically indicated

Complications and referral criteria: Ongoing pain and fevers despite antibiotic use. Worsening of kidney function.

Alternatively

- Give **Gentamycin** 240mg IM or IV STAT
- Followed by any of the above oral antibiotics for 10-14 days
- Refer patients with recurrent UTI for further investigations

21.2.2 URINARY TRACT INFECTIONS (UTIs) IN CHILDREN

CLINICAL FEATURES

SIGNS AND SYMPTOMS

In young children

- non- specific e.g. vomiting, fever, irritability, or failure to thrive

Older children:

- fever
- abdominal pain
- dysuria
- increased frequency of passing urine

INVESTIGATIONS

- Urine dipstick
- Urine microscopy and culture
  - clean catch sample of urine
  - In sick infants, suprapubic aspiration of urine may be required
  - consider UTI if more than 5 white cells per high power field
- Blood culture
- LP if systemically unwell
- Indications for abdominal ultrasound scan in children with UTI:
  - In all male infants with UTI
  - Recurrent UTIs
  - Abdominal mass or abnormal voiding
  - Not responding to treatment

TREATMENT

<3 months	Admit the child and treat with: **Gentamicin Preterm 3mg/kg** Term neonate 5mg/kg **>2 weeks :7.5mg/kg IV daily** and **Benzylpenicillin 50,000 IU/kg 12 hourly in first week of life then 6 hourly there after** consider Blood Culture and Lumbar Puncture Adjust antibiotics as guided by culture results Second line: **Ceftriaxone 50mg/kg IV 24 hourly**
>3 months or older child **with** signs of systemic illness (T>38C, rigors, renal angle tenderness)	Admit and treat with **Gentamicin 7.5mg/kg IV** and **Benzylpenicillin50,000 IU/kg IV ^ hourly** or **Ceftriaxone 50mg/kg IV 24 hourly** Change to oral antibiotic when fever settled and improving to complete 10 days treatment
>3 months or older child with no signs of systemic illness	Treat with oral antibiotics **Cotrimoxazole** 10mg/kg every 12hrs for 3 days or **Ciprofloxacin 10mg/kg 12 hourly for 5 days** or **Nitrofurantoin** 1.5mg/kg 6 hourly for 5 days

Complications

- Renal scarring
- Chronic kidney disease

REFERRAL CRITERIA

- Atypical UTI:
  - Seriously ill
  - Poor urine flow
  - Abdominal or bladder mass
  - Raised creatinine if measured
  - Septicemia
  - Failure to respond to treatment with suitable antibiotics within 48 hours
- Recurrent UTIs:
  - 2 or more episodes of UTI with acute pyelonephritis/upper urinary tract infection
  - One episode of UTI with acute pyelonephritis/upper urinary tract infection plus one more episode of UTI with cystitis/lower urinary tract infection
  - Three or more episodes of UTI with cystitis/lower urinary tract infections

21.2.3 ACUTE NEPHROTIC SYNDROME

CLINICAL DESCRIPTION

This condition is associated with proteinuria in excess of 3-3.5 g/1.73 m2 daily accompanied by hypoalbuminemia, oedema, hyperlipidemia and hypercoagulable state. Most often caused as a complication of a streptococcal infection. Usually manifests itself 1 – 5 weeks after an episode of pharyngitis, impetigo or infected scabies

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Oedema, low albumin, ascites, periorbital oedema, pleural effusion, genital oedema, protein energy malnutrition (especially in children)

INVESTIGATIONS

- Urinalysis, Urine microscopy (look for casts and check for Schistosoma ova), MPs and PCV, Electrolytes, Urea and Creatinine, Imaging on individual basis: renal USS, CXR, cardiacEcho

TREATMENT

NON-PHARMACOLOGIC

- Monitor BP, urine output, weight
- Avoid added salt
- Treatment is usually supportive

PHARMACOLOGICAL

Adult:

For control of oedema:

- Give **Frusemide** 40-80 mg 24 hourly (may require intravenous frusemide)

If hypertension is present:

- Treat accordingly (hypertension treatment section)

For control of proteinuria:

Use Angiotensin Converting enzyme inhibitors (i.e. Enalapril)

Note: Renal diseases can easily be mistaken for malnutrition

21.2.4 NEPHROTIC SYNDROME IN CHILDREN

CLINICAL DESCRIPTION

Presence of nephrotic range proteinuria, oedema, hyperlipidemia, and hypoalbuminemia

Criteria

1. Edema
2. Proteinuria (at least 3+)
3. Hypoalbuminemia usually plus Hyperlipidemia

Causes

Primary:

- Minimal change disease, Focal segmental glomerulosclerosis, Membranoproliferative glomerulonephritis

Secondary:

- Hepatitis B, HIV, Lupus, Postinfectious GN, Subacute infective endocarditis
-

Congenital:

- Occur in children less than 1 year of age

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Signs of systemic disease like joint complaints, rash, fever
- Preceding symptoms or illnesses e.g. respiratory, skin or urinary tract infections
- Oedema
- Abdominal pain, flank pain
- Breathlessness and cough
- Past medical history of similar problem
- Family history of renal problems
- ascites

INVESTIGATIONS

- Urine dipstick and microscopy
- FBC,
- Urea, electrolytes and Creatinine
- albumin
- HIV test
- Hepatitis B and C
- VDRL
- Malaria parasites
- Stool microscopy
- Kidney ultrasound

TREATMENT

First episode

- Admit
- Salt restriction
- fluid restriction if fluid overload
- Stat dose **Praziquantel**
- Monitor daily: blood pressure, weight and urine dipstick until normal
- Encourage mobilization (bed rest may increase risk of venous thrombosis.)
- Steroids: **Prednisolone** 2mg/kg/day for 4-6 weeks, If no response in 4 -6 weeks, refer to tertiary facility.
- Diuretics: if severely fluid overloaded
    - **Furosemide** 1mg/kg IV(maximum 40mg) 12-8 hourly
    - If no response after few days,refer to tertiary facility

- Pneumococcal vaccine, if available, and not previously immunized
- Follow up all patients in paediatric/renal clinic

Relapses

Proteinuria at least ++ for more than 3 days

- Start treatment as above
- Refer to tertiary facility
- The same as above, except

Complications

- Infections
- Thromboembolism (Doppler Ultrasound)
- Acute kidney injury
- Hypovolemia
- Protein malnutrition
- Hyperlipidemia
- Spontaneous bacterial peritonitis

Referral criteria

- Not responding after 4 -6 weeks of steroids
- All cases of relapse
- Severe fluid overload not responding to diuretics
- Patients with complications

NEPHROTIC SYNDROME IN ADULTS

Adults

- Give **Frusemide** 40-80 mg as a single dose each morning
- Give **Enalapril** 10-20 mg every day (use with caution, stop if renal function deteriorates)
- A trial of steroids is indicated (responsiveness to steroids in adults is less than in children). Give **Prednisolone** 50-60 m every day for up to two months, tapering off is required after response
- Give Proton pump inhibitors and calcium carbonate plus vitamin D tablets for bone protection if long term steroid use is indicated

If Schistosomiasis is diagnosed or suspected as cause

- Give **Praziquantel** 40 mg/kg single dose

Referral Criteria:

Refer all patients to a physician specialist, pediatrician or nephrologist immediately after diagnosis and stabilization.

If presentation is acute:

- Give **Phenoxymethlyl Penincillin** 500 mg 6 hourly for 7 days
- Refer to Nephrologist

Note: Furosemide should not be given to children as routine treatment. Steroids use in nephrotic syndrome should be discussed with nephrologist

21.2.5 ACUTE GLOMERULONEPHRITIS IN CHILDREN (NEPHRITIC SYNDROME)

CLINICAL DESCRIPTION

Acute glomerular injury, defined by:

- Hematuria (may be macroscopic) and RBC casts in urine
- Hypertension
- Oliguria and increasing creatinine
- Mild Proteinuria (not nephrotic range)
- Oedema

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Preceding symptoms or illnesses (Infections, bloody diarrhea, joint pains, rash):
- Oliguria or anuria
- haematuria
- Abdominal pain
- Breathlessness, cough
- Headache, convulsions (hypertension) hypertension
- Past medical history of similar problem
- Family history of kidney diseases
- Oedema and pulmonary oedema
- Ascites

Causes

- Mostly post-infectious glomerulonephritis Membranoproliferative glomerulonephritis (MPGN)
- Lupus nephritis
- Haemolytic uraemic syndrome
- Vasculitides, such as Henoch Schonlein Purpura (IgA nephropathy)

- Sickle cell disease

INVESTIGATIONS

- Blood pressure
- Urine dipstick and microscopy – Haematuria with red cell casts on microscopy,
- proteinuria and leucocyturia can be present
- FBC
- Creatinine,urea and electrolytes
- Albumin
- HIV- test, Hepatitis B and C
- Sickle cell test
- Renal ultrasound
    - ➢ chest X-ray and Cardiac echo

TREATMENT

- Salt restriction
- **Furosemide** 1-2mg/kg IV, if moderate/ severe fluid overload and hypertension
- Treat blood pressure Start **Nifedipine** 0.25-0.3mg/kg 6-8 hourly, if hypertensive Give **Praziquantel** 40mg/kg PO STAT. When poststreptococcal glomerulonephritis is suspected, give **Amoxicillin** 15mg/kg PO 8 hourly for 10 days
- Follow up in pediatric or renal clinic

Complications:

- Hypertensive emergency
- Acute kidney injury
- Chronic kidney disease

Referral

- Hypertensive emergency
- Persistent uncontrolled hypertension
- Acute kidney injury

21.3 RENAL COLIC

CLINICAL DESCRIPTION

The syndrome caused by stone(s) passage down the urinary tract. Typically affecting males aged 20 – 40. Colicky abdominal pain (often very severe), radiating from loin to groin (especially as stones moves toward the vesico-ureteric junction.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Nausea and vomiting are common. Renal angle tenderness, hematuria (often macroscopic), dysuria and symptoms of UTI.

INVESTIGATIONS

- Full blood count
- Urea, creatinine and electrolytes including calcium
- Serum Uric acid
- Urine dipstick and microscopy
- Abdominal erect xray
- KUB Ultrasound

TREATMENT

- Intravenous fluids
- Give **Morphine** or **Pethidine**. *(Section 24.9)*
- Give **Hyoscine butylbromide** 20 mg deep IM stat
- Consider **Sodium bicarbonate** 1 sachet 24 hourly
- Repeat after 30 minutes if necessary
- Ensure fluid intake of 3-4 litres/day after the crisis
- Intravenous Pyelography is usually indicated

21.4 ACUTE KIDNEY INJURY (AKI)

CLINICAL DESCRIPTION

Acute Kidney Injury (AKI) is a term that has now replaced the term Acute Renal Failure (ARF). It describes a sudden decrease in renal function occurring over a period of hours to days resulting in accumulation of nitrogenous waste products and disruption of blood volume, electrolyte and acid-base balance. Patients with acute kidney injury should be referred to a hospital. Carefully check the use of any drug in renal failure and reduce drug doses where required, see below

Diagnosis in children

- Anuria (urine output <0,2 ml/kg/hr) or Oliguria (<0.5ml/kg/hr for 6 hours)

OR

- increasing creatinine (>0.3mg/dL above baseline)

Causes of AKI

Prerenal AKI

- • Dehydration, Bleeding, Burns, Nephrotic syndrome, Septic shock, Anaphylaxis, Heart failure

Intrinsic AKI, Tubular injury (often acute tubular necrosis (ATN)), Nephrotoxins, Infections (Malaria), Rhabdomyolysis, severe hemolysis, Vascular, Hemolytic uremic syndrome (recent bloody diarrhea), Vasculitidies (symptoms from other systems - lungs, brain, joints, skin), Congenitalanomalies of kidneys, Glomerulonephritis

Postrenal AKI

- Bilateral urinary tract obstruction
- Renal calculi
- neurogenic bladder
- posterior urethral valves
- spinal trauma/ tumours

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Oliguria/anuria
- Nausea, vomiting
- Altered level of consciousness
- Tachypnoea
- Hypertension
- Oedema
- Pulmonary oedema
- Look for clues for the cause of renal failure, which include:
    - ➢ Shock
    - ➢ Acute glomerulonephritis
    - ➢ Use of herbal remedies containing nephrotoxins

Investigations

- Urine dipstick,microscopy and culture
- FBC
- urea, electrolyes and Creatinine
- blood gases
- malaria test
- HIV
- Hepatitis B and C
- Renal ultrasound

- Investigate underlying cause

TREATMENT IN CHILDREN

- Monitoring of blood pressure, urine output, fluid balance (input and
- output), daily weight
- Avoid nephrotoxins (NSAIDs, gentamycin, tenofovir)
- Treat the underlying cause

Pre-renal AKI

- If the child is in hypovolaemic shock and /or severely dehydrated, treat according to protocol

refer

Renal AKI

- Treat hypertension with Calcium channel blockers: Nifedipine initial dose 0.25-0.5mg/kg/day divided in 2 to 4 doses/day, titrate upwards up to 1mg/kg and if needed with Betablockers: Atenolol initial dose 0.5-1mg/kg 12 to 24 hourly
- Treat fluid overload:
    - salt restriction
    - Frusemide 1-2 mg/kgIV 2- 4 times a day

Refer patient

Post-renal AKI

- Urgent catheterization
- Refer to tertiary facility

NON-PHARMACOLOGICAL

- Avoid nephrotoxins
- Adjust the doses of renally excreted drugs (penicillin, amoxicillin, cotrimoxazole,ciprofloxacin)
- Nutrition
    - Low salt diet
    - Low potassium diet (no bananas, tomatoes, unboiled potatoes, citrus fruits)
    - High caloric diet
    - Breastfeeding can be continued

Complications

- Chronic kidney disease
- Pulmonary oedema

- Uraemic encephalopathy
- Bleeding diapthesis

Referral

All patients with AKI

TREATMENT IN ADULTS

Objectives

- Assess the hydration status of the patient
- Patients who are dehydrated will need fluid resuscitation
- Avoid **Ringer's Lactate** fluids (has high potassium content)
- Patients who are fluid overloaded will need fluid restriction and/or diuretics
- Restrict salt intake
- Weigh the patient daily
- Carefully monitor fluid intake and output on a chart
- Medical rehabilitation for cardiorespiratory rehabilitation.
- Reduce the rate of rise of urea:
    - Give adequate calories
    - Restrict protein in the diet
    - Treat hyperkalaemia:
        - Restrict potassium intake by restricting fruits, vegetables, meat and feezy drinks
        - If potassium is > 6.5mmol/l give **Insulin** 10 Units in 50ml of 50% **Dextrose** infusion over 30 minutes
        - Give a **Potassium Binding Resin** 30-60g orally
- Refer patient to Central Hospital for further management and consideration for dialysis if not responding to measures above

Indications for dialysis include:

- Hyperkalaemia refractory to insulin shifting
- Fluid overload not responsive to diuresis
- Metabolic acidosis
- Pericarditis
- Uremic symptoms and signs (encephalopathy, haemorrhagic pericardial effusion bleeding***)***
- Lithium and theophylline overdose

Note:

- Treat complications of renal failure such as convulsions, hypertension
- Do an HIV and Hepatitis B test before referral for dialysis.

21.5 USE OF MEDICINES IN RENAL DYSFUNCTION/IMPAIRMENT

Note: Take great care when prescribing any medicine and carefully check medicine prescribing information (e.g. in BNF, MNF) regarding use in renal failure/impairment

Usually safe medicines:

- Doxycycline
- Erythromycin
- Penicillin
- Phenytoin
- Rifampicin

Use with care in reduceddoses:

- Amoxycillin
- Chloramphenicol (avoid in severe impairment)
- Cotrimoxazole
- Diazepam
- Digoxin
- Insulin
- Isoniazid-containing medicines
- Pethidine (increase dose interval, avoid in severe impairment)
- Phenobarbitone
- Propranolol
- Antiretroviral medicines

Avoid using:

- ACE inhibitors (eg. Captopri)
- Aspirin and other NSAIDS (eg. Ibuprofen, Indomethacin, diclofenac)
- Codeine
- Ethambutol
- Gentamycin
- Nalidixic acid
- Nitrofurantoin
- Streptomycin

21.6 CHRONIC KIDNEY DISEASE

CLINICAL DESCRIPTION

Chronic Kidney Disease (CKD) refers to kidney damage of more than 3 months duration. The early stage of CKD is usually asymptomatic but can be detected through laboratory tests of

serum creatinine and estimation of Glomerular Filtration Rate (eGFR), measurement of urine albumin creatinine ratio and screening of individuals at increased risk such as those with hypertension, diabetes mellitus or a past history of glomerulonephritis.

Causes:

- Chronic hypertension, Chronic glomerulonephritis, Diabetes mellitus, Obstructive uropathy, Renal calculi, Polycystic kidney disease, Toxins (drugs, herbs, heavy metals, etc.), Connective tissue disease

Stages of Chronic Kidney disease:

Stage	Description	eGFR (ml/min/1.73 m2)
1	Kidney damage with normal or increased eGFR	>90
2	Kidney damage with mildly reduced eGFR	60 – 89
3	Moderately reduction in eGFR	30 – 59
4	Severe reduction in eGFR	15 – 29
5	Kidney failure (End-stage kidney disease)	<15

**eGFR – estimated glomerular filtration rate

SIGNS AND SYMPTOMS

- None in the early stages, Reduced attention and concentration, Anorexia, nausea, vomiting, Gastrointestinal bleeding, Hiccups, Breathlessness on exertion, Thirst, Nocturia, polyuria, Muscle Cramps, Paraesthesia, Pruritus, Insomnia
- Lethargy, Bleeding tendency, Pallor, Hypertension, Pericarditis, Peripheral neuropathy, Peripheral oedema, asterixis (flapping tremor), Increased skin pigmentation and/or excoriation

INVESTIGATIONS

- FBC, Sickling, Blood film comment, Urinalysis, Blood Urea, Electrolytes, Serum Creatinine, Calcium, Phosphate, Fasting blood glucose, Lipids, Chest X-ray, Ultrasound of kidney

TREATMENT

- To detect chronic kidney disease early in susceptible individuals, To control hypertension, To control blood glucose, To manage underlying causes, To prevent complications and further worsening of kidney function.

NON-PHARMACOLOGICAL TREATMENT:

- Avoid nephrotoxins e.g. NSAIDs, herbal medication, Restrict salt intake, Restrict dietary protein to 1 gram/kg/day, Avoid potassium containing foods e.g. bananas, Dialysis (refer to a nephrologist)

PHARMACOLOGICAL TREATMENT

- To control fluid overload
  - **Furosemide**, oral or IV, 40-120 mg 24 hourly
- Treatment of hypertension (See section on 'Hypertension')
- Treatment of renal anaemia (See section on 'Anaemia in Chronic Kidney Disease')
- Control of hyperkalaemia Adult
  - **Calcium gluconate** 10%, IV, 10-20 ml, slow IV, over 2-5 minutes And then **Soluble Insulin**, IV, 10 units in 50-100 ml Dextrose 50% , **Sodium bicarbonate** IV 8.4% (50 mEq in 50ml) 1-2 ml/kg over 5 minutes can be given to control acidosis.

Note: Do not mix calcium gluconate and sodium bicarbonate

Referral Criteria: Refer all patients with predisposing factors and complications to a physician specialist or nephrologist for further definitive management of chronic kidney disease. Refer all patients requiring dialysis to a nephrologist.

CKD Stage	Description	Action
Stage 1	Kidney damage with normal or reduced GFR	Slow progression by meticulous BP control, annual follow up, Urinalysis, and UPCR measurement
Stage 2	Kidney damage with mildly decreased GFR	Estimate progression and manage as Stage 1
Stage 3	Moderately decreased GFR	Estimate and treat complications: If Hb<11, check ferritin, B12 and folate. Annual check of calcium, phosphate and PTH.
Stage 4	Severely decreased GFR	Prepare for kidney replacement therapy
Stage 5	Kidney failure	Kidney replacement therapy: Dialysis or kidney transplant

CHAPTER 22: POISONING

GENERAL PRINCIPLES OF TREATMENT

Determine details of the poisoning:

- What was the poison?
- When did the poisoning take place?
- What kind of poisoning took place?

e.g., by swallowing, inhalation, contact with the skin or eyes

- How much was taken?
- What has been performed at home or in the community since the poisoning?
- Was it deliberate or accidental?

Prevent further exposure to the poison (if possible)

- Remove contaminated clothing
- Wash contaminated skin with soap and lots of cold water

Note: Non-accidental injury or neglect should be considered in all cases of poisoning in children., The social workers may need to be involved to assess the social circumstances and take the necessary steps to ensure the child is not at risk of further incidences.

GENERAL MANAGEMENT

General management involves supportive care:

- **Airway**: Clear the airway
- **Breathing**: Maintain respiration, may need to support breathing (use bag and mask if necessary. Consider need for intubation and ventilation)
- **Circulation**: Maintain BP/treat shock, maintain fluid balance, monitor fluid intake and output, elevate legs, in refractory shock discuss with anesthetist
- **Disability**: Monitor sugar levels
- **Exposure**: Conserve body heat (if necessary), remove clothes (in case of contamination)

22.1 SWALLOWED POISONS

TREATMENT

- Prevent gut absorption
- Empty the stomach (if appropriate)

Only do this if within 4 hours of the poisoning and if the patient is conscious

Do not empty the stomach if:

- A corrosive substance was swallowed, e.g., strong acid or alkali, bleach, paraffin or a petroleum product.
- The patient is unconscious or convulsing
- The subsistence is not known

DO not induce vomiting nor perform gastric lavage in children. This is dangerous practice as it poses risk for aspiration.

- Treat any complications as necessary e.g. hypothermia, hypoglycemia, convulsions, electrolyte or acid/base disturbances

METHODS OF EMPTYING THE STOMACH

- Induction of vomiting: Adults ONLY
  - Give **Ipecacuanha** emetic mixture
    - Children < 18 months: 10ml
    - Children > 18 months: 15ml
    - Adults: 15-30 ml
  - Repeat after 20 mins if ineffective
  - Follow this with 15 ml/kg of water

Note: It is essential to prevent any vomit from entering the lungs

- Stomach wash-out (gastric lavage): Adults ONLY
  - Should only be done by staff familiar with the procedure
  - Lie the patient head down on the left side
  - Pass a wide gauge soft rubber tube (Ryle's tube) into the stomach
  - Tube should be wide enough to allow large particles to pass through. e.g. tablets
  - Pour 300ml tap water down the tube
  - For children > 5years: use 100-200 ml water
  - For children < 5 years: use normal saline instead of water
  - Aspirate the patient with the head down position, taking special note of the airway
  - Repeat lavage until aspirated fluid is clear

USE OF ACTIVATED CHARCOAL

- 50-100g **Activated Charcoal** will prevent absorption of most medicines given within 1 hour of ingestion
- Only effective if given within 4 hours of poisoning when most of the poison is still in the stomach
- Only give Activated Charcoal after vomiting (induced or otherwise) has ceased

- Do not use ordinary charcoal - it will have no effect
- Do not use activated charcoal in the following situations:
    - If the patient is vomiting, unconscious, drowsy, or having fits, convulsing because of the risk of choking
    - At the same time as, or just before giving Ipecacuanha or any oral antidote as it may bind these and prevent them from working
    - For poisoning by acids, alkalis, alcohol, iron, and petroleum products

ADMINISTRATION OF ACTIVATED CHARCOAL

- Add 50 g (children: 1 g/kg) to 400 ml water in a bottle
- Mix well by shaking until all the powder is wet
- Administer by the gastric lavage tube (unless the patient agrees to drink the charcoal slowly)
- Repeat if required after 4-6 hours

Children:

NEONATE-12 years: 1 g/kg (max. per dose 50 g)

12-18 years: 50 g

PARAFFIN, PETROL AND OTHER PETROLEUM PRODUCTS

- Includes paint thinners, organic solvents, etc.
- The main danger from these is damage to lung tissue and liquid pneumonitis following aspiration

General Measures

- Treatment is mainly supportive
- There is no special antidote
- Take great care to prevent the substance entering the lungs
- Do not make the patient vomit
- Do not do gastric lavage except:
    - Where the amount of paraffin, etc., swallowed was high (> 10 ml/kg) as these levels may cause brain damage
    - Only after endotracheal intubation under anesthesia
- Treat any pulmonary oedema and pneumonia as required
- Giving un absorbable oral liquid, e.g., medicinal liquid paraffin

22.2 IRON POISONING

TREATMENT

- A dose of 20 ml/kg of Iron Syrup or 2-3 iron tablets/kg may be fatal in children. Abdominal X-ray may show the number of tablets swallowed
- In severe cases there are risks of vomiting and gut hemorrhage in the acute stage and liver necrosis and shock after 1-2 days. Therefore, observe the patient for at least 48 hours
- Remove any tablets by inducing vomiting and/or by gastric lavage

In less serious cases:

- Give **Desferrioxamine** 5-10g orally or by nasogastric tube in 50-100ml of Sodium Bicarbonate solution 5%

In serious cases:

- Give **Desferrioxamine** 15mg/kg/hour by IV infusion in Dextrose 5% or Sodium Chloride 0.9% solution
- Max: 80 mg/kg in each 12-hour period
- Continue until free of symptoms for 24 hours

Children

- Treatment is supportive
- May need IV fluid resuscitation and electrolyte supplementation
- Consider giving desferrioxamine (15 mg/kg/hour IV)
- If anuria, consider peritoneal dialysis

22.3 SALICYLATE (ASPIRIN) POISONING

Adults

- Gastric emptying is delayed
- Always empty the stomach
- Give repeated doses of **Activated Charcoal** to delay absorption of any remaining poison (See Section 22.2.2.1)
- Watch for and treat hypoglycemia, convulsions, and metabolic acidosis

In severe cases:

- **Darrow's ½ strength in Dextrose** 5% infusion with added **Sodium Bicarbonate** (30 mmol/litre) or Ringers Lactate may be needed to increase renal excretion

Children

- Give **activated charcoal** (1 g/kg) if within 4 hours of ingestion
- "Forced alkaline diuresis" is no longer advised in children due to risks of fluid overload
- Maintain a good urine flow of around 1ml/kg/hour
- Can use sodium bicarbonate to alkalinize urine in severe cases (1mmol/kg $NaHCO_3$ over 4 hours – IV or oral)

ORGANOPHOSPHATE OR CARBAMATE POISONING

- Very toxic chemicals found in insecticides and pesticides, e.g. Some rat poisons
- Poisoning may be by ingestion, inhalation, or absorption through the skin
- Presents with diarrhoea, urination, small pupils, bradycardia, vomiting, lacrimation, secretions, anxiety and restlessness, increased secretions and bradycardia

GENERAL MANAGEMENT: ADULT

- Remove any contaminated clothing
- Establish and maintain airway
- Artificial respiration with oxygen may be required at any stage during the first 24 hours after poisoning
- Empty the stomach if poison swallowed
- If there is skin contact with the poison, wash them thoroughly
- Wear rubber gloves to prevent contamination
- Do not rub the skin
- Shave hair if heavily contaminated
- Give **Atropine** 1.2mg IV or IM (children: 0.05 mg/kg)
- Then give 0.6 mg (children: 0.05mg/kg) every 10 minutes as required to achieve and maintain atropinisation (hot dry skin, dry mouth, widely dilated pupils, fast pulse)

In severe organophosphate poisoning:

- Give an initial **Atropine** dose of 4-6mg (children: 2 mg)
- Repeat 2mg every 10 minutes as required to achieve and maintain full atropinisation
- Total needed in first 24 hours is usually < 50 mg
- High dose Atropine may be required for several days

In severe organophosphate poisoning only and in cases not responding to atropine:

- Give **Pralidoxime Mesylate** 1-2g concurrently with **Atropine**

Children: 20-40 mg/kg

- Administer by slow IV (over 15-30 minutes) as a 5% solution in water for injections
- If IV not possible: give IM or S/C and repeat once or twice at 4–6-hour intervals if needed

- If possible: monitor treatment by determination of blood- cholinesterase concentrations

Note: **Do not** give Pralidoxime (or other oximes) in carbamate poisoning

Children

- Irrigate the eyes or skin to remove the chemical if required
- If available and <4 hours since ingestion, administer activated charcoal
- Do not induce vomiting
- If respiratory compromise give oxygen and treat with atropine: 20 micrograms/kg IM or IV. Repeat every 15 minutes until chest is dry.
- May need escalation to peadiatric intensive care for respiratory support and ongoing treatment

22.4 PARACETAMOL POISONING

- Paracetamol is an ingredient of many over the counter pain, cold, and flu remedies
- A dose of over 150 mg/kg (i.e. approx. 10 g in an adult) may cause severe liver and (less frequently) kidney damage within hours of ingestion
- In the first 24 hours there may be nausea and vomiting or there may be no sign of poisoning
- Persistence of these symptoms and associated right subcostal pain and tenderness usually indicates hepatic necrosis
- Liver damage reaches a maximum 3-4 days after poisoning and may be fatal

Even if there are no significant early symptoms, overdose patients should be urgently transferred to hospital

If overdose occurs within 4 hours of admission:

- Empty the stomach to remove ingested medicine
- If respiration is depressed: do not use emesis - use airway protected gastric lavage instead
- Keep patient warm and quiet
- Observe carefully for at least 3-4 days
- Monitor fluid, electrolytes, blood glucose, liver and kidney function
- Give supportive care and correct fluid and electrolyte balance as required

Adults:

If within 24 hours of overdose with over 10g of paracetamol:

- Give the specific antidote **N-acetylcysteine** as an IV infusion in **Glucose 5%**
- Initially give 150mg/kg in 200ml over 15 minutes
- Then give 50 mg/kg in 500 ml over 4 hours
- Then give 100mg/kg in 1L over 16 hours

If a serious reaction occurs:

- Stop the infusion
- Treat the reaction (see Section 5.1.1)
- Restart the infusion

Children:

Treatment is usually guided by Paracetamol levels

If these are unavailable, use the empiric **Acetylcysteine** regime

Weight	Initial dose	Second dose	Third dose	Instructions
<20 kg	150 mg/kg in 3 ml/kg fluid over 1 hour	50 mg/kg in 7 ml/kg over 4 hours	100 mg/kg in 14 ml/kg over 16 hours	Mix in 5% Dextrose or 0.9% sodium chloride
20-40 kg	150 mg/kg in 100 ml fluid over 1 hour	50 mg/kg in 250 ml over 4 hours	100 ml/kg in 500 ml over 16 hours	Mix in 5% Dextrose or 0.9% sodium chloride
>40 kg	150 mg/kg in 200 ml fluid over 1 hour	50 mg/kg in 500 ml over 4 hours	100 ml/kg in 1 litre over 16 hours	Mix in 5% Dextrose or 0.9% sodium chloride

Anaphylaxis to Acetylcysteine should be managed in accordance with standard treatment protocols, but the infusion should be continued at a slower rate.

If **Acetylcysteine** is not available, then PO **Methionine** can be used:

- < 20 kg 625 mg
- 20 – 40 kg 1.25 grams
- >40 kg 2.5 grams

CHAPTER 23: NUTRITIONAL DISORDERS

23.1 SEVERE MALNUTRITION (SAM) IN CHILDREN

CLINICAL DESCRIPTION

Severe acute malnutrition in children is the presence of bilateral pitting oedema or WFH of <-3 Z score or

- In children 6-59 months MUAC <11.5cm
- Children 5 -9 years MUAC <13.0cm
- Children 10 – 15 years <16.0cm

23.1.1 SEVERE CHILDHOOD ACUTE MALNUTRITION WITHOUT COMPLICATIONS

CLINICAL FEATURES

Any Children with SAM who meet the following criteria:

- The child is > 6 months of age and weight 3kg
- Pitting oedema of ≤ +2
- The child is alert (not lethargic)
- The child has a good appetite and is feeding well
- The child does not have any danger signs and is clinically well

TREATMENT

General measures:

- Children with severe acute malnutrition without complications should be admitted in the Outpatient Therapeutic Program (OTP) and followed up every 2 weeks.
- Conduct appetite test in a quite separate area. The child passes the test if he/she eats at least one-third (1/3) of a packet of RUTF (92g).
- Conduct medical assessment

PHARMACOLOGICAL TREATMENT

- Antibiotics
  - All children with SAM without complications should receive oral antibiotics.
  - Amoxicillin is the antibiotic of choice in OTP and it given as shown in the table below:

Weight of the Child (kg)	Syrup 125mg/5ml	Syrup 250mg/5ml	Tablets 250mg
< 2.0	62.5mg (2.5ml) every 8 hours	62.5mg (1.25ml) every 8 hours	62.5mg (1/4 tablet) every 8 hours
2.0-9.9	125mg (5ml) every 8 hours	125mg (2.5ml) every 8 hours	125 (1/2 tablet) every 8 hours
10.0-30.0	250mg (10ml) every 8 hours	250mg (5ml) every 8 hours	250mg (1tablet) every 8 hours
>30.0	Give tablets	Give tablets	500mg (2 tablets) every 8 hours

- If Amoxicillin is not available, use Cotrimoxazole according to IMCI protocol
- Do not give Vitamin A Supplementation to children with SAM in OTP
- Do not give Iron and Folic acid to children with SAM in OTP
- Children with diarrhea with mild and moderate dehydration should receive only RUTF and water.
- ORS contains high sodium and is inappropriate (and potentially fatal) for children with SAM.
- All children with severe dehydration they should be referred for inpatient care.
- Zinc should not be given in children on RUFT.

Antimalarial

- Lumefantrine/Artemether (LA) should only be prescribed if there is a positive diagnostic test.
- Refer to malaria section

Deworming

- All children in OTP should be dewormed using Albendazole or mebendazole as shown in the table below.
- If the child is transferred between OTP and NRU ensure that this dose is not repeated.

Age	Albendazole	Mebendazole
<12 months	None	None
12 to 23 months	200mg single dose	100mg EVERY 12HRS for 3 days
24 to 59 months	400mg single dose	100mg EVERY 12HRS for 3 days

Nutritional management

- The nutritional treatment is managed in the home, with the children attending OTP sessions on a weekly basis to monitor the health and nutritional status and replenish RUTF stocks.
- **Ready to Use Therapeutic Food (RUTF)** is used to treat patients with SAM in OTP.

- Amounts of RUFT to give are given in the table below:

Weight of Child (kg)	Packets per Day	Packets per Week
3.5-3.9	1.5	10
4.0 -4.4	1.5	11
4.5-4.9	1.75	12
5.0-5.9	2	14
6.0-6.9	2.5	17
7.0-7.9	3	20
8.0-8.9	3.25	23
9.0-9.9	3.75	26
10-11.9	4	28
≥12	5	35

23.1.2 SEVERE CHILDHOOD ACUTE MALNUTRITION WITH COMPLICATIONS

SIGNS AND SYMPTOMS

- Any child with SAM has ONE of the following features:
  - < 6 months of age or weighs < 3 kg
  - Pitting Oedema of 3+
  - Refusing feeds or is not eating well (poor appetite)
  - Eye signs of Vitamin A deficiency
  - Localizing signs of infection (pneumonia, skin, ear / nose / throat)
  - Mouth ulcers
  - Skin changes of Kwashiorkor:
    - Hypo- or hyper-pigmentation
    - Desquamation
    - Ulceration (spreading over limbs, thighs, genitalia, groin and behind the ears)
    - Exudative lesions (resembling severe burns) often with secondary infection (including candida)
- Signs of developmental delay
- Signs of any underlying chronic disease / condition
  - HIV/AIDS
  - TB
  - Cerebral palsy
  - Congenital anomalies (e.g. congenital heart disease and cleft palate)

TREATMENT OF CHILDHOOD SEVERE ACUTE MALNUTRITION WITH COMPLICATIONS

- General measures
- Must be admitted to hospital -NRU
- Do a full assessment especially looking for underlying disease such TB, HIV infection, cardiac or neurological disorder.
- Assess and treat common complications and other medical condition such as:
  - Signs of shock
  - Hypoglycemia
  - Hypothermia
  - Diarrhoea
  - Dehydration
  - Severe anaemia
  - Skin lesions (dermatosis)
  - Eye problems
  - Oral Candidiasis

Nutrition Management

Phase 1

- **F75** is used to stabilize malnourished children in Phase 1 of treatment
- On the first day, feed the child small amounts of **F-75** 2 hourly (12 feeds in 24 hours, including through the night)
- After 24 hours give 8 feeds of **F75 (130mls/kg/day)** (3 hourly). This will assist to prevent and treat hypoglycaemia and Hypothermia
- Give **F75** to all children except infants <6 months where breastfeeding is being established. For these infants use dilutes **F100** except if oedema is present
- Continue breastfeeding on demand

Transition phase

- A patient in phase 1 is moved to the transition phase as soon as the patient's appetite returns and or oedema starts to subside.
- Children with severe oedema [+++] should undergo transition when oedema has reduced to moderate [++].
  - **Transition using RUTF**
    - Introduced RUTF gradually alongside F-75
    - When the child finishes 50% of RUTF, reduce the volume of F-75 by 50%
    - Stop F75 when the child can finish 75 – 100% of the daily RUTF ration
  - **Transition using F-100**
    - The volume of feeds remains the same as in the stabilization phase.

- Give 130 ml of **F100** per kg bodyweight per day every 3 hours.

Routine Medical Treatment and Prophylaxis

- Give **Vitamin A** only if there are eye signs of vitamin A deficiency (dry conjunctiva or cornea, corneal clouding or ulceration, Bitots spots, keratomalacia) on day 1, Day 2 and Day 14 as follows:

Age	Vitamin A orally on day 1 and 2 and day 14
<6 months	50, 000 IU {2 drops or one third redcap)
6 to 12 months	100, 000 IU
>12 months	200,000 IU

Antibiotic regimen in NRU

All patients with SAM should receive antibiotics as follows:

On admission if	Give
IV antibiotics may not be given	Amoxicillin orally, 15mg/kg 8 hourly for 7 days
With Complications	Give Benzyl penicillin 50,000iu/kg 6 hourly IV/IM for 48 hours then oral amoxicillin 15mg/kg 8 hourly for 5 days AND If the child fails to improve within 48 hours add Gentamycin 7.5mg/kg 24 hourly IV/IM for 7 days If no improvement after 48 hours Ceftriaxone 100 mg/kg IV or IM 24 hourly for 5 days (Infants <3 kg: 50 mg/kg) If the child fails to improve within 48 hours and if suspected staphylococcal infection, give: Cloxacillin 25-50 mg/kg/dose IV (or IM) 6 hourly for 5 days (Infants <3 kg: 25-50 mg/kg/dose every 8 hours).
If child is HIV infected or exposed give cotrimoxazole preventive therapy (CPT)	Cotrimoxazole: <6 months-120mg/day >6 months-5 years 240mg every day >5 years-480mg every day

MANAGEMENT OF DEHYDRATION IN CHILDREN WITH SEVERE ACUTE MALNUTRITION

- It is difficult to estimate dehydration status in a child with SAM using clinical signs alone.
- A diagnosis of dehydration therefore needs to be associated with a definite recent history of significant fluid loss; watery diarrhoea (not just soft or mucoid) and frequent (more than 3 stools per day) with a recent onset.

- Assume that all children with watery diarrhoea may have dehydration and give ReSoMal as follows:
    - Give **ReSoMal** 5mls/kg every 30 minutes for the first 2hrs.
    - Then, if the child is still dehydrated, give **ReSoMal** 5–10 mL/kg/h in alternate hours **with F-75**, up to a maximum of 10 h; Encourage mother to give the fluid slowly, and to persist even if the child is slow to take the fluids. Give the mother only the amount of fluid required for the next hour.
    - If the child is refusing or vomiting insert a naso-gastric tube and commence NG fluids.
    - Do not treat dehydration with intravenous fluids as these children can become overloaded with fluid very quickly and this is very dangerous and can lead to heart failure and death.
    - Continue breastfeeding.

During treatment, rapid respiration and pulse rates should slow down and the child should begin to pass urine.

SHOCK MANAGEMENT IN SEVERE ACUTE MALNUTRITION

A child with SAM is considered to have shock if he/she:

- is lethargic or unconscious, and
- has cold hands

plus, either:

- s*low* capillary refill (longer than 3 seconds), *or*
- weak or fast pulse

- If the child is in shock:
    - Give **Oxygen** 1-2 litre per minute.
    - Give **Sterile 10% glucose** 5 ml/kg IV over about 10 minutes.
    - Keep the child warm
- Infuse IV fluid at 15 ml/kg over 1 hour. Use one of the following solutions, listed in order of preference:
    - Half-strength Darrow's solution with 5% dextrose
    - Ringer's lactate solution* with 5% dextrose
    - If the above fluids are not available, give half-normal (0.45%) saline solution with 5% dextrose.
    - If either of these is used, add sterile **Potassium chloride** (20 mmol/L) if possible.

- If the child fails to improve after the first hour of IV fluids, then assume that the child has septic shock. A blood transfusion is indicated.
- Give maintenance IV fluids (4 ml/kg/hour) while waiting for blood.
- When blood is available, stop all oral intake and IV fluids, give a diuretic to make room for the **blood & then transfuse whole fresh blood at 10 ml/kg slowly over 3 hours.**
- If there are signs of heart failure, give packed cells instead of whole blood as these have a smaller volume
- Observe the child and check respiratory and pulse rates every 10 minutes.
- If the respiratory rate increases by 5 breaths/minute and the pulse rate increases by 25 beats/minute, stop the IV.
- If respiratory rate and pulse rate are slower after 1 hour, the child is improving. Repeat the same amount of IV fluids for another hour. Continue to check respiratory and pulse rates every 10 minutes.
- Once signs of shock resolves, switch to **oral or NG rehydration with ReSoMal**.
- **Give 5 -10 ml/kg ReSoMal in alternate hours with F-75 for up to 10 hours**. Leave the IV line in place in case it is needed again

All children with SAM and shock should receive antibiotics; ideally parenteral antibiotics as indicated under the section of routine medical treatments and prophylaxis.

TREATMENT OF OTHER COMPLICATIONS OF SAM:

- Hypothermia:
  - Re-warm
  - Consider the possibility of sepsis or hypoglycaemia
- Hypoglycaemia:
  - Give the child a 50 ml (infant less than 6 months 25 ml) bolus of **10% glucose** or sucrose (i.e., sugar water) orally or by nasogastric (NG) tube
  - If the child can drink, give the 50 ml bolus orally. If the child is alert but not drinking, give the 50 ml by NG tube
  - Then give **F75** orally or via NGT as soon as possible and recheck the blood sugar after 1 hour
  - **Note:** Hypothermia and hypoglycaemia are frequently signs of sepsis. Consider sepsis treatment if present
- Cardiac failure:
  - Give **Frusemide** 1-2 mg/kg IV or IM
  - Digoxin is contraindicated in kwashiorkor
- Severe anemia:
  - Transfuse 10 mL/kg packed cells
- Mouth ulceration:
  - If not severe use GV Paint
  - *If severe like cancrum oris use:*
  - Give Benzylpenicillin 25,000 units/kg per dose IM 6 hourly and
  - Give Metronidazole 7.5 mg/kg 8 hourly for 7 days

- Skin ulcers:
  - Soak lesion with Potassium Permanganate 1% solution for 10-15 minutes *then*
  - Apply a paraffin Gauze Dressing

Note: provide psycho-social stimulation for all children treated for acute malnutrition

23.1.3 SEVERE ACUTE MALNUTRITION IN ADOLESCENTS AND ADULTS

CLINICAL DESCRIPTION

Severe acute malnutrition in adolescents and adults is defined as bilateral pitting oedema or MUAC <18.5cm or Body-Mass-Index (BMI) <16.0.

In pregnant/lactating women severe acute malnutrition is defined as a MUAC <19.0cm.

23.1.3.1 SEVERE MALNUTRITION IN ADOLESCENTS AND ADULTS WITH MEDICAL COMPLICATION

CLINICAL DESCRIPTION

Most adolescents and adults with severe undernutrition will present with other health problems.

SIGNS AND SYMPTOMS

- Severe bilateral pitting oedema (Grade +++)
- Failed appetite test
- Infection that requires intravenous antibiotics
- Inability to care for oneself and absence of caretakers at home

TREATMENT

MEDICAL MANAGEMENT

- All adolescents and adults with severe malnutrition with complications require admission to the hospital.
- Review the client's medical records and condition and treat severe infections and other medical conditions, such as severe anaemia, chronic diarrhoea, severe dehydration, HIV, TB, malignancy as per the national guidelines and refer where appropriate.

NUTRITIONAL CARE

- If admitted to inpatient care, give the client **F-75** as an initial feed for the first 1–2 days based on weight (130 ml/kg/day).

- If the client has severe (+++) oedema, give only 100 ml/kg/day of F-75

See the table below for daily amounts of F-75 therapeutic milk feeds for adolescents and adults who are wasted or have bilateral pitting oedema + or ++.

Weight of patient (kg)	8 feeds per day, amount of each feed (ml)
15.0–19.9	260
20.0-24.9	290
25.0–29.9	300
30.0–39.9	320
40.0–60.0	350

See the table below for daily amounts of **F-75** therapeutic milk feeds for adolescents and adults with severe bilateral pitting oedema (+++).

Weight of patient (kg)	8 feeds per day, amount of each feed (ml)
15.0–19.9	210
20.0-24.9	230
25.0–29.9	240
30.0–39.9	255
40.0–60.0	280

- When the condition is improving and the client is ready to transition, gradually introduce RUTF.
- When the client is able to consume 75% to 100% (2–3 sachets) of RUTF, stop giving the F-75 milk feeds.
- If the client is having difficulty eating RUTF due to mouth sores or severe oral thrush, use F-100 instead of RUTF during the transition period.

23.1.3.2 ADOLESCENTS AND ADULTS WITH SEVERE MALNUTRITION WITHOUT COMPLICATIONS

MEDICAL TREATMENT

- Assess for associated or underlying medical conditions such as HIV, TB, malignancy or anaemia and provide treatment or refer for treatment according to the national guidelines.

NUTRITIONAL CARE

- All patients who fail the appetite test i.e., does not eat at least half a sachet of RUTF, should be referred to in-patient care.

- Patients who pass the appetite test should be given 3 sachets of RUTF and 300 grams of *likuni phala* per day or 3 sachets of RUTF and 300 grams of CSB++ (Corn Soya Blend) to consume at home provided they have someone to support him or her.
- RUTF and *likuni phala* or CSB++ should not be shared with family members; they should not be discontinued if the patient has diarrhea and they should be given in addition to the family food.

Note: Severely undernourished pregnant and lactating women up to 6-month post-partum **should not** be treated with RUTF. Provide the client with only *likuni phala* or CSB ++ or other supplementary food that meets recommended standards. RUTF contains high doses of vitamin A, above the recommended 10,000 IU per day. High doses of vitamin A can cause teratogenic effects in early pregnancy.

- Encourage pregnant and lactating women to meet their additional energy requirements by eating other home-prepared nutritious foods.
- Adolescents and adults should be transitioned from severe undernutrition without medical complications to moderate undernutrition if the criteria indicated in the table below are met.

Group	BMI	BMI-for-age	MUAC	Weight
12–14 years		≥ –3	≥ 160 mm	Gains 10% or more of his/her body weight
15–18 years		≥ –3	≥ 185 mm	
≥ 19 years	≥ 16.0		≥ 190 mm	
Pregnant women and lactating women up to 6 months post-partum			≥ 190 mm	Gains at least 2.0 kg per month

23.2 MODERATE MALNUTRITION IN CHILDREN AND ADULTS

CLINICAL DESCRIPTION

Moderate acute malnutrition in children is the presence of WFH of -3Z to <-2 Z score or

- In children 6-59 months MUAC 11.5cm to <12.5cm
- Children 5 -9 years MUAC 13.0–<14.5 cm
- Children 10 – 15 years 16.0– <18.5 cm

Children with moderate acute malnutrition have no oedema, they have good appetite and they look clinically well.

Adolescents and adults with moderate acute malnutrition have a MUAC 18.5 to <22.0cm or Body-Mass-Index (BMI) 16.0 to <17.0.

Pregnant /lactating women with moderate acute malnutrition have a MUAC of <22.0cm.

TREATMENT OF CHILDREN WITH MODERATE MALNUTRITION

- Children with moderate acute malnutrition (MAM) with no medical complications, and has good appetite should be referred to supplementary feeding program (SFP).
- HIV positive children with acute malnutrition (moderate or severe) should be treated in OTP as they are more at-risk of death than children who are malnourished but HIV negative.

TREATMENT OF ADOLESCENTS AND ADULTS WITH MODERATE MALNUTRITION

Medical treatment

- Review the patient's medical records and condition and provide treatment or refer for treatment.
- Pregnant women or up to 6 months post-partum should be given iron/folic acid daily up to six months post-partum.
- Pregnant women should receive malaria prophylaxis (sulfadoxine pyrimethamine) and deworming tablets (**400mg of albendazole**)

Nutritional care

- Patients with chronic disease such as HIV positive should meet the extra 20% energy using locally available nutritious food or supplement with CSB (likuni phala) or super cereal plus (CSB++).
- Adolescents require more additional energy to gain and maintain weight.

23.3 OVERWEIGHT AND OBESITY

SIGNS AND SYMPTOMS

Adolescents (non-pregnant and non-post-partum):

BMI-for-age:

- Overweight: ≥ +1 to < +2
- Obese: ≥ +2

Adults (non-pregnant and non-post-partum):

BMI:

- Overweight: 25.0 to 29.9

- Obese: ≥ 30.0

Pregnant and post-partum women up to 6 months:

MUAC:

- Overweight/Obese: ≥ 300 mm

MEDICAL CARE FOR OVERWEIGHT AND OBESITY

- Check and treat or refer any associated medical conditions such as hypertension, HIV and diabetes.
- Check cholesterol levels if available.

NUTRITIONAL CARE FOR OVERWEIGHT AND OBESITY

- Counsel the client on making changes to diet and physical activity to attain a healthy weight range that is within the BMI of 18.5 to 25.0.
- Reducing the intake of highly processed food, fatty food, junk foods, sweet drinks, and sugary foods
- Increasing the consumption of fresh fruits and vegetables
- Doing at least 30 minutes of physical exercise every day, such as walking, jogging, and doing household chores
- Reducing portion sizes
- If the client is pregnant, do not encourage weight loss, but set appropriate weight gain targets for pregnancy and encourage healthy eating habits.

DISCHARGE CRITERIA FROM TREATMENT PROGRAMMES

The table below summarises the discharge criteria of children from OTP and NRU

NRU	OTP

Refer children 6 months to 15 years to OTP if:

- Appetite returned (passed appetite test for RUTF – the child is eating more than 75 percent of daily prescription of RUTF) and start of weight gain
- Medical complication resolving
- Bilateral pitting oedema decreasing
- If marasmic kwashiorkor admission: bilateral pitting oedema resolved
- Clinically well and alert

In case there's no OTP:

Children 6-59 months

- MUAC ≥ 12.5 cm
- WFH ≥ -2 z-score
- No bilateral pitting oedema for two consecutive weeks
- Clinically well and alert

Children 5 – 15 Years

- MUAC > 13.0cm (5 – 9 years)
- MUAC > 16.0cm (10-15 years)
- No bilateral pitting oedema for 2 consecutive weeks
- Clinically well and alert

Infants 0- 6 months (Breastfeeding)

- Successful re-lactation with effective suckling
- Good appetite, clinically well & alert
- Weight gain on either exclusive breastfeeding is satisfactory.

Infants 0- 6 months (Not Breastfeeding)

- WFH ≥ - 2 z-score for 2 consecutive weeks
- No oedema for 2 consecutive weeks
- Clinically well and alert, no medical problem

Children 6-59 months

- MUAC >12.5cm
- WFH >-2 Z scores
- No bilateral pitting oedema for 2 consecutive weeks
- Clinically well and alert

Children 5 – 15 Years

- MUAC > 13.0cm (5 – 9 years)
- MUAC > 16.0cm (10-15 years)
- No bilateral pitting oedema for 2 consecutive weeks.
- Clinically well and alert

23.4 PELLAGRA (VITAMIN B_3/NIACIN DEFICIENCY)

CLINICAL DESCRIPTION

Nicotinic acid deficiency, a condition known as pellagra is usually accompanied by other Vitamin deficiencies.

CLINICAL FEATURES AND DIAGNOSIS

Include the triad of diarrhea, dementia and dermatitis (darkening of sun-exposed skin)

TREATMENT

Objectives

- To prevent complications associated with the deficiency
- To replenish the deficient Vitamin B_3
- *Children:* **Nicotinamide**, oral, 50mg 8 hourly for 2 weeks.
- *Adults*: **Nicotinamide**, oral, 100mg 8 hourly for 2 weeks.
- ***For Malnutrition clients, refer to inpatient care CMAM/NCST guidelines***

Dietary advice

- Increase intake of liver, kidneys, other meats, poultry and fish, peanuts, milk, pulses, whole meal wheat and bran, Reduce intake of alcohol.
- Encourage diversification (6 food groups)

REFERRAL CRITERIA

- Refer all clients that have failed to respond to the above treatment
- Vitamin A Deficiency (Xerophthalmia)

CHAPTER 24: PSYCHIATRIC CONDITIONS

24.1 DELIRIUM

CLINICAL DESCRIPTION

Sudden onset of confusion often accompanied by impairment of consciousness often caused by underlying organic conditions {e.g., infections) and usually reversible.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Confusion
- Fluctuating level of consciousness
- Disorientation
- Agitation / psychomotor retardation
- Perceptual disturbances e.g., illusions, hallucinations
- Fever, headache, sweating or other physical symptoms
- delusions
- Autonomic instability
- Mood changes

INVESTIGATIONS

Look for underlying causes:

- Systemic and CNS infections
- Hypoxia
- Hypo- or hyperglycemia
- Urinary tract infections
- Drugs
- Alcohol intoxication or withdrawal
- Post-convulsion phase in epilepsy
- Head trauma
- Subdural hematoma
- Stroke etc.

Full physical examination including vital signs

- Full blood count
- Urine/ Blood glucose test
- Blood film or rapid diagnostic test for malaria
- Consider LP for CSF analysis if suspect meningitis or encephalitis

- Advisable to determine HIV serostatus
- Syphilis

TREATMENT

NON-PHARMACOLOGICAL.

- Nurse the patient in calm, quiet and well-lit environment with frequent reassurance and orientation

PHARMACOLOGICAL

- The aim of treatment is to identify and treat the underlying organic cause. Psychotropic medications are supportive.
- For behavioral disturbances or aggression give short course of low dose of antipsychotic medications, preferably orally
    - 1st line: **Haloperidol** 0.5 – 5mg 12 hourly or **Risperidone** 0.5 mg – 3 mg 12 hourly. If unavailable **Chlorpromazine** 50 - 100mg 12 hourly for 7 days or until agitation / confusion resolves
    - If the patient is refusing oral medications, use **Haloperidol** 2.5 - 5mg IM 12 hourly or **Chlorpromazine** 50 - 100mg IM 12 hourly if unavailable until sufficiently improved to accept medications orally
    - Avoid the use of diazepam / other benzodiazepines unless if history is suggestive of alcohol withdrawal, please refer to alcohol section for scheduling of benzodiazepines in alcohol withdrawal.
- *Note:* Delirium is a medical emergency. All delirious patients must be admitted and investigated appropriately. Intravenous or high dose Diazepam can cause respiratory depression/ distress
- If agitation is severe review the patient regularly
- Once symptoms have resolved, stop antipsychotics and arrange review in 5- 7 days' time to ensure patient remained stable

REFERENCE CRITERIA

For referral

- Decreasing level of consciousness
- Worsening physical health
- Investigations required not available at health facility

24.2 DEMENTIAS

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Deterioration of activities of daily living e.g., hygiene, social interaction
- Forgetfulness including wondering and getting lost
- Language deficits e.g., word finding difficulties
- Disturbances of orientation
- Personality changes such as irritability, and suspiciousness {sometimes persecutory delusion)

INVESTIGATIONS

- Formal memory tests should be used; e.g., MMSE and MOCA
- HIV, syphilis, FBC, LFTS, U & Es, urinalysis
- If impairment is due to HIV, use International HIV Dementia Scale (IHDS) Any impairment symbolizes possibility of dementia.

TREATMENT

Do physical examination to look for possible causes such HIV, high BP, alcohol dependence, vitamin deficiencies etc. Assess for depression which can mimic dementia

- The aim of treatment is supportive
- Correct any sensory impairment such as visual or hearing deficits
- Treat any physical comorbidities e.g., vascular, and optimize patient's physical health - good diet, exercise, hygiene
- Treat any physical illness promptly
- Encourage patient to use remaining abilities as much as possible
- Use reminders and prompts to help memory
- Manage pertinent risks such as unintentional fire setting, getting lost, suicide and falls
- Discuss end of life planning e.g., wills and power of attorney
- If depressed, refer to depression section for treatment details
- Antipsychotics should be avoided as they are associated with a high risk of mortality
- Antipsychotics should be avoided if presentation with features of parkinsonism or prominent visual hallucinations
- If the psychotic symptoms are prominent, use low dose antipsychotic medications
    - 1st line: **Haloperidol** 1.25-2.5mg PO 24 hourly until the symptoms resolve or
    - 2nd line: **Risperidone** 0.5 - 1mg PO 24 hourly until the symptoms resolve
    - If possible, avoid use of medication especially sleeping tablets {e.g., Diazepam) as they make confusion worse. Aspirin in low doses may slow down vascular dementia

REFERENCE CRITERIA

Admission

- If there is sudden increase in confusion in known cases of dementia which

FOLLOW-UP

- may be due to acute infection, toxic reaction to medication, acute psychosis, misuse of alcohol or drugs
- {rule out Delirium or Acute Psychosis)
- If the possible cause is treatable or manageable diseases such as HIV, High blood pressure
- Assess for normal pressure hydrocephalus if presenting with prominent gait abnormalities and incontinence
- Always do a physical check up to rule out comorbid illnesses which can complicate the dementia
- Assess risk for committing suicide
- Assess for and treat moderate - severe depression in the care givers {guardians)

24.3 ALCOHOL RELATED DISORDERS

24.3.1 ALCOHOL INTOXICATION

CLINICAL DESCRIPTION

Behavioral change with disinhibition, potentially agitated and aggressive behavior after recent ingestion of alcohol

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Argumentativeness
- Lability of mood
- Impaired attention and judgment, and interference with personal functioning
- Unsteady gait
- Difficulty standing
- Slurred speech
- Decreased conscious level
- Flushed face
- Conjunctival injection

INVESTIGATIONS

Blood or breath alcohol {if available)

TREATMENT

NON-PHARMACOLOGIAL

- Management is primarily supportive until the effects of the alcohol have worn off
  - ➢ If very aggressive then follow treatment guidelines for Violence and Aggression management
- Admission

Note: Diazepam should be avoided due to increased risk of respiratory depression

FOLLOW-UP

- If underlying condition and behavioral disturbance cannot be managed at home or health facility
- Give advice about safe levels of alcohol intake and screen for alcohol use disorders {CAGE questionnaire) and provide alcohol brief interventions.

24.3.2 ALCOHOL WITHDRAWAL SYNDROMES

CLINICAL DESCRIPTION

These occur following sudden withdrawal from alcohol. They are often seen 12 to 18 hours after the last drink, but may be earlier and are worst between 24 to 48 hours after onset. This commonly occurs in patients admitted to hospital for other problems e.g. arising from accidents or physical illnesses, which keeps them from drinking. The presentation varies from minimal tremors to states of full-blown agitation and confusion, which are potentially fatal. Caused by abrupt cessation or significant reduction in alcohol intake in an individual with heavy drinking over many months or years

CLINICAL FEATURES

SIGNS AND SYMPTOMS

Minor Withdrawal Alcoholic Hallucinosis Alcoholic Seizures Onset 12 to 18 hours after last drink, but may be earlier. Peaks between 24-48 hours 12-24 hrs after cessation of drinking and generally stops within 48 hours 7-36 hours after the last drink but may be earlier.

- Headache
- Nausea
- Anxiety
- Fevers
- Shaking

- Tremor
- Sweating
- Vomiting
- Increased pulse and blood pressure
- Agitation
- In severe cases will progress to Delirium Tremens which presents with: confusion, marked agitation, aggression, hallucinations {frequently visual), delusions, seizure and autonomic instability

INVESTIGATIONS

- Full physical examination including vital signs {to exclude other causes of delirium if present)
- Consider FBC, LFT
- Random blood sugar

TREATMENT

- The aim of treatment is to reduce the symptoms associated with alcohol withdrawal, which can result in seizures and potentially be fatal
    - A reducing course of oral Diazepam should be given four times a day, over five to seven days, titrated according to symptom resolution: for example:
    - **Diazepam** 20mg 6 hourly for 1 day
    - **Diazepam** 15mg 6 hourly for 1 day
    - **Diazepam** 10mg 6 hourly for 1 day
    - **Diazepam** 5mg 6 hourly for 1 day
    - **Diazepam** 5mg 12 hourly for 1 day
    - **Diazepam** 5 mg 24 hourly 1 day, It should be accompanied by oral Thiamine supplements
    - **Thiamine** 100mg 24 hourly orally for 1 month

Secondary /alternative treatment

- If markedly agitated and unable to comply with oral medication **IV Diazepam** 5-10mg can be used up to 4 times per day until able to comply with oral treatment

Red Flags

- High dose IM / IV thiamine can be given if available
- IV fluids may be required if evidence of dehydration {low BP, tachycardic)

For admission:

- Delirium tremens should be treated as an inpatient {medical emergency)
- People with a high risk of seizures e.g., previous seizures, known epilepsy,

- People with co-morbid physical illnesses e.g., HIV, jaundice

Note: The dose of Diazepam should be reduced in the physically frail or those with liver impairment or alternatively use lorazepam.

FOLLOW-UP

- Once detoxification complete offer advice regarding safe levels of alcohol intake and counseling support if planning to stop drinking. Refer to alcoholic anonymous

REFERRAL CRITERIA

- Refer all patients with alcohol withdrawal syndromes to a psychologist or psychiatrist. Also refer all children to a paediatrician.
- Acute confusional state that occurs within hours to days of cessation, or reduction of alcohol intake after prolonged {weeks to months) / heavy consumption
- The peak onset is at 24-48 hours post last ingestion and it can last for 7 - 10 days if untreated

24.3.3 WERNICKE -KORSAKOFF SYNDROME

CLINICAL DESCRIPTION

Is characterized by confusion, ataxia and ocular disturbances {usually due to weakness or paralysis of 6th cranial nerve) including nystagmus

- May have acute onset or develop slowly over 1 week or so
- Korsakoff's psychosis is a state of amnesia that usually follows Wernicke's syndrome
- This is due to thiamine {vitamin B1) deficiency in alcoholics and malnourished non-alcoholics

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Mostly anterograde amnesia {inability to retain new memories) and possibly retrograde amnesia {inability to recall the past)
- Fabricating answers or confabulating to cover their memory problems, and
- Oculomotor disturbances - nystagmus.
- Patient is alert but can be confused if having Wernicke's disease, responsive and normal

INVESTIGATIONS

- Substance use history

- String test to diagnose Korsakoff's psychosis {clinician asks the patient to take an imaginary string in his or her hands, and the patient complies, as though the string were real)
- Do a physical examination to rule out medical complications or comorbid illnesses
- Laboratory tests include FBC, offer PITC for HIV, LFTs, Urine/ Blood glucose test

TREATMENT

NON-PHARMACOLOGICAL

Management of Physical and Neurological

Complications of Alcohol Dependence

- Conduct a comprehensive physical examination of the patient
- Counsel the patient
- Institute a brief intervention or motivational interview
- Abstinence is essential
- Refer to Alcoholic Anonymous groups if available or link with other agencies such as religious organizations, social welfare services
- Encourage a healthy diet with high protein and vitamin content {give thiamine or Vitamin B Complex)
- Treat specific disorders symptomatically
- {e.g., gastro-intestinal disorders, cirrhosis, neuropathy) as per guidelines

PHARMACOLOGICAL

The aim is to rapidly treat Wernicke's syndrome in order to prevent onset of Korsakoff's psychosis

- Immediately give **Thiamine {Vitamin B1)** 500 mg IV over 30 minutes 8 hourly for 2 consecutive days followed by 250mg IV/IM 24 hourly for 5 days follow with one month of oral thiamine 100mg OD
- Glucose without Vitamin B1 can worsen Wernicke's encephalopathy
- Advise the patient to abstain from alcohol use or consider alcohol detoxification to prevent alcohol withdrawal
- Always treat medical complications of chronic alcohol use such as GIT, neurologic, cardiovascular, pulmonary, hematologic and endocrine.
- To treat delirium tremens: see alcohol withdrawal section

Red Flags

For Admission

- If delirium tremens or wernickes encephalopathy
- Severe medical complications of chronic alcohol use such as vomiting blood
- Continued high risk alcohol use or multiple substance use

FOLLOW UP

- Assess for continued alcohol use and offer brief intervention to promote change in alcohol use on each visit
- Assess for and treat the medical complications
- Counsel the patient using problem solving technique
- Educate and support the family

24.4 ANXIETY DISORDERS

CLINICAL DESCRIPTION

Anxiety disorders refers to a group of disorders that share features of excessive fear / anxiety and the related behavioral and physical disturbances with associated impairment in functioning or subjective distress.

Types:

- *Phobias*: characterized by irrational and excessive fear of objects/ public situations
- *Panic disorder*: characterized by recurrent spontaneous panic attacks, subsequent fear of another attack and maladaptive compensatory behaviours.
- *Generalized anxiety disorder*: excessive worry for six months or more about actual circumstances/ events

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Feeling tense, uncontrollable anxiety and worry
- Associated physical health symptoms e.g., heart palpitations, Sweating, chest pains, difficulty breathing, poor sleep, restlessness, feeling dizzy, lightheadedness or faint

INVESTIGATIONS

- Exclude comorbid mental health disorders such as depression and alcohol and drug use
- Elicit psychosocial stressors from patients as well as guardians
- Perform a physical examination to rule out other causes of anxiety such as thyrotoxicosis, asthma, etc.

TREATMENT

NON-PHARMACOLOGICAL

- Explain anxiety to patient especially the link between physical and psychological symptoms
- Give good health advice such as reducing or stopping substance use, good diet, exercise etc.
- Educate on relaxation methods such as deep breathing exercises during panic attack and muscle relaxation techniques
- The mainstay or first line treatment of anxiety disorders is psychotherapy such as exposure and systematic desensitization or cognitive behavioral therapy.

PHARMACOLOGICAL

- If symptoms are severe or psychotherapy hasn't been effective, prescribe antidepressants in conjunction with the psychotherapy.
    - 1st line: Give **Fluoxetine** 20 – 60 mg
    - 2nd line: Give **Amitriptyline** 50-150mg nocte
- Avoid the use of diazepam and benzodiazepines except as short course medications (should not exceed 14 days)
- **Propanolol** (20 – 40mg) PRN may be used for short term symptomatic relief of excessive anxiety symptoms.

Red flags

For referral/admission

- If there is significant comorbid physical illness
- The symptoms are interfering with activities of daily living
- The patient is suicidal with no significant psychosocial support at home

FOLLOW UP

- Once symptoms resolve, continue treatment for 6 months and consider stopping thereafter
- Assess for substance use and other psychosocial stressors.

24.5 POST-TRAUMATIC STRESS DISORDER

CLINICAL DESCRIPTION

PTSD is a disorder that may occur in individuals that have been exposed to actual, threatened, repetitive or serious threat / violence.

CLINICAL FEATURES

SYMPTOMS AND SIGNS

- Intrusive symptoms e.g., nightmares, flashbacks
- Avoidance behaviors e.g., people, places that are reminders
- Negative changes in mood and cognition e.g., shame, guilt, dissociative amnesia (poor recollection of important aspects of the traumatic event etc.)
- Hyperarousal e.g., sleep disturbances, irritability, reckless and self-destructive behavior.

INVESTIGATIONS

- Ensure patient has had relevant physical assessment and investigations e.g., gynecology assessment in individuals who have been sexually assaulted
- Assess for psychiatric comorbidity including depression, alcohol and drug use and suicidality

TREATMENT

- Educate the patient or family on condition
- Avoid psychological debriefing in immediate aftermath of traumatic event
- Use Cognitive behavior therapy (trauma-focused)
- Prescribe Selective Serotonin Reuptake Inhibitor Antidepressants e.g., Fluoxetine 20-60mg once daily for 6 months

Follow-up

- Continue follow-up and monitor for substance abuse and suicidality
- Refer patient if poor response to treatment

24.6 PSYCHIATRIC EMERGENCIES

24.6.1 SELF-HARM AND ATTEMPTED SUICIDE

CLINICAL DESCRIPTION

- An act of self-harm without suicidal intent is deliberately harming oneself, e.g., cutting oneself. A suicide attempt is an act of self- harm with suicidal intent but not resulting in death
- Both are to be taken very seriously because they are high risk factors for completed suicide in the future
- Risk of future attempt is raised if:
- Underlying psychiatric disorder {depression, bipolar affective disorder, schizophrenia/ drug or alcohol misuse or personality disorder)
- Ongoing suicidal thoughts or plans
- Regret at having survived the attempt
- Access to dangerous means e.g., firearms/ agro-chemicals/ medicines
- Evidence of hopelessness, marked emotional distress
- Previous self-harm/ suicide attempts
- Family history of completed suicide
- Male gender, older age, lack of social support

CLINICAL FEATURES

SIGN AND SYMPTOMS

- Evidence of injuries from or history of actual suicide attempt method e.g., hanging, poisoning, drowning, etc.

TREATMENT

General Management

- Asking about suicidal thoughts in a routine assessment
- First establish therapeutic rapport
- Ask how they feel about their life at the moment, how they see the future and if they think life is not worth living?
- Do they have thoughts about trying to harm them-self or end their life? If yes, have they made any plans. Do they have access to lethal means at home?
- What has prevented them from acting on these thoughts? What protective factors are in their life? {family/ religious faith/ hope that things will get better)
- Have they made an attempt to harm them-self end their life in the past? If yes, what happened?
- If assessing someone presenting with a serious attempt at self-harm, first treat the physical effects of the attempt whilst ensuring that they are in a safe environment e.g.

suture any wounds and manage bleeding, monitor appropriately if ingested poisons such as rat poison/fertiliser/ overdose of prescribed or over-the-counter medication

- All people with a self-harm/ suicide attempt should be referred for assessment by the social worker or mental health team before leaving the health facility
- If there is current active suicidal ideation with a plan and access to dangerous methods, the person should be referred for assessment for admission by the psychiatry team urgently. If patient is unwilling or uncooperative, involuntary admission and subsequent referral for psychiatric assessment may be done under the Mental Health Act (Temporary Treatment Order).
- If suicidal thoughts are present but there is no plan and protective factors are in place, treat any underlying psychiatric disorder, give supportive counselling, with patient's consent alert guardians or relatives, eliminate potentially lethal means in home environment and provide pathway to care e.g., contacts for subsequent suicidal ideation. Monitor the suicidal thoughts at follow up visits. If the suicidal ideation does not improve, refer for assessment by the psychiatry team

24.6.2 ACUTELY DISTURBED OR VIOLENT BEHAVIOUR

CLINICAL DESCRIPTION

- Most people with psychiatric disorders are never aggressive or violent
- However, some factors do make it more likely that some people may become aggressive when unwell e.g., active psychotic symptoms, agitation and over activity, auditory hallucination, confusion and disorientation, alcohol, or drug use)
- Factors associated with violence or aggression
    - Feeling threatened
    - Young male
    - Previous or recent history of aggression
    - Drug or alcohol use
    - Increased impulsivity – e.g., delirium, brain injury, learning disability, dementia
    - Psychiatric disorders - e.g., schizophrenia with current active psychotic symptoms especially command hallucination or paranoid persecutory delusion, mania.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Making verbal threats or shouting
- Agitation or irritability
- Suspiciousness/ anxious look
- Pacing up and down
- Actual physical aggression towards people or property

INVESTIGATIONS

- Assess for bio-psychosocial causes of the acute disturbed or violent behaviour

TREATMENT

- The aim is to alleviate suffering and to prevent harm/ injury to the patient and the health care staff
- Also, to allow investigation and management of the underlying cause of the aggression e.g., delirium, psychosis, mania

General Measures

- First ensure your own safety – Avoid interviewing patients in isolated places (avoid being trapped in a corner; have other staff or guardians with you), terminate interviews if patients become increasingly agitated and move towards a safer place -
- De-escalation of the situation:
    - Give clear, brief, assertive instructions
    - Explain your purpose or intention
    - Negotiate options and try to understand the reason for their distress
    - Avoid verbal and non-verbal threats
- If de-escalation attempts fail, prescribe pharmacological management -Offer oral sedation initially and proceed to rapid parenteral tranquilization if refused
- Avoid use of diazepam in lactating women
- Have at least four additional people to handle patient if rapid tranquilization is needed
- If patient comes while tied do not immediately remove physical restraints until safe to do so

Steps of Rapid Tranquilization (RT)

Step Intervention Dosages of Medication Other/ Adjuvant treatment

- De-escalation
- Offer oral treatment Repeat this up to 2 more time at 30-minute intervals if person remains agitated **Haloperidol** 2.5- 5mg or **Chlorpromazine** 100-200mg With or without oral **Diazepam** 5- 20mg or lorazepam 1-4 mg or **Promethazine** 50mg.
- Consider IM treatment if the person doesn't accept oral medication or is not effective.
- **Haloperidol** 5mg or **Chlorpromazine** 50-100mg or **Lorazepam** 1-4mg
- **Lorazepam** 1-4mg IM, **Promethazine** 50mg IM is an alternative in benzodiazepine-tolerant patients {people with alcohol dependence)

Note: Diazepam should NOT be given IM

- Consider IV treatment using large vein **Diazepam** 5-10mg slow push over at least 5min.
- repeat after 5-10 min if insufficient effect {up to three times)

Note: if giving IV Diazepam, patient should be continuously monitored through vital signs recording every 15 minutes

- Seek expert

General monitoring after RT

- Pulse
- BP
- Respiratory rate
- Temp
- oxygen saturation should be monitored every 15 minutes for the first hours and then every 30 minutes until the patient is awake and alert
- Full physical examination including vital signs to determine if any physical cause for the aggression e.g., delirium, drug or alcohol withdrawal

24.7 PSYCHOTIC DISORDERS

This is an umbrella term for a group of conditions where the person loses touch with reality through experiencing perceptual disturbances, having abnormal beliefs, and lacking insight

24.7.1 SCHIZOPHRENIA

CLINICAL DESCRIPTION

To diagnose schizophrenia there must be at least a six month history of impairment and disability and within the six months period, at least a month (or less if the symptoms have been successfully treated)

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- history of the symptoms listed below.
- Hallucinations {often auditory) and delusions {fixed false belief)
- Speech can be irrelevant and incoherent
- Disorganized thought / behaviour
- Lack of insight is prominent

INVESTIGATIONS

- In a first episode of psychotic symptoms, physical causes for the symptoms must be excluded e.g delirium, thyroid dysfunction, syphilis, HIV)
- Full physical examination

- FBC
- VDRL
- Urine drug screen if available

TREATMENT

PITC Treatment

- Treatment is both pharmacological and psychological {supportive counselling about the illness, compliance with medication, education to the guardians
- The aim of treatment is to remove all symptoms if possible and to help the person to return to their previous level of functioning

Primary treatment

- First line commences an anti-psychotic medication which will need to be continued for at least two years if this is a first episode or for a minimum of five years if the person has had two episodes. If the person has had three or more episodes without clear precipitants (e.g., substance use, psychosocial stressors) antipsychotics should be continued for life
- Give **Chlorpromazine** 100 mg nocte or **Haloperidol** 2.5mg nocte. Increase dose weekly/ two weekly depending on patient response and side effects to a maximum of Chlorpromazine 300mg nocte or Haloperidol 5mg nocte.
- Always start the antipsychotic at the lowest effective dose and prescribe as a single daily dose
- All anti-psychotic medication ha a delayed onset of action - advice the patient/ guardian it will take 1-2 weeks before improvement is noted
- Antipsychotics should be prescribed as monotherapy (only one antipsychotic should be used at one time)
- Advise about the side effects:
- Chlorpromazine: sedation, postural hypotension, constipation, photosensitivity, sexual side effects
- Haloperidol: Extra-pyramidal side effects (parkinsonism symptoms), stiffness of limbs/jaw, eyes rolling upwards, restlessness, drowsiness, salivation, sexual side effects
- Patients should be advised to report to the hospital immediately if they develop stiffness of limbs/jaw and abnormal eye movements
- If EPSEs persist consider reducing the dose of anti- psychotic or adding **Benzhexol** 5mg daily until side effects resolve.
- Use lower doses of antipsychotics in patients with HIV, epilepsy and intellectual disability
- Secondary /alternative treatment
    - If symptoms have not improved on chlorpromazine/haloperidol or if the person has lots of side effects use a second-generation anti-psychotic **Risperidone** 1mg nocte 2 days then increase to 2mg nocte. Increase

weekly/two weekly by 1mg to a maximum dose of 6mg nocte depending on patient response or side effects.

Advice about side effects:

Risperidone: weight gain, sedation, impaired glucose tolerance, sexual side effects

- If compliance with medication is poor despite trying to reduce side effects and counselling on the importance of compliance with medication, consider a long-acting depot anti- psychotic **Fluphenazine** 12.5mg IM into a large muscle e.g. gluteal/ deltoid) as a test dose
- Caution: risk of Acute Dystonic reaction {painful spasm of head and neck muscles)
- If occurs give Benzhexol po if able to swallow
- Otherwise, IV/IM Procyclidine or Benzhexol 5mg OR slow IV push Diazepam 5-10mg
- Advice about side effects: EPSE
- Maintenance dose **Fluphenazine** 25mg every 4 weeks which can be increased to 50mg every 4 weeks IM after a 3-month interval

Red Flags

- *For referral*

  - If EPSE persist, consider reducing the dose or stop the Fluphenazine
  - If symptoms persist/ worsen despite 6-8 weeks of anti-psychotic medication at an effective dose
  - If side effects are not manageable
  - If the person has Catatonic symptoms
  - If the patient has been treated with two different antipsychotics (one first generation and one second generation) at adequate doses for longer than three months on each but psychotic symptoms or functional impairment persists.
  - If the patient develops tardive dyskinesia (abnormal facial movements – chewing, grimacing or chorea-like trunk movements) on antipsychotics

- *For admission*

  - Marked agitation / aggression should be managed as an inpatient following the Violence and Aggression treatment guidelines
  - Evidence of dehydration and malnutrition due to prolonged poor self-care
  - Evidence that the patient is a risk to themselves {self-harm/ neglect/ vulnerable to exploitation) or a risk to others {agitation/ aggression)
  - If insight is lacking and there is no guardian to ensure compliance with medication at home

Treatment duration

- When considering stopping medication, discuss carefully with the patient and guardian and start to reduce slowly over 4-8 weeks

- • Advise about symptoms that would indicate relapse {difficulty sleeping, auditory hallucinations, suspicious thoughts) and inform to return to the clinic promptly. Continue to monitor until medication free for 2-3 months before discharging
- • Advise them to return to the clinic for review if have any concerns in the future

FOLLOW-UP

Note: Neuroleptic Malignant Syndrome is a severe but rare complication of anti-psychotics, presenting with fever, rigidity, fluctuating pulse and BP and reduced conscious level. It is a medical emergency. All anti-psychotics should be stopped, and the person referred for medical admission.

- Screen for ongoing symptoms and monitor for side effects at each review
- Adjust the dose of medication accordingly
- Ask about any drug or alcohol use and give advice about use
- Screen for low mood and suicidal ideation at each review and follow Depression Treatment Guideline if present
- Once symptoms are improving advice the patient to return to their usual daily activities, including work if employed

24.7.2 SUBSTANCE INDUCED PSYCHOSIS

CLINICAL DESCRIPTION

Development of psychotic symptoms related to prolonged use of psycho- active drugs {eg cannabis) within the last month

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Hallucinations {often auditory but can be visual etc) and delusions {fixed false belief) often paranoid/ suspicious in nature
- Speech can be irrelevant and incoherent
- Abnormal behaviour and at times agitation and aggression
- Lack of insight is prominent

INVESTIGATIONS

- Physical causes for the symptoms must be excluded (as described in schizophrenia)
- FBC
- VDRL

- Urine drug screen if available
- PITC

TREATMENT

Aim of treatment is to reduce/ remove symptoms and to encourage abstinence from the psycho-active drug

Primary treatment

- Advise to stop using the drug
- A short course of oral Diazepam may help with agitation, insomnia while symptoms resolve Prescribe **Chlorpromazine** 100mg nocte or **Haloperidol** 2.5mg nocte and increase weekly/two weekly depending on response and side effects. Continue treatment for up to six months after resolution of symptoms.
- In Substance induced psychosis, psychotic symptoms should resolve in a month after cessation of substance. If symptoms persist beyond a month, a diagnosis of Schizophrenia should be considered and the patient managed as per the Schizophrenia guidelines.

Treatment duration:

- Medication should be continued for 6 months after complete symptom resolution
- When considering stopping medication, discuss carefully with the patient and guardian and start to reduce slowly over 2-4 weeks
- Advise about symptoms that would indicate relapse e.g difficulty sleeping, auditory hallucination, suspicious thoughts and inform to return to the clinic promptly
- Continue to monitor until medication free for 4- 6 weeks before discharging
- Advise them to return to the clinic for review if have any concerns in the future

FOLLOW-UP:

- Psychosocial interventions for cessation of substance use should be used as described in Alcohol Related Disorders

24.7.3 PUERPERAL PSYCHOSIS

CLINICAL DESCRIPTION

- A disorder affecting the mother, which can develop within 6 weeks of childbirth
- It can be particularly florid with vivid hallucinations, delusions, marked agitation and aggression
- Care must be taken, as there can be significant risk to both mother and baby

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Confusion
- Insomnia
- Anxiety
- Agitation
- Possible aggression
- Mood changes
- • Hallucinations {in any modality) and delusions {particularly paranoid persecutory)

INVESTIGATIONS

- The puerperium is a time of increased risk of many physical conditions such as sepsis, post- partum hemorrhage, metabolic imbalance, eclampsia etc.
- These conditions can present with delirium and so care must be taken to exclude underlying physical causes
- Full physical examination including vital signs
- FBC U&E LFT
- Blood/ urine glucose
- MRDT
- PITC

TREATMENT

General Management

- The aim of treatment is to reduce/ alleviate symptoms to allow a return to usual functioning and to promote good bonding between mother and baby
- Medication treatment duration is for at least 1 year
- First assess the risk of the mother to herself and her baby (some may have thoughts of harming their baby due to the psychotic symptoms) and the risk of aggressive behaviour
- If present follow Violence and Aggression Treatment Guideline. Ensure that the baby is in the care of a guardian and that all mother baby interactions are supervised until more stable
- Care should be taken in breastfeeding mothers as medication can be found in the breastmilk. Use low doses and increase slowly. Monitor the baby for evidence of sedation

Primary treatment

Give **Risperidone** 1mg 24 hourly. The medication should preferably be taken after breast feeding or after breast milk has been expressed to minimize amount ingested by baby.

Increase by 1mg weekly/two weekly depending on side effects and response to a maximum of 6mg once daily.

- If **Olanzapine** is available, use as primary treatment. Take baseline fasting blood sugar, weight and triglycerides before start. Prescribe 5mg once daily, increase to maximum of 10mg once daily. Monitor weight, random blood sugar, triglycerides monthly while on use.
- If Risperidone or Olanzapine not available, **Chlorpromazine** 100-200mg or **Haloperidol** 2.5-5mg may be used.
- Avoid use of diazepam. If necessary, use **promethazine** 25-50 mg or lorazepam 1-2 mg if agitated

Red Flags

For referral

- If symptoms persist or worsen, despite adequate doses of anti-psychotic for 6- 8 weeks
- If there is evidence that the baby is failing to thrive {dehydration, weight loss, inadequate care etc.)

For admission

- Marked agitation / aggression should be managed as an inpatient following the Violence and Aggression treatment guidelines
- Evidence that the patient is a risk to themselves {self-harm/ neglect/ vulnerable to exploitation) or risk to the infant, other children or others {agitation/ aggression)
- Screen for suicidal ideas and harmful thoughts toward infant at each follow-up as risk of suicide and infanticide remains high in first year after recovery.
- Ask about any drug or alcohol use and give appropriate advice.
- Once symptoms are improving advise the patient to return to their usual daily activities, including work if employed

Treatment duration

- If first episode: Medication is continued for 1 year from complete resolution of symptoms
- If previous episodes of psychotic illness {e.g., schizophrenia/ Bipolar affective disorder) continue medication for 2-5 years from complete resolution of symptoms
- When considering stopping medication, discuss carefully with the patient and guardian and start to reduce slowly over 4-8 weeks
- Advise about symptoms that would indicate relapse {difficulty sleeping, auditory hallucination, suspicious thoughts) and inform to return to the clinic promptly
- Continue to monitor until medication free for 2-3 months before discharging
- Advise them to return to the clinic for review if have any concerns in the future or when pregnant again {high risk of recurrence in future pregnancies)

24.8 MOOD DISORDERS

These disorders mainly present with a disturbance of mood, which can either be elevated or depressed, with associated changes in activity levels, thinking and behaviour

24.8.1 DEPRESSION

CLINICAL DESCRIPTION

- Presence of low mood, with decreased energy and anhedonia, most days for at least 2 weeks
- If it is moderate to severe there is impairment of the usual occupational and functional activities such as going to work, housework and self-care
- Suicidal ideation should be asked about at every assessment

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Low mood or irritability
- Reduced energy
- Lack of enjoyment of previously pleasurable activities
- Poor or excessive sleep
- Reduced appetite and weight loss (or increased appetite and weight gain)
- Poor attention and concentration
- Feelings of guilt and worthlessness
- Suicidal ideation
- Looks sad
- Poor eye contact
- Reduced speech at low volume
- Evidence of weight loss and poor self-care
- Possible agitation
- If severe psychotic symptoms (delusions and hallucinations), catatonic symptoms e.g., mutism

INVESTIGATIONS

- Some physical illnesses can present with depressive symptoms e.g., anaemia, hypothyroidism, HIV, syphilis so these must be excluded
- Full physical examination including vital signs
- FBC, U&E, glucose
- If evidence of hypothyroidism on examination
    - (Weight gain, dry skin, goitre) check TFTs if possible

- VDRL
- PITC
- Urine drug screen if available

TREATMENT

General Management

- The aim of management is to completely resolve symptoms, if possible, to allow the person to return to their previous activities and occupation
- If the presentation is a first episode, treat for 6 months after remission. In second episode treat for up to 2 years. Subsequent episodes require lifelong treatment. Primary treatment
- If mild to moderate depression
    - first line treatment should be supportive counselling, problem solving skills and physical exercise
    - Consider referring to local supportive groups e.g church, womens groups
    - If moderate to severe, or if mild depression persists despite counselling commence anti- depressant treatment
    - Give Fluoxetine 20mg daily
    - Increase after 3-4 weeks by 20mg up to a maximum of 60mg daily depending on response and side effects)
    - Monitor for side effects {agitation, increase in anxiety initially, insomnia, GI upset, sexual side effects)
    - If fluoxetine is not available give Amitriptyline 50-75mg nocte
    - Increase after 2 weeks by 25mg if symptoms persist up to a maximum of 150mg
    - Monitor for side effects (sedation, hypotension, dry mouth, constipation, sexual dysfunction)
    - Avoid the use of amitriptyline for the management of depression in patients on ARV's and/or isoniazid. Where available, use sertraline 50mg daily. If no improvement after 4 weeks refer.
    - **Avoid amitriptyline in elderly individuals.** Use fluoxetine.
    - Explain that antidepressants have delayed onset of action and it may take 1-2 weeks before improvements are noted
    - Do not prescribe amitriptyline if suicidal ideation is present. If fluoxetine is unavailable, amitriptyline should be kept and administered by a guardian Note that Amitriptyline can be fatal in overdose due to cardiac effects). If no guardian, admit the patient until suicidal ideation is resolved.
    - If psychotic symptoms {hallucinations or delusions) present, add an anti-psychotic and consider referral

Primary treatment

Caution should be used when prescribing medication to pregnant and breast- feeding women.

- If mild to moderate depression, treat with supportive counseling.
- If severe depression, antidepressants should be considered. Untreated depression can lead to adverse pregnancy outcomes
- Where possible delay initiation of antidepressants to second trimester and use psychotherapy unless if benefits outweigh risks. The risks of treatment should always be discussed with the patient and the management should be patient informed
- If medication is required:
    - Where available, give sertraline 50mg daily as it is safe for use in pregnancy and lactation
    - Give **Amitriptyline**: start at 25- 50mg nocte and increase slowly. Avoid during first trimester of pregnancy. Monitor the baby for evidence of sedation as small amounts can be found in the breast milk.
    - Give **Fluoxetine** 20 mg daily: May be used in pregnancy. Avoid in breastfeeding mothers.
    - Otherwise follow Depression Treatment Guidelines as above

Red Flags

For referral

- Ongoing or worsening symptoms despite adequate anti-depressant treatment for 4 weeks
- Depression with psychotic symptoms
- Persistent or increasing suicidal ideation or if the person has developed a suicide plan
- Evidence of self-neglect, dehydration or malnutrition

For admission

Evidence that the patient is a risk to themselves (self-harm/ neglect/ vulnerable to exploitation) or a risk to others (agitation/ aggression)

- Severe depression with psychotic symptoms and evidence of psychomotor retardation, this is an emergency and should be referred for admission for consideration of Electro Convulsive Therapy (ECT)
- If patient has active plans of suicide or a recent suicidal attempt.
- Thoughts of harming others.
- Evidence of self-neglect including not eating and drinking properly which may require intravenous fluids

FOLLOW-UP

- At each review, ask about symptoms, suicidal ideation, and side effects from medication.
- Monitor for emergence of manic symptoms
- as some people can develop manic symptoms when treated with anti-depressants.
- Give supportive counselling to patient (see mild -moderate depression above).

- Advise to increase physical activity gradually once improved and to return to usual activities when possible, including work if employed.
- When considering stopping medication, discuss carefully with the patient and guardian and start to reduce slowly over 4-8 weeks. Advise about symptoms that would indicate relapse such as difficulty sleeping, low mood, reduced energy, increase worries and inform to return to the clinic promptly. Continue to monitor until medication free for 1-2 months before discharging
- Depression occurring during pregnancy or within six months of childbirth
- Assess risk of: self-harm, harm from mother to baby and neglect of the baby.
- If any concerns admit or refer for review.

24.8.2 MANIA

CLINICAL DESCRIPTION

Presence of elated or irritable mood, associated increase in energy / activity, possible aggression and/or psychotic symptoms for at least a week or less if resulting in complete disruption of usual functioning.

CLINICAL FEATURES

SIGNS AND SYMPTOMS

- Elevated or irritable mood
- Reduced need for sleep
- Increased energy and activity
- Grandiosity
- Talkativeness and rapid loud speech
- Overspending
- Increased libido
- Agitation and over activity
- Possible aggression
- Reduced attention and concentration
- Possible psychotic symptoms {hallucinations and delusions Investigations
- Full assessment including physical examination to exclude underlying organic causes (delirium, syphilis, mania)or medications (steroids, some antiretrovirals))
- Vital signs: If severely unwell, dehydration/ exhaustion can be potentially fatal

INVESTIGATIONS

- FBC, U&E, glucose
- If evidence of hyperthyroidism on examination
    - (Weight loss, tremor, exophthalmos, goiter) consider TFTs if available

- VDRL
- PITC

TREATMENT

General Management

- The aim of management is to reduce / alleviate symptoms, to allow the person to return to their previous daily activities and occupation if employed and to prevent any further relapses in the future. It is continued for at least 2 years.
- If marked agitation / aggression follow the Violence and Aggression Treatment Guideline.
- Always assess risk - of suicide, harm to others and of self-neglect

Primary treatment

- Commence either a mood stabilizer or an anti-psychotic
- Give **Sodium Valproate** 200mg AM / 200mg PM. Increase by 200mg weekly depending on response. Usual effective dose 400 – 1000mg in a day.
- Caution: Sodium Valproate should be avoided in women of child-bearing age due to teratogenicity and risk of polycystic ovarian syndrome. If no available alternative advice about contraception.
- Side effects: sedation, tremor, weight gain, liver impairment
- Alternative treatment:
- Give Carbamazepine 200mg BD increasing by 200mg weekly depending on response and side effects to a maximum of 1200mg in a day. Usual dose 400- 600mg BD.
- Caution: Carbamazepine should be avoided in women of childbearing age due to teratogenicity. If no available alternative advice about contraception.
- Carbamazepine should not be prescribed in patients receiving antiretroviral treatment
- Side effects: sedation, rash, incoordination, RARELY Steven Johnsons syndrome
- If prominent psychotic symptoms present also give an anti-psychotic medication
- Give **haloperidol** 2.5mg nocte, Risperdal 1mg nocte for 2 days then 2mg or Chlorpromazine 100-200mg nocte

Alternative treatment

- Give **Haloperidol** 2.5mg nocte increasing by 1.25mg every week until symptoms resolve. Usual dose 1.25- 5mg daily
- Risperidone 1 mg nocte for 2 days then 2 mg nocte. Usual dose 2 to 6 mg daily. This should be considered instead of sodium valproate or carbamazepine in females of reproductive age group.

Duration of treatment

- First episode treatment should be continued for 1 year from complete resolution of symptoms.

- Multiple episodes: treatment should be for at least 5 years from complete resolution of symptoms, and some may need lifelong medication.
- When considering stopping medication, discuss carefully with the patient and guardian. There is significantly increased risk of relapse if medication is stopped abruptly. Start to reduce slowly over 2-3 months.
- Advise about symptoms that would indicate relapse (difficulty sleeping, low/elevated mood, reduced or increased energy, increased worries) and inform to return to the clinic promptly. Continue to monitor until medication free for 1-2 months before discharging

Red Flags

For referral

- Ongoing or worsening symptoms despite adequate treatment for 2-4 weeks

For Admission

- Evidence of exhaustion, dehydration due to over-activity. IV fluid may be necessary
- Evidence that the patient is a risk to themselves (self-harm/ neglect/ vulnerable to exploitation) or a risk to others {agitation/ aggression)
- No guardian available to monitor adherence to medication

FOLLOW-UP

- At every review, ask about symptoms, suicidal ideation and medication adherence and side effects.
- Provide education about illness to patient and guardians. Give supportive counselling and encourage return to previous activities and occupation as soon as able.

CHAPTER 25: PALLIATIVE CARE

- The objective of Palliative care is to achieve the best quality of life for patients and their families facing the problems associated with life threatening illness, through the relief of serious health related suffering including early identification and impeccable assessment and treatment of pain and other problems -physical, psychosocial, and spiritual. Palliative care has been found to be effective where integrated throughout the life course. It should NOT be confined to end of life care or used only in cancer related illnesses.
- This chapter provides a symptom-based approach to common symptoms experienced in settings of advanced life limiting illnesses. Symptomatic management can help support patients whatever the stage of their illness.

25.1 SYMPTOM MANAGEMENT

25.1.1. PAIN

Objective

- The objective of pain management is to ensure that the patient is free from pain at night, at rest, during the day and during movement.

NON-PHARMACOLOGICAL

- Effective pain control requires holistic assessment of 'Total pain' which includes physical, psychological, social and spiritual aspects.
- This is critical for effective pain management. Issues such as positioning, management of anxiety, family support, play for children e.t.c should be attended to in the assessment and management of the patient.

PHARMACOLOGICAL

The treatment of long-term pain associated with life limiting illness is guided by the following principles

- Accurate diagnosis and treatment of the cause of the pain (see other chapters)
- Assessment of the severity (mild/moderate/severe) and type of pain (nociceptive/neuropathic)
- Appropriate analgesics: Non opioid, opioids and adjuvants and other modalities e.g. radiotherapy and bisphosphonates (bone pain),

surgery (pathological fractures).

By the clock

- Regular analgesia is given to the patient to prevent exacerbations
- PRN medication (i.e. given as required) does not work for chronic pain

By the mouth

- Oral medication is the standard preferred for long term pain management

By the patient

- Required dose of analgesia is determined on an individual basis. This should be kept under regular review

By the ladder

The analgesic ladder

- A two- or three- step analgesic ladder enables person-centred step-wise treatment of pain. Analgesia is selected by moving up the ladder where pain increases, or where pain is not controlled, moving down the ladder e.g. if the cause of the pain is removed (e.g. following amputation or chemotherapy for a tumour).

Mild Pain - Step 1

- **Paracetamol** 1g 6-8 hourly {max 4g daily)

  Children: 10-15-20mg/kg 8 hourly

- Or **NSAIDS** **Aspirin** 300-600mg, 6-8 hourly (max 2.4g/day)

  Ibuprofen 400mg, 6-8 hourly {max 2.4 g daily), children 5-10mg/kg {max 40mg/kg/day)

  Diclofenac 50 mg 8 hourly, or 100mg slow release 24 hourly, {max 150mg/daily), (not in children)

Note: use only one NSAID at any one time, avoid long term use of NSAIDs, considering contraindications e.g. renal/heart failure, PUD, pregnancy, asthmatics etc. NSAID are not to be used in children.

Moderate Pain - Step 2 (not used in children)

- **Codeine phosphate** 30-60mg 6-8 hourly {max 240mg daily), *Always prescribe codeine with a laxative {not tramadol) e.g. Give **Bisacodyl** 10mg at night, unless the patient has diarrhoea*
- **Tramadol** 50-100 mg 8 hourly (max daily dose 400mg/daily)

Notes: both codeine and tramadol can be combined with non-opiates and/or adjuvants, but <u>not</u> used together at the same time, or used at the same time as strong opiates e.g. morphine

Severe Pain - Step 3

Immediate release **Morphine** is the drug of choice for severe pain

Formulation and starting dose

- **Immediate release (green) morphine** 1mg/1ml - starting dose for adults 2.5-5mg, i.e. 2.5-5ml, 4 hourly
- **Immediate release (red) strong morphine** 10mg/1ml - starting dose for adults 2.5-5mg i.e. 0.25-0.5ml, 4 hourly
- Morphine sulphate tablets (MST) 10mg tablets - starting dose 10mg, 12 hourly

Children

- Over 1 year, dose start at 0.2mg/kg/dose, 4 hourly
- Under 1 year, dose start at 0.1mg/kg/dose, 4 hourly
- Maximum starting dose of morphine is 3mg 4 hourly, even for children larger than 15kg.

Notes:

- If a patient cannot swallow, morphine can be administered and absorbed via mucous membranes e.g. buccal (liquid) and rectal (tablets)
- If the patient no longer requires morphine, the dose should be gradually reduced to avoid withdrawal symptoms (sweating nausea, agitation)
- Pethidine is not recommended for use in chronic pain due to its short duration of action and its side effects

Titration (i.e. increasing dose to achieve pain relief)

- When pain is helped - but not totally relieved - by a starting dose of morphine the regular dose can be increased by 30-50% every 48 hours until pain is controlled.
- Where breakthrough doses are prescribed, dose increment can be calculated as follows (new dose = total regular morphine daily dose+ total breakthrough doses)
- There is no maximum dose of morphine, the correct dose is a dose which takes away the pain without causing unacceptable side effects.

Use of morphine to control 'breakthrough pain'

- Breakthrough pain is a flare in pain of rapid onset, moderate to severe intensity and of short duration. Liquid immediate release morphine can help breakthrough pain. The dose given is equivalent to the regular four hourly dose of immediate release morphine e.g. if taking MST 10mg 12 hourly, the breakthrough dose is 20/6= 3.3mg as required (in practice give 2.5mg liquid morphine as required).
- If taking 10mg of immediate release morphine 4 hourly, the breakthrough dose = 10mg as required.

Dose conversion (changing from other opiates to or from morphine)

- Oral codeine to oral morphine, ratio 10:1, Calculation: divide total daily dose codeine dose by 10 e.g. codeine 30mg 8 hourly = total daily dose codeine 90mg = total daily dose 9mg morphine
- Oral tramadol to oral morphine, ratio 5:1 calculation: divide total daily dose tramadol by 5 e.g. 50mg every 8hrs tramadol = total daily dose 150mg = total daily dose 30mg morphine
- Oral morphine to fentanyl patch (central hospitals only) ratio 100:1 calculation: multiply total daily dose of morphine in mg by 10 to obtain the total daily dose fentanyl in microgram (μg); divide by 24 to obtain μg/hr patch strength e.g. morphine 10mg four hourly = total daily dose morphine 60mg = total daily dose 600μg fentanyl = 25μg/hour fentanyl patch

Use of morphine in special circumstances

- Immediate release morphine can be used in the management of acute pain (see other sections). When used for wound care and/or dressing changes it can be effective where administered 30 minutes -one hour before the dressing change.
- In children (e.g. for dressing change in burns) use morphine 0.2mg/kg as a single dose one hour before procedure.

Other considerations

- Monitor and manage constipation which is a common side effect of opiates e.g. attend to intake of regular fluids (water), bisacodyl 10mg at night and/or other local remedies for constipation e.g. green mango, papaya
- Patients and their caregivers should be carefully educated on how to administer immediate release morphine as four hourly dosages. This should be reviewed during follow up appointments.
- Doses of four hourly immediate release liquid morphine are administered at the following times each day: 6am, 10am, 2pm, 6pm and 10pm. The 2am dose can be avoided by administration of a double dose of morphine administered at 10pm.
- Opiates are controlled drugs. Prescribers are referred to the DDA ACT for further guidance.

Complications

- Opiate toxicity (overdose) causes respiratory depression, and drowsiness (check for pinpoint pupils and muscle twitching). Patients with renal failure (and severe jaundice) are at risk of toxicity as morphine is excreted by the kidneys. Dose frequency of morphine in confirmed or suspected renal failure should be reduced to 8 hourly.

Guidance for use of Fentanyl patches (central hospitals only)

- Fentanyl is a strong opiate used for the management of severe chronic cancer pain. It is much stronger than morphine. *Serious, life-threatening or fatal respiratory depression may occur with the use of Fentanyl. Be aware of situations which increase the risk of respiratory depression, modify dosing in patients at risk and monitor patients closely, especially on initiation or following a dose increase*
- Fentanyl is delivered via transdermal patch replaced every 3 days (72 hours), available dose of patch: 12.5ug/hourly
- Patients should only be started on a fentanyl patch where they have already had their pain controlled by morphine. For details of the conversion from morphine to fentanyl, see 'dose conversion' above

Adjuvant Analgesics

- 'Adjuvant' analgesics are drugs whose primary action is not analgesia but which can be used to control pain. They are used in situations such as neuropathic or bone pain, smooth or skeletal muscle spasms. They can be used alone, or in conjunction with step 1, 2 and 3 analgesics

Tricyclic anti-depressants: neuropathic (nerve involvement) pain,

- **Amitriptyline** 12.5- 25mg at night. Effect should be reviewed after 2-4 weeks. maximum dose 75mgs at night

Anti - convulsant

- **Gabapentin** 300mg, single dose on day one; then 300mg, 12 hourly on day two; 300mg 8 hourly from third day onwards
- Monitor for drowsiness

Corticosteroids*:* Reduce pain related to oedema e.g. liver capsule pain (hepatoma), sciatic nerve root compression (cervical cancer) headache (brain tumour, brain metastases)

- **Dexamethasone** 4-8mg, 12 hourly. Reduce by 2mg daily to the lowest effective dose *children*
  - ***< 1 year, 0.5-1mg 12 hourly,***
  - ***1-5 years 2mg 12 hourly,***
  - ***6-11 years 4mg 12 hourly (max 16mg/day)***

Prednisolone 30mg once daily for 7 days, gradually reduce to lowest effective dose, depending on prognosis.

Note: Monitor steroid side effects: poor sleep, psychosis, dyspepsia

COMPLICATIONS AND REFERRAL CRITERIA

- Where pain persists or is complex, referral to next level of care and/or specialist palliative care providers should be considered

25.1.2 NAUSEA AND VOMITING

CLINICAL DESCRIPTION:

Common causes (see relevant chapter for details). Gastrointestinal - gastric status, intestinal obstruction, Oral/oesophageal candidiasis, indigestion drugs - opioids, antibiotics, iron, NSAIDs

metabolic - hypercalcaemia, renal failure, Constipation, Infections - malaria, gastroenteritis, urinary tract infection, severe pain, anxiety, fear etc.

NON-PHARMACOLOGICAL

- Encourage clear fluids - small sips better absorbed
- Ginger chewed or boiled as a drink may help or diluted malambe juice

PHARMACOLOGICAL

Table 1.

Pattern of nausea and vomiting	***Causes***	**Suggested drugs**
Poor stomach emptying: Main symptom is; - vomiting - Vomiting relieves nausea - Patient feels full quickly - May have reflux	- Opioids - Constipation - Stomach and bowel conditions	- **Metoclopramide** 10-20mgs 8 hourly before meals
Blood chemistry disturbances - Nausea is the main symptom - Vomiting does not relieve nausea	- Drugs - Renal failure - Hypercalcaemia chemotherapy induced nausea and vomiting	- **Ondansetron** 8mg 30 mins before chemo, then twice daily for 1-2 days after chemo - Haloperidol 0.5-1.5mg nocte
Inflammation or swelling in the head - May be worse on movement - Vomiting does not relieve nausea - May be worse in	- Ear infections - Brain tumours - Meningitis - Malaria	- dexamethasone 2m-8mg 24 hourly

the morning		
Vomiting with diarrhoea *Exclude constipation with overflow*	- *Infectious diarrhoea*	- *Promethazine 25mg every 8hrs or*
Partial bowel obstruction Large volume vomiting Patient still passing occasional flatus/stools	- Constipation - Abdominal or pelvic tumour	- **Metoclopramide** 10-20mg IM. **STOP if increasing abdominal pain and prescribe as below**
Complete bowel obstruction Large volume vomiting Patient **not** passing flatus or faeces	- Abdominal or pelvic tumour	- **Promethazine** 25mg s/c 8 hourly

COMPLICATIONS AND REFERRAL CRITERIA

- Where nausea and vomiting persists or the patient become dehydrated, referral to next level of care and/or specialist palliative care providers should be considered

25.1.3 ANOREXIA (LOSS OF APPETITE)

CLINICAL DESCRIPTION

Common causes (see relevant chapter for details). Cancer, opportunistic infections, pain, weakness/fatigue, treatment side effects (antibiotics/chemotherapy), sore mouth, dysphagia, anxiety, depression, strong food smells during cooking

NON-PHARMACOLOGICAL

- Small frequent meals, served in appetizing manner, support the patient to sit upright whilst eating and to eat with other family members
- explain to the patient and family that anorexia is normal as disease progresses
- encourage gentle exercise

PHARMACOLOGICAL

Appetite stimulants: **Prednisolone** 5-15mg 24 hourly (maximum seven days), **Multivitamins** 24 hourly (long term)

COMPLICATIONS AND REFERRAL CRITERIA

Tube feeding / enteral feeding are not indicated. Patient and family support should be continued.

25.1.4 DIARRHOEA

CLINICAL DESCRIPTION

Common causes (see relevant chapter for details)

Infectious (refer to specific chapters), check for constipation with overflow diarrhoea in immobile patients on opiates, other

NON-PHARMACOLOGICAL

- Encourage oral fluids if dehydrated
- Attention to skin care and regular change of linen (see section on pressure/bed sores)

PHARMACOLOGICAL

- **Morphine** 2.5mg-5mg 4 hourly or **MST** 10mg every 12hrs
- **Loperamide** 4mg STAT then 2mg after each loose stool

COMPLICATIONS AND REFERRAL CRITERIA

- IV fluids maybe indicated in certain situations when patient becomes dehydrated (e.g. as a result of chemotherapy)

25.1.5 CONSTIPATION

CLINICAL DESCRIPTION

Common causes (see relevant chapter for details)

Cancer, drugs (especially opiates, ondansetron), debility

NON-PHARMACOLOGICAL

- Encourage fluid intake and eating papaya, ambulation/gentle exercise where possible, manual evacuation may be needed for faecal impaction

PHARMACOLOGICAL

- osmotic laxatives - lactulose? liquid paraffin (dose?)
- stimulant laxatives - **Biscodyl** 10mg nocte
- lubricant - **Glycerine suppository** 1, 24 hourly (not long term)

COMPLICATIONS AND REFERRAL CRITERIA

- Faecal impaction is very distressing and painful which may require referral for further management and/or manual evacuation where indicated.

25.1.6 HALITOSIS (BAD BREATH)

CLINICAL FEATURES

Common causes (see relevant chapter for details)

- poor dental and oral hygiene, oral thrush, dry mouth, lung cancer, necrotic ulcers

NON-PHARMACOLOGICAL

- cleaning with soft toothbrush, mouthwash with boiled salty water, modify diet - e.g. exclude garlic and onions, stop smoking, sucking pineapple or orange

PHARMACOLOGICAL

- crushed metronidazole (400mg) in diluted sobo orange squash as mouthwash, crushed prednisolone (10mg) to reduce odor and pain

25.1.7 MOUTH SORES (CANDIDIASIS)

CLINICAL DESCRIPTION

- Common causes (see relevant chapter for details)
- Candidiasis, viral, drug induced e.g. chemotherapy, malnutrition, immunosuppression

NON-PHARMACOLOGICAL

See under Halitosis

PHARMACOLOGICAL

- Antifungal: **Fluconazole** 100mg once daily,
- **Nystatin oral suspension** 100,000units/ ml
- advise patient to use Nystatin pessaries orally 12 hourly
- Stop Amitriptyline
- Stop or reduce steroids if taking high dose
- "miracle paint" = **acyclovir 200mg+5ml nystatin + (2x200mg metronidazole tablets crushed**) : mix together and use as a mouthwash or paint on oral ulcers twice a day

25.1.8 CACHEXIA/ SEVERE WASTING (WEIGHT LOSS)

- Common causes (see relevant chapter for details)
- Cancer

NON-PHARMACOLOGICAL

- Counselling the family to avoid over feeding

COMPLICATIONS AND REFERRAL CRITERIA

- Tube feeding / enteral feeding are not indicated. Patient and family support should be continued.

25.1.9 DYSPHAGIA (DIFFICULTY SWALLOWING)

- Common causes (see relevant chapter for details)
- Esophageal pathology e.g. Candida, Cancer

NON-PHARMACOLOGICAL

- Small meals, soft food, support patient sit upright (see anorexia)

PHARMACOLOGICAL

- **Dexamethasone** 16mg STAT, if effective 8mg 12 hourly for a week then reduce dose (with **Nystatin pessaries** (suck) to prevent oesophageal candida)

COMPLICATIONS AND REFERRAL CRITERIA

- Consider referral for stenting in oesophageal cancer

25.1.10 ASCITES (MALIGNANT AND NON-MALIGNANT)

Common causes (see relevant chapter for details)

SIGNS AND SYMPTOMS

Malignant: cancers - liver, KS, cervical ovarian cancer

Non-malignant: Complication from abdominal infection e.g. tuberculosis, cardiac failure, renal failure

INVESTIGATIONS

- Full blood count
- Liver function
- Urea, creatinine and electrolytes
- Ascitic tap for LDH, Protein, Microscopy, gram stain, ZN stain, geneXpert and cytology

TREATMENT

NON-PHARMACOLOGICAL

- comfortable positioning, counselling the patient and family, salt reduction

PHARMACOLOGICAL

- **Furosemide** 40 to 80 mg 24 hourly, can be combined with **Spironolactone** 25 to 100mg 24 hourly

COMPLICATIONS AND REFERRAL CRITERIA

- Where necessary patients can be referred for therapeutic tapping although this provides short term relief only, note potential risk of infection, perforation, continuous leakage of fluid, induction of hypovolemic shock from repeated tapping

25.1.11 BREATHLESSNESS

Common causes (see relevant chapter for details)

SIGNS AND SYMPTOMS

- TB, pleural effusion, pneumonia, heart failure, pulmonary embolism, COVID, severe pain/ascites

TREATMENT

NON-PHARMACOLOGICAL

- Sit upright in comfortable position, sit near open window to ensure good ventilation, fanning face can help to reduce experience of breathlessness, relieve anxiety therapeutic drainage of effusion (risk of infection if recurrent drainage).

PHARMACOLOGICAL

- **Immediate release oral morphine** 2.5mg 4 hourly can reduce the experience of breathlessness higher doses may be used if patient is also in pain, monitor response, stop if not helping.

COMPLICATIONS AND REFERRAL CRITERIA

- Think carefully before referring a patient for oxygen therapy. If the cause is irreversible, will it really benefit the patient?

25.1.12 CHRONIC COUGH

- *Common causes (see relevant chapter for details)*

SIGNS AND SYMPTOMS

- TB, pneumonia, asthma and other respiratory/cardiac conditions, drugs: ACE inhibitors

INVESTIGATIONS

-depend on suspected cause

TREATMENT

NON-PHARMACOLOGICAL

- comfortable (semi-prone) positioning, sips of lemon juice in warm water

PHARMACOLOGICAL

- **Immediate release morphine** 2.5mg 4 hourly
- monitor response, stop if not helping

25.1.13 HICCUP

Common causes (see relevant chapter for details)

In advanced disease this is often caused by sub-diaphragmatic irritation e.g. from invasive tumour. it can be a troublesome distressing symptom and maybe difficult to control

NON-PHARMACOLOGICAL

- Manage and relieve anxiety
- Reduce gastric distention (e.g. ascetic tap, small frequent meals etc.)

PHARMACOLOGICAL

- **Haloperidol** 5-10mg by mouth STAT, maintenance 1.5-3mg at bedtime
- **Chlorpromazine** 10-25mg by mouth (maintenance 25-50mg 8 hourly)

25.1.14 BLEEDING

- *Common causes (see relevant chapter for details)*

SIGNS AND SYMPTOMS

- Cancer of cervix, oral cavity, head and neck

INVESTIGATION

- Depend on suspected cause.

TREATMENT

NON-PHARMACOLOGICAL

- Reassure patient and relieve anxiety, use of dark colored / green cloths to mop up blood loss.

PHARMACOLOGICAL

- **Tranexamic acid** 500mg 8 hourly - start as soon as bleeding commences and stop once bleeding stops.

COMPLICATIONS AND REFERRAL CRITERIA

- Consider referral for transfusion in case of massive or persistent bleeding

25.1.15 SPASTICITY

Common causes (see relevant chapter for details)

- cerebral palsy, post-stroke

TREATMENT

NON-PHARMACOLOGICAL

- improve independence e.g. use of CP chair for feeding, rehabilitation therapy (physio, speech, OT)

PHARMACOLOGICAL

- Baclofen is not indicated for these conditions
- Complications and Referral criteria

25.1.16 DROWSINESS

Common causes (see relevant chapter for details)

Commonly drug induced, especially when using high dose of opiates and or in renal failure, hypercalcaemia

TREATMENT

NON-PHARMACOLOGICAL

- attention to determine cause, prevent aspiration during feeding (NG tube and/or upright positioning)

PHARMACOLOGICAL

- Carefully review drugs being taken by the patient, monitor urine output (if reduced, suggests renal impairment). If opiate toxicity (drowsy, pin point pupils, muscle twitching, reduced respirations) then STOP opiates and monitor carefully before reintroducing. In hypercalcaemia (drowsiness, nausea, constipation, bone pain) use of IV normal saline 2-3 litres/24 hr, bisphosphonates at central hospital (see section under oncology for details)

COMPLICATIONS AND REFERRAL CRITERIA

Refer to the rehabilitation technicians for occupational therapy. This must happen concurrently with all other treatment.

25.1.17 DELIRIUM

CLINICAL DESCRIPTION

Uncontrolled pain, medications, infections, urinary retention, constipation, metabolic, brain metastases, alcohol withdrawal. Common causes (see relevant chapter for details)

TREATMENT

NON-PHARMACOLOGICAL

- Ensure safe environment, explanation to patient and caregivers, encourage caregiver to stay with patient at all times, recovery position (if unconscious to protect airway)

PHARMACOLOGICAL

- **Haloperidol** 1.25-5mg up to 8 hourly (oral or subcutaneously)

COMPLICATIONS AND REFERRAL CRITERIA

- Refer for thorough investigations to confirm the exact cause

25.1.18 URINARY INCONTINENCE / VOIDING DIFFICULTIES

CLINICAL DESCRIPTION

- see section under prostatic cancer and BPH, rectovaginal fistula
- Common causes (see relevant chapter for details)

TREATMENT

NON-PHARMACOLOGICAL

- Train and support family to optimise personal hygiene (regular bathing and change of clothing/bed linen). Convene catheter or insertion of in-dwelling catheter may assist with comfort and nursing of bed ridden patients

PHARMACOLOGICAL

- Complications and Referral criteria
- Refer for difficult catheterization, further investigations to ascertain the cause if necessary

25.1.19 PRESSURE/BED SORES

CLINICAL DESCRIPTION

- Immobility, advanced disease, cachexia. Occasionally need referral for surgical debridement.

INVESTIGATION

Common causes (see relevant chapter for details)

TREATMENT

NON-PHARMACOLOGICAL

- support for family members to conduct regular (2 hourly) turning, clean/dry bed linen, positioning

PHARMACOLOGICAL

- see section on management of pain

COMPLICATIONS AND REFERRAL CRITERIA

- Depending on the level of care, refer appropriately for comprehensive care.

25.1.20 FUNGATING WOUNDS

CLINICAL DESCRIPTION

Fungating wounds are a complication of cancer and may develop in patients with advanced disease (advanced cancer). *Common causes (see relevant chapter for details)*

TREATMENT

NON-PHARMACOLOGICAL

- smells associated with fungating wounds can be very distressing for patients and family members, use of charcoal/coffee in the room may absorb some of the smells

PHARMACOLOGICAL

- crush metronidazole tablets and apply as powder to the surface of fungating wound once or twice daily.

COMPLICATIONS AND REFERRAL CRITERIA

- Depending on the level of care, referral is necessary for appropriate management.

25.1.21 ITCHING (DRY SKIN ETC.)

CLINICAL DESCRIPTION

This is due to Kaposi's sarcoma, side effect of opiates and chemotherapy, see under common skin conditions eg. scabies, psychosis. *Common causes (see relevant chapter for details)*

TREATMENT

NON-PHARMACOLOGICAL

- reduce use of soap and stones (as this dries the skin), keep nails short, use gel from aloe vera leaves as emollient, assess psychological status

PHARMACOLOGICAL

- antihistamines such as **Cetirizine** 10mg daily, **Chlorpheniramine** (Piriton) 4g 8 hourly sometimes helps, low dose steroids (e.g. prednisolone 5mg daily) can help to reduce severe generalised itching, emulsifying ointment e.g. zinc oxide

25.1.22 SPINAL CORD COMPRESSION (LATE PRESENTATION)

CLINICAL DESCRIPTION

Metastatic cancer (breast, prostate, renal etc.), presents with neurological deficit (weakness, paresthesia, incontinence of stool and urine). Refer to neurosurgery for imaging and possible intervention (surgical/radiotherapy) only if patient presents early (within 24 hours of neurological symptom onset). *Common causes (see relevant chapter for details)*

TREATMENT

NON-PHARMACOLOGICAL

see under constipation, urinary symptoms, bed sores.

PHARMACOLOGICAL

- if seen early, trial of high dose dexamethasone may temporarily reverse some of the neurological sequelae. **Dexamethasone** 16-20mg IV or PO STAT. Review after 24 hours. if improved then continue **Dexamethasone** 8mg 12 hourly for one week, if no change then no need to continue.

COMPLICATIONS AND REFERRAL CRITERIA

- Depending on the level of care, refer for appropriate care.

25.1.23 DEPRESSION, INCLUDING ANXIETY DISORDERS, COMPLICATED BEREAVEMENT, POOR SLEEP ETC.

CLINICAL DESCRIPTION

- Psychological impact of advanced incurable disease
- *Common causes (see relevant chapter for details)*

TREATMENT

NON-PHARMACOLOGICAL

- Symptoms can be common in patients with advanced disease. Holistic care, including pain management and spiritual support of the patient and family caregivers can assist. Allowing the patients to engage in activities of daily living including cooking, attending prayers etc. can reduce these symptoms.

PHARMACOLOGICAL

- Antidepressants (e.g. amitriptyline , fluoxetine) are rarely indicated, refer to section on depression for details of drugs
- Benzodiazepines (e.g. lorazepam and diazepam) are highly addictive, and use should be avoided

COMPLICATIONS AND REFERRAL CRITERIA

- Depending on the level of care, referral might be necessary for appropriate care

CHAPTER 26: ANAESTHESIA AND CRITICAL CARE

Anaesthesia is a medical specialty concerned with the total perioperative care of patients before, during and after surgery. It encompasses anaestheisa, intensive care medicine, critical emergency medicine and pain medicine.

26.1 PREOP ASSESSMENT

Aim is to minimize risk for all patients + identify patients at particular risk.

Preop assessment allows optimization of the patient, reduce cancellation on day of surgery, improve patients experience and may reduce morbidity and mortality. From the assessment patients should be assigned an ASA score.

- ASA 1 - A normal healthy patient
- ASA 2 A patient with mild systemic disease
- ASA 3 A patient with severe systemic disease
- ASA 4 A patient with severe systemic disease that is a constant threat to life

The following are guidelines to fasting periods to reduce risk of aspiration during assessment.

Ingested material	Minimum fasting period
Clear liquids	2h (1 hour in children)
Breast milk	4h
Infant formula	6h
Solids	6h

26.2 ANAESTHESIA FOR EMERGENCY SURGICAL PROCEDURES.

Optimization of patients for anaesthesia is a dynamic process. In extreme emergencies it may not be possible to stabilize a patient fully before theater but the process must be instigated

immediately on admission, to allow the best chance of a good outcome for the patient. This is multidisplinary decision of weighing risk vs benefit and managing clinicians and anaesthetists must work together

Septic hypotensive patients must be resuscitated and source isolation surgery commenced within 12 hours of admission.

ALL patients requiring resuscitation should have 2 wide bore (18G or larger for adults) placed and rapid infusion of isotonic fluids commenced immediately. A urinary catheter must also be placed. Close monitoring of these patients is paramount.

Uncontrolled haemmorhage is an indication for surgery with or without the availability of blood. All efforts should be made to make blood available.

If patient requires referral, ensure patient is stable to survive transfer. **LIFE SAVING SURGERY** (eg stopping bleeding/ delivery of eclamptic) **SHOULD BE PERFORMED PRIOR TO REFFERAL**.

INVESTIGATIONS PRIOR TO SURGERY

Minor Surgery (excision, biopsy, suturing, MUA, I&D)

	ASA1	ASA2	ASA3
FBC	N/A	N/A	N/A
Clotting	N/A	N/A	
U&E/kidney function	N/A	N/A	
ECG	N/A	N/A	Consider if no ECG in past 12 months
CXR	N/A	N/A	

Intermediate (hernia, knee arthroscopy, tonsillectomy, adenoidectomy)

	ASA1	ASA2	ASA3

FBC	N/A	N/A	Yes
Clotting	N/A		Consider in patients with chronic liver dzz and taking anticoagulants
U&E	N/A	Consider in patients at risk of AKI	Yes
ECG	N/A	Consider for people with cardiovascular, renal or diabetes comorbidities	yes
CXR	N/A	n/a	consult

Major (laparatomy, c/s, thoracotomy)

	ASA1	**ASA2**	**ASA3**
FBC	yes	yes	Yes
Clotting	n/a	Consider in patients with chronic liver disease	Consider in patients with chronic liver disease
U&E &CR (Renal Function)	Consider in patients at risk of AKI	yes	Yes

ECG	n/a	Consider in patients with heart disease and HTN	Consider in patients with heart disease and HTN
CXR		yes	Yes (pts with heart disease, htn, chest disease)

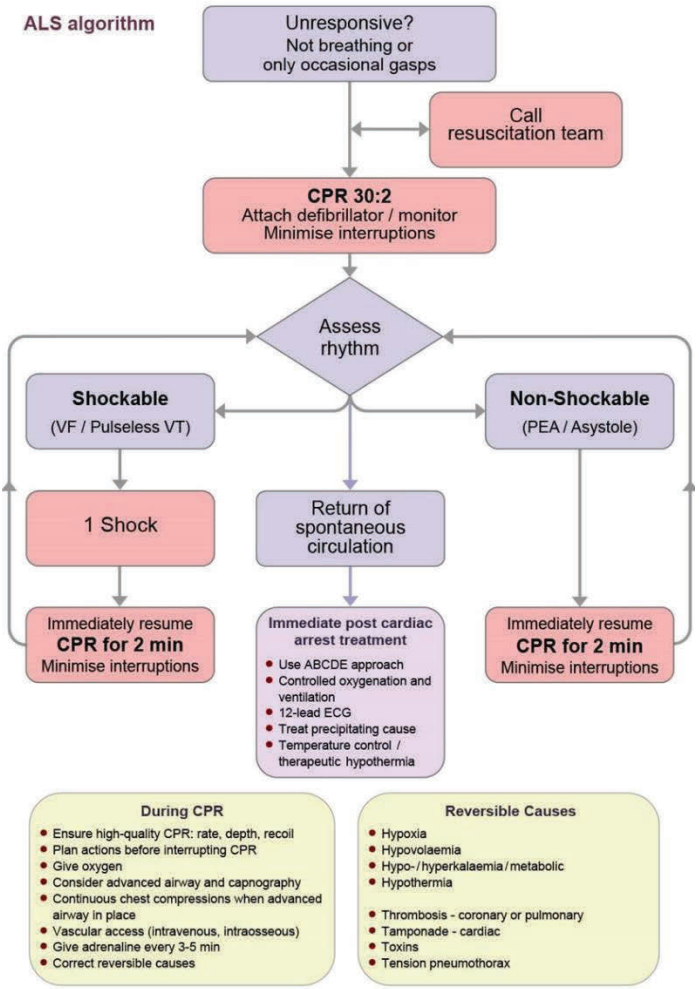
26.3 ACUTE PAIN MANAGEMENT

Many preoperative, intraoperative, and postoperative interventions and management strategies are available for reducing and managing postoperative pain. Control of postoperative pain plays an essential role in facilitating a patient's recovery to normal function and reduces the incidence of adverse physiologic and psychological effects associated with acute, uncontrolled pain. Multimodal anaesthesia must be used incorporating regional, pharmacological and non-pharmacological methods.

Cesarean Section	Regional: Spinal
	Pharmacological: NSAIDS, Opiods, Paracetamol
Laparotomy	Regional: TAP block, epidural
	Pharmacological: opioid, NSAID, Ketamine (IV), Dexamethasone, Paracetamol
Orthopedic	Opioid (IV), Paracetamol IV, NSAID, Regional block (depending on site of surgery e.g spinal, femoral block,)
Minor surgery	Assessment (refer to palliative care section on pain management)

26.4 MANAGEMENT OF CARDIAC ARREST IN THEATRE OR OF CRITICALLY ILL PATIENTS

Advanced life support algorithm



26.5 CRITICAL CARE.

Critical illness is a potentially reversible state of ill health with vital organ dysfunction and high risk of death. It is the most severe form of acute illness and can be due to any underlying condition, in any patient, irrespective of age.

Effective assessment of patients with suspected critical illness requires systematic evaluation of vital organ functions. Health workers should focus on the airway, respiratory, cardiovascular and neurological systems using an ABCD approach (see emergencies section). Evaluation and treatment should be conducted in parallel to rapidly stabilise the patient. The presence of any severely deranged vital sign indicates critical illness. The renal, gastro-intestinal, hepatic, dermatological and hematological systems should then be assessed to determine the type and extent of multi-organ failure (Table 1). The more organs failing, the more serious the critical illness is likely to be. Critical care specific scoring systems.

Critical care aims to restore and maintain safe (not necessarily normal) physiology to promote

Patient recovery and organ function. This involves titrated escalation and de-esclation of supportive therapies (e.g. oxygen, fluids, and antibiotics) and early recognition if care modification is required (e.g. medication change or surgery). Setting physiological targets facilitates this aim and promotes nurse- led titration (e.g. adjustment of oxygen according to saturation). Goals should be individualized for each patient and their current condition. To achieve set goals, systematic approaches should be used, incorporating the views of the multidisciplinary team. The underlying cause of disease must be managed.

MEML INDEX

PREFACE

- The MEML lists all those medicines considered to be most suitable for current use in the country. Although primarily intended for public sector application, it is equally appropriate for private sector prescribers, who are strongly encouraged to select medicines on the MEML whenever possible.

PROCEDURE FOR AMENDMENTS OF THE MEML

- Prescribers are encouraged to continually and critically review the relevance of the MEML to current clinical practice.
- Suggestions for amendments should be made through submission of a proposal in writing to:

  HTSS-Pharmaceuticals, PO Box 30377, Lilongwe 3, Malawi.

  Tel: {265} 01 788 371

  Fax: {265} 01 788 502

- An amendment form which may be used for this purpose has been included at the end of this booklet.
- Amendments can include the addition or deletion of an item, change of dose presentation, change of categorisation code (s}, change of layout of the publication, etc.}
- When sufficient proposals have been received or if urgent amendments are required, a special NMC will be convened to review these and agree on any changes to the MEML. Otherwise it is planned for the MEML to be revised once every 2 years in conjunction with the MSTG.

FOR ADVERSE REACTIONS:

Please contact the Pharmacy, Medicines and Poisons Board at info@pmra.mw

PRESENTATION OF INFORMATION

General

- **Medicines names:** As in previous lists, each medicines item is described by its generic name which, according to the National Medicine Policy (NMP) 2014, should be used for all prescribing and dispensing.

- Order of Sections: Medicines are arranged by pharmacological/therapeutic groups following the same basic format as the "WHO Model List of Essential Medicines – 22nd List, 2021," with the addition of an extra section (Number 31; Nutritional Disorders)
- Medicines numbering: each item is numbered within its section and thus can be conveniently identified by a composite number, consisting of the section number and the medicines numbers (final number):

CATEGORISATION/PRIORITISATION OF MEDICINES ITEMS

- Medicines items have again been categorised using a three letter coding system according to the:

  approved level of use (H, D or C}

  therapeutic priority (V or E}

  procurement system (A or B}

- Such categorisation is intended to facilitate the prioritisation of selection and subsequent procurement of drugs both by Central Medical Stores Trust (CMST} and user units.

LEVEL OF USE CODE (H, D, OR C)

- This indicates the level of Health Institution at which the item would normally be permitted for use:

  H = Health Centre level (i.e. for use throughout the health system at Health Centre, District Hospital and Central Hospital levels).

  D = District Hospital level (i.e. for use at District Hospital and Central Hospital levels only)

  C = Central Hospital level (i.e. for use at Central Hospital level only)

Thus C drugs should not normally be used at D and H levels, and D drugs should not normally be used at H level.

However, there are ***possible exceptions*** to this general rule:

- ***Additional clinical*** expertise: if this is available at H level (e.g. An Ophthalmic Medical Assistant, Psychiatric Enrolled Nurse/Midwife, Clinical officer, etc.), certain D level drugs may be made available for use by that particular prescriber. This however, will be at the discretion of the Director of Health and Social Services (DHSS). Written authorisation should be given to the named prescriber by the DHSS, listing the drugs authorised and a copy of this sent to the Chief of Health Services (CHS).
- Special clinical expertise: Certain DHOs may have access to specialised clinical expertise in one or more areas and must request their Regional Medical Stores to

make available certain C level drugs for use at the particular district hospital. Authorisation stating name of prescriber, specialty and specified drugs, should be sought in writing from the Chief Executive Officer of CMST.

- Maintenance treatment: Individual patients being treated for chronic conditions may have arrangements made for them to receive maintenance treatment with the required D or C level drugs at H level. In these cases, such arrangements should be authorised by the DHSS and formalised in writing (named patient specified drug/s and duration of treatment) with a copy retained at the district.

THERAPEUTIC PRIORITY CODE (V, E)

This code identifies the therapeutic importance of each item using the VEN system as follows:

- **V (Vital) drugs** which: are potentially life-saving have significant withdrawal side-effects making regular supply mandatory. Are of major public health importance (e.g. needed by many patients for treatment of serious. contagious diseases, needed to control epidemics, etc.)
- E (Essential) drugs which: are effective against less severe, but nevertheless significant forms of illness

PROCUREMENT SYSTEM CODE (A OR B)

This third code specifies how items will be procured by CMST and by the user units.

- **A – List items:** They are generally required for large numbers of patients. Will be routinely procured and stocked by CMST Include all H level drug.

Note: Where funds for procurement are insufficient, first priority will be given to the procurement and supply of Vital) A- list items (see 2.2 above) i.e. those of the highest therapeutic importance. If funds remain after securing such VA items, procurement of (Essential) A – list items will then be initiated. Thus, ensuring the availability of A-list items is primarily the responsibility of CMST.

- **B – List items:** They are generally required for limited number of patients. Will **NOT** be routinely procured and stocked by CMST. Estimates of annual requirements for these will have to be made well in advance by the hospitals and submitted to CMST through the Pharmaceutical section of the HTSS, according to a pre-agreed time schedule. Payment for these must also be made in advance prior to procurement by CMST and subsequent supply to the hospitals. Thus procurement of B-list items is primarily the responsibility of the user units. Each user unit must carefully consider the total annual budget allocated for medicines and medical supplies and make appropriate allocations for other categories. It should be clearly understood that the ultimate decision as to which items to select/procure lies with the user units.

The categorisation of items by the NMC by therapeutic priority (see 2.2 above) should facilitate this selection process and is intended to help ensure the continuous availability of the most important (i.e. VA) items.

EMERGENCY ORDERS

- Because of the limited numbers of patients involved, some potentially life-saving medicines on the MEML are categorised as VB items.
- Following established procurement priorities, CMST will not therefore routinely stock these (B-list) items. Ideally user units should keep small contingency stocks of such items to cover emergencies. However, if necessary, special emergency orders can be placed (initially by phone or fax and then followed up by a written requisition with CMST for identified lifesaving VB drugs.
- These orders, which must be authorised by the DHSS and countersigned by the Regional Medical Stores Pharmacist in Charge and will not require advance payment, as with other B-list medications. User units will be promptly notified if CMST is unable to procure and deliver these items within 24hrs.

LISTING BY CATEGORY/PRIORITY WITHIN SECTIONS

- In order to make the MEML easier to use by different levels of health institution, drugs are listed by generic name within individual sections and subsections according to the following order of priority.

H level then D level then C level.

Within each level the listing is V (vital) then E (essential) drugs which are on the A list for procurement (i.e. always stocked by CMST) followed by V (vital) then E (essential) drugs which are on the B list for procurement (i.e. only stocked if ordered/paid for in advance)

ABBREVIATIONS

amp	=	ampoule
aq	=	aqueous
cap	=	capsule
CHSU	=	Community Health Sciences Unit, Lilongwe
CMST	=	Central Medical Stores Trust
COM	=	College of Medicine
EO	=	emulsifying ointment
g	=	gram
HTSS	=	Health Technical and Support Unit
inj	=	injection
IU	=	international units
IM	=	intramuscular

IV	=	intravenous
KCH	=	kamuzu Central Hospital
L	=	litre
Mcg	=	Microgram
mg	=	milligram
mixt	=	mixture
mL	=	millilitre
MOH	=	Ministry of Health
MU	=	mega (million) units
oint	=	ointment
paed	=	paediatric
PFR	=	powder for reconstitution
PIH	=	pregnancy - induced hypertension
PMRA	=	Pharmacy and Medicines Regulatory Authority
QECH	=	Queen Elizabeth Central Hospital,
RMS	=	Regional Medical Stores
SC	=	subcutaneous or sugar-coated as appropriate
soln	=	solution
susp	=	suspension
tab	=	tablet
vag	=	vaginal
YSP	=	yellow soft paraffin
%v/v	=	percentage volume in volume
ZCH	=	Zomba Central Hospital
ZMH	=	Zomba Mental Hospital

Malawi Essential Medicine List		
1. ANAETHESTICS, PREOPERATIVE MEDICINE AND MEDICAL GASES		
1.1 General Anaesthetics and Oxygen		
1.1.1 Inhalation		
Halothane	inhalation	DVA
Isoflurane	inhalation	DVA
Nitrous Oxide	inhalation	CEB
Sevoflurane	inhalation	CEB
Oxygen	inhalation (medical gas)	DVA
1.1.2 Intravenous Medicines		
Ketamine	inj, 50mg/ml, 10ml, amp	DVA
Propofol	inj, 2%, 50ml, vial	CVA
Thiopentone	inj, 500mg vial, PFR	DVA
1.2 Neuromuscular blockers & Anticholinesterase		
Atracurium	inj, 10mg/ml, 5ml amp	CEB
Neostigmine	inj, 2.5mg/ml, 1ml amp	DVA
Rocuronium	inj, 10mg/ml, 5ml vial	CEB
Suxamethonium	inj, 50mg/ml, 2ml, amp	DVA
Vecuronium	inj, 10mg vial, PFR	DVA
Morphine Sulphate	inj, 2mg/ml, 50ml vial	CVA
1.3 Opioid analgesia		
Fentanyl	inj, 50mcg/ml, 10ml	CEB
Morphine sulphate	inj, 2mg/ml, 50ml vial	CVA
Nalbuphine	inj, 20mg/ml, 10ml, vial	CEB
Pethidine	inj, 50mg/ml, 2ml amp	DVA
1.4 Local Anaesthetics		
Bupivacaine isobaric	inj, 5%, 10ml amp	DVA
Bupivacaine (heavy) + Glucose	inj, 5mg+80mg/ml, 4ml amp	DVA
Lignocaine HCl	inj, 2%, 20 ml vial	DEA
Lignocaine HCl	spray, 10%	CEB
Lignocaine HCl	gel, 2%, 30 g tube	DEA
Lignocaine HCl + Adrenaline	Dental catridges, 2% + 1/80000, 2.2ml	HEA
Ropivacaine	Inj, 7.5mg/ml, 10ml amp	CEB
1.4 Preoperative medications and sedation medications for short procedures		
Amiodarone	inj, 30mg/mL, 10mL	CVA
Atropine sulphate	inj, 600 mcg/mL, 1mL amp	DVA
Dobutamine	inj, 12.5mg/mL, 20mL amp	CVA
Ephedrine	inj, 30mg/mL, 1mL amp	DVA
Epinephrine	inj, 100mcg/ml, 10ml amp	DVA
Metoclopramide	inj, 5mg/ml, 2ml, amp	CEB
Pethidine	Inj, 50mg/ml, 2ml, amp	DVA

Phenylephrine	inj, 10mg/mL, 1mL amp	CEB
Promethazine	tab, 25mg	DEA
Promethazine	inj, 25mg/ml, 2ml, amp	DEA
2 MEDICINES FOR PAIN AND PALLIATIVE CARE		
2.1 Non Opioids and non-steroidal anti-inflammatory Drugs (NSAIDS)		
Aspirin	tab, 300 mg	HVA
Diclofenac sodium	tab, 50 mg	DEA
Ibuprofen	tab, 200 mg	DEA
Indomethacin	tab, 25 mg	HEA
Mefenamic acid	cap, 250mg	DVA
Paracetamol	elixir 125mg/ml	HVA
Paracetamol	tab, 500 mg	HVA
Tranexamic acid	tab, 500mg	DEB
2.2 Opioid analgesics		
Codeine phosphate	tab, 15 mg	DVA
Dihydrocodeine tartrate	tab, 30 mg	DEA
Fentanyl	12.5mcg, Patches	CEB
Morphine sulphate	strong soln, 10mg/ml	DVA
Morphine sulphate	weak soln, 5mg/5ml	DVA
Morphine sulphate	inj, 15 mg/ml, 1 ml amp	DVA
Morphine sulphate	tab, slow-release, 10 mg	DVB
Naloxone HCl	inj, 20mcg/ml, 2ml ampl	DEA
Pethidine HCl	inj, 50 mg/ml, 2 ml amp	DVA
Tramadol	cap, 50mg	DEB
2.3 Medicines used for other common symptoms for palliative care		
Amitryptiline	tab, 25mg	HVA
Baclofen	tab, 5mg	DEB
Bisacodyl	tab, 5mg	DEA
Bupivacaine	inj, 1mg/ml ampoule	CVA
Carbamazepine	liquid, 100mg/5ml	HVA
Chlopromazine	tab, 25mg	HVA
Dexamethasone	inj, 4mg/ml,1 ml ampoule	DEB
Dexamethasone	tab, 0.5mg	DEB
Diazepam	inj, 5mg/ml	DVA
Diazepam	tab, 5mg	DVA
Fluconazole	tab, 200mg	DVA
Gabapentine	cap, 300mg	DVA
Glycerine Suppositories	tab, Rectal	DEB
Haloperidol	tab, 0.5mg	DEA
Hyoscine Hydrobromide	inj, 400mcg/ml	CEB
Lactulose	liquid, 3.1-3.7g/5ml	CVB

Liquid Paraffin	500ml	HEA
Loperamide	tab, 2mg	DEB
Metoclopramide	tab, 10mg	DEB
Multivitamin	tab	HVA
Ondansetron	tab, 4mg	DEB
Phenytoin	tab, 100mg	HVA
Prednisolone	tab, 5mg	DVA
Promethazine	tab, 25mg	DEA
Senna	liquid, 7.5mg/5ml	DVB
3 ANTI-ALLERGICS AND MEDICINES USED IN ANAPHYLAXIS		
Adrenaline	inj, 1mg/ml, 1ml amp	DVA
Cetirizine	tab, 10mg	DEB
Chlorpheniramine maleate	tab, 4 mg	HEA
	inj, 10mg/ml	DEA
Dexamethasone	inj, 4mg/ml,1 ml ampoule	DEB
Hydrocortisone	inj, 50mg/ml, vial	DVB
Phenylephrine	inj, 10mg/mL, ampoule	DVB
Prednisolone	tab, 5mg	DVA
Promethazine	tab, 25 mg	HVA
Promethazine HCl	inj, 25 mg/ml, 2 ml amp	DEA
Salbutamol	nebuliser, 5mg/ml, vial	DVA
4 ANTIDOTES AND OTHER MEDICINES USED IN POISONING		
4.1 Non Specific		
Activated Charcoal	Powder	DVB
4.2 Specific		
N-Acetycysteine	inj, 200 mg/ml, 10 ml amp	DVB
Atropine sulphate	inj, 600 mcg/ml, 1ml amp	DVA
Darrows half strength	Infusion, 1L with 5% glucose	CVB
Desferrioxamine	inj, 500 mg vial (PFR)	DVB
Dextrose	Infusion, 5% 1L	HVA
Ipecacuanha	emetic mixture, paediatric	HEA
Pralidoxime mesylate	inj, 200 mg/ml, 5 ml amp	CVB
Sodium Bicarbonate	tab, 650mg	CVB
Sodium Chloride	infusion, 0.9%, 1l	HVA
5 ANTICONVULSANT/ANTIEPILEPTIC MEDICATIONS		
Carbamazepine	tab, 200 mg	DEB
Diazepam	inj, 5 mg/mL, 2 mL amp	DVA
Ethosuximide	cap, 250 mg	CEB
Levetiracetam	tab, 500mg	CEB
Levetiracetam	inj, 500mg/5ml	CEB
Magnesium sulphate	inj, 500 mg/m, 2 mL amp	DVA

Paraldehyde	inj, 10 mL amp	HVA
Phenobarbitone sodium	tab, 30 mg	HVA
Phenobarbitone sodium	inj, 200 mg/mL, 1 mL amp	HVA
Pheytoin sodium	tab, 100 mg	DVA
Phenytoin sodium	inj, 50mg/ml, amp	DVA
Sodium valproate	tab, 200 mg	CVB
6 ANTI-INFECTIVES MEDICINES		
6.1 Antihelminthics		
6.1.1 intestinal antihelminthics		
Albendazole	tab, 200mg	HEA
Mebendazole	tab, 500mg	HEA
Niclosamide	tab, chewable, 500mg	DEB
6.1.2 antifilarials		
Ivermectin	tab, 6mg	HVB
6.1.3 Antischistomal and other antitrematode medicine		
Praziquantel	tab, 600mg	HEA
6.2 Antibacterials		
To assist in the development of tools for antibiotic stewardship at local, national and global levels and to reduce antimicrobial resistance, the Access, Watch, Reserve (AWaRe) classification of antibiotics was developed – where antibiotics are classified into different groups to emphasize the importance of their appropriate use.		
Access group: This group includes antibiotics that have activity against a wide range of commonly encountered susceptible pathogens while also showing lower resistance potential than antibiotics in the other groups. Selected Access group antibiotics are recommended as essential first or second choice empiric treatment		
Watch group: This group includes antibiotic classes that have higher resistance potential and includes most of the highest priority agents among the Critically Important antimicrobials for Human Medicine. These medicines should be prioritised as key targets of stewardship programs and monitoring.		
Reserve group: This group includes antibiotics and antibiotic classes that should be reserved for treatment of confirmed or suspected infections due to multi-drug-resistant organisms. Reserve group antibiotics should be treated as “last resort” options.		
ACCESS GROUP MEDICINES		
Aminoglycosides		
Amikacin	inj, 1g vial,PFR	CVA
Gentamicin	inj, 40mg/ml, 2ml vial	HVA
Amphenicols		
Choramphenicol	inj, 1g vial,PFR	HVA
Cephalosporins		
Cefalexin	cap, 250mg	DVA
Cefazolin	inj, 1g vial,PFR	CVA
Imidazoles		

Metronidazole	tab, 200mg	HVA
Metronidazole	inj, 5mg/ml, 100ml infusion	DVA
Metronidazole	Suspension 200mg/5ml	HVA
Lincosamides		
Clindamycin	cap, 150mg	DEB
Nitrofurantoin		
Nitrofurantoin	tab, 50mg	DEA
Nitrofurantoin	Suspension 25mg/5ml	DVB
Penicillins		
Amoxicillin	cap, disp 250mg	HVA
Amoxicillin	elixir, 125mg/5ml	HVA
Amoxicillin/Clavulanic Acid	tab, 500mg + 125mg	CEA
	inj, 1.2g vial, PFR	
Ampicilin	inj, 250mg vial, PFR	DVA
Benzathine benzylpecillin	inj, 1.44g vial PFR (2.4 MU)	HVA
Benzylpenicillin	inj, 3g vial, PFR (5MU)	HVA
Cloxacillin	cap, 250mg	DEA
Flucloxacillin	cap, 250mg	DVA
	elixir, 125mg/5ml	
	inj, 250mg vial, PFR	
Procaine benzylpenicillin	inj, 4.8 MU, vial	CVB
Sulfamethoxazole/trimethoprim		
Co-trimoxazole	tab, 480mg	HVA
Tetracyclines		
Doxycycline	tab, 100mg	HVA
WATCH GROUP MEDICINES		
Aminoglycosides		
Neomycin	tab, 500mg	DEB
Beta lactamase inhibitor		
Piperacillin/Tazobactam	inj, 4g + 500mg vial, PFR	CEB
Carbapenems		
Imipenem/Cilastatin	inj, 250mg + 250mg PFR	CVA
Meropenem	inj, 500mg vial, PFR	CVA
Cephalosporins		
Cefotaxime	inj, 500mg, PFR	DVA
Cefipime	inj, 1g vial,PFR	DVA
Cefixime	tab, 250mg	DVA
Cefuroxime	tab, 500mg	DVA
Cefriaxone	inj, 1g vial,PFR	DVA
Ceftazidime	inj, 1g vial,PFR	CVB

Glycopeptides		
Vancomycin	inj, 1g vial,PFR	CVA
Vancomycin	cap, 250mg	DVB
Fluoroquinolones		
Ciprofloxacin	tab, 250mg	DVB
	inj, 200mg/100ml	
Levofloxacin	tab, 250mg	CVA
Macrolides		
Azithromycin	Tab, 500mg	DEA
	Suspension, 200mg/5ml	
Clarithromycin	tab, 500mg	CVA
Clarithromycin	Suspension,125mg/5ml	CVA
Quinolones		
Nalidixic acid	tab, 500mg	DVA
Rifamycins		
Rifampicin	cap, 150mg	DVB
Steroid antibacterial		
Fusidic Acid	Cream, 2%w/w, 20gm tube	CVB
Sodium fusidate	tab, 250mg	CVB
RESERVE GROUP MEDICINE		
Oxazolidinones		
Linezolid	Inj, 2mg/ml, 300ml vial	CEB
6.2.3 Antileprosy medicines		
Clofazimine	cap, 50mg	DVA
Dapsone	tab, 100mg	DVB
Rifampicin	caps, 150mg	DVB
6.2.4 Antituberculosis medicines		
Bedaquiline	tab, 100mg	DVA
Clofazimine	tab, 50mg, 100mg	DVA
Cycloserine	cap, 125mg, 250mg	CVB
Delamanid	tab, 50mg	DVA
Ethambutol	tab, 400mg	DVA
Ethionamide	tab, 250mg	CVA
Isoniazid	tab, 100mg, 300mg	DVA
Levofloxacin	tab, 100mg, 250mg	DVA
Linezolid	tab, 600mg	DVA
Pretomanid	tab, 200mg	DVB
Prothionamide	tab,250mg	DVB
Pyrazinamide	tab, 400mg	DVA
Rifapentine	tab, 150mg	DVA

6.3 Antifungal medicines		
Liposomal amphotericin B	inj, 50mg vial, PFR	CVA
Cotrimazole	pessary, 500mg	DEA
Fluconazole	cap, 200mg	DVA
	IV infusion, 2mg/ml, 100ml	
	Suspension, 10mg/ml	
Flucytosine	tab, 100mg	DEA
Gentian violet	paint, 0.5%, 500ml	HEA
Griseofulvin	tab, 125mg, 250mg, 500mg	DEA
Nystatin	pessary, 100000 units/tab	HVA
	Suspension, 100000 units/ml	
Ketoconazole	tab, 200mg	DVA
Itraconazole	tab,100mg	CEB
Miconazole	pessary, 200mg	CVA
Terbenafine	tab, 250mg	CVB
	Cream, 1%w/w, 20gm tube	
6.4 Antiviral medicines		
6.4.1 Antiherpes medicine		
Aciclovir	tab, 200mg	HVA
	cream, 5%w/w, 10g	
Ganciclovir	inj, 500mg, PFR	CEB
	tab, 500mg	
6.4.2 Antiretroviral		
6.4.2.1 Nucleoside reverse transcriptase inhibitors		
6.4.2.2 Non-nucleoside reverse transcriptase inhibitors		
Efavirenz (EFV)	tab, 600mg	HVA
Neverapine (NVP)	Suspension 10mg/ml, 240ml	HVA
6.4.2.3 Protease inhibitors		
Atazanavir/Ritonavir	tab, 300mg/100mg	HVA
Darunavir	tab, 75mg, 150mg,600mg	CVA
Lopinavir/Ritonavir (LPV/r)	tab, 200mg/ 50mg,	DVA
6.4.2.4 Intergrase Inhibitor		
Dolutegravir	tab, 10mg,dispersible	HVA
Dolutegravir	tab, 50mg	HVA
6.4.2.5 Fixed dose combinations		
6.4.2.5.1 Pediatric Anti-HIV medicines		
Abacavir/Lamivudine	tab, 120mg/60mg, dispersible	HVA
Zidovudine/Lamivudine	tab, 60mg/30mg, dispersible	HVA
Neverapine/Zidovudine/Lamivudine	tab, 50mg/60mg/30mg, dispersible	HVA
Lopinavir/Ritonavir (LPV/r)	tab, 100mg/25mg	DVA
6.4.2.5.2 Adult Anti-HIV medicines		

Abacavir/Lamivudine	tab, 600mg/300mg	DVA
Tenofovir/Lamivudine	tab, 300mg/300mg	HVA
Tenofovir/Emtricitabine	tab, 300mg/200mg	HVA
Lamivudine/Zidovudine	tab, 150mg/300mg	HVA
Lamivudine/Tenofovir/Dolutegravir	tab, 300mg/300mg/50mg	HVA
Efavirenz/Lamivudine/ Tenofovir	tab, 400mg/300mg/300mg	HVA
Atazanavir/Ritonavir	tab, 300mg/100mg	DVA
Lopinavir/Ritonavir	tab, 200mg/ 50mg	DVA
6.5 Antiprotozoal medicines		
6.5.1 Antiamoebic and Antigiardiasis medicines		
Metronidazole	tab, 200mg	HVA
	Suspension, 200mg/5ml	
Praziquantel	tab, 600mg	HEA
6.5.2 Antileishmaniasis medicines		
Amphotericin B	inj, 50mg, vial	CEB
Fluconazole	tab, 200mg	DVA
6.5.3 Antimalarial medicine		
6.5.3.1 For curative treatment		
Artemether+ Lumefantrine	tab, 20mg + 120mg	HVA
Artesunate + Amodiaquine	tab, 25mg + 67.5mg	DVA
Artesunate + Amodiaquine	tab, 50mg + 135mg	DVA
Artesunate + Amodiaquine	tab, 100mg + 270mg	DVA
Artesunate Bicarbonate	inj, 60mg vial	CVB
Artesunate Rectal	Suppository, 50mg	HVA
Artesunate Rectal	Suppository, 100mg	HVA
Artesunate Rectal	Suppository, 400mg	HVA
Halofantrine	suspension, 100 mg/5 mL	CVB
Quinine dihydrochloride	inj, 300 mg/mL, 2ml amp	HVA
Quinine sulphate	tab, 300mg	DVA
6.5.3.2 For prophylaxis		
Atovaquone + Proguanil	250mg/100mg	CEB
Chloroquine	tab, 150mg	DVB
Sulphadoxine + Pyrimethamine	tab, 500mg + 25mg	HVA
Proguanil HCl	tab, 100 mg	DVA
Mefloquine HCL	tab, 250mg	CEB
6.5.4 Antipneumocytosis and Antitaxoplasmosis		
Co-trimoxazole	tab, 480mg	HVA
6.5.5 Ant-trypanosomal medicines (AFRICAN)		
Melarsoprol B	inj, 3.6% solution, 5mL amp	DVB
Suramin sodium	inj, 1 g vial PFR	DVB
7 ANTI-MIGRAINE MEDICINES		

7.1 For treatment of acute attack		
Paracetamol	tab, 500 mg	HVA
	IV infusion, 5mg/ml, 100ml	DVA
Ibuprofen	tab, 200 mg	DVA
Morphine Sulphate	tab, 10 mg (slow release)	DVA
7.2 For prophylaxis		
Amitriptyline	tab, 25 mg	DVA
Carbamazepine	tab, 200 mg	DVA
Propranolol HCl	tab, 40 mg	DVA
8. Antineoplastic and Immunosuppressant medicines		
8.1 Immunosuppressive medicines		
Aziothioprine	inj, 50mg vial, PFR	CVB
Cyclosporin	cap, 25mg, 100mg	CVA
Prednisolone	tab, 5mg	DVA
8.2 Cytoxic and Advuvant medicines		
6-mercaptopurine	tab, 50mg	CVA
Abiraterone	tab, 250mg	CVB
Actinomycin D	inj, 500mcg, PFR vial	CVB
Adriamycin/doxorubicin	inj, 50mg vial PFR	CVA
Aflibercept	inj, 2mg/0.05ml	CEB
Anastrazole	tab, 1mg	CVA
Bevacizumab	inj, 25mg/ml, amp	CEB
Bleomycin	inj, 15 IU vial PFR	CVA
Bortezomib	inj, 3.5mg, vial	CVB
Busulphan	tab, 2 mg	CVB
Cabazitaxel	inj, 60mg/1.5ml,vial	CEB
Capecitabine	tab, 500mg	CVA
Carboplatin	inj, 50 mg/5 ml, vial	CVB
Cetuximab	inj, 2mg/ml, vial	CVB
Chlorambucil	tab, 2 mg	CVB
Cisplatin	inj 50mg/50ml, vial	CVB
Cyclophosphamide	tab, 50 mg	CVA
	inj, 200 mg vial PFR	
Cyclosporin	cap, 100mg	CVB
Cytarabine	inj, 100mg/mL, amp	CVB
Docetaxel	inj, 20mg/ml, vial	CVA
Daunorubicin HCL	inj, 20mg, vial	CVB
Darcabazine	inj, 100mg/mL, PFR, vial	CVB
Doxorubicin	inj, 2mg/ml, vial	CVA
Denosumab	inj, 60mg/ml, vial	CEB
Enzalutamide	tab, 40mg	CEB

Etoposide	inj, 20 mg/ml, ampoule	CVB
Fludarabine Phosphate	inj, 50mg, vial	CVB
Fluorouracil	inj 500mg/10ml, ampoule	CVB
Gemcitabine	inj, 200mg, PFR vial	CVB
Goserelin	inj, 10.8mg, vial	CVB
Hydroxyurea	tab, 500mg	CVB
Ifosphamide	inj, 1 g vial, PFR.	CVB
Imatinib mesylate	tab, 400mg	CVA
L-asparaginase	inj, 10000 IU, vial	CVA
Lenalidomide	tab, 10mg	CVB
Leucovorin	inj, 10mg/mL, ampoule	CVA
Lestrozole	tab, 2.5 mg	CVA
Melphalan	tab, 2 mg	CVB
Methotrexate	inj, 2.5. mg/mL, amp	CVA
	tab, 2.5 mg	
Nilotinib	tab, 200mg	CVB
Paclitaxel	inj 300mg/50ml, vial	CVB
Pomalidomide	tab, 4mg	CVB
Procarbazine	cap, 50mg	CVB
Ranibizumab	inj, 2mg/0.05ml	CEB
Rituximab	inj, 10mg/ml, vial	CVB
Taxotere (Docetaxel)	inj, 40mg/ml, 2ml vial	CVB
Trastuzumab	inj, 440mg, PFR vial	CEB
Vinblastine	inj, 1mg/mL, PFR, 10mL vial	CVB
Vincristine sulphate	inj, 1 mg vial PFR	DVA
Zolendronic acid	inj, 4mg/5ml,ampoule	CVA
8.3 Hormones and Antihormones		
Anastrazole	tab1mg	CVB
Bicalutamide	tab,50mg	CVB
Fludrocortisone	tab, 100mcg	CVB
Tamoxifen	tab, 40mg	CVB
	susp, 10mg/5ml	
9 ANTIPARKISONISM MEDICINES		
Benzhexol HCl	tab, 5 mg	DEA
Bromocriptine	tab, 2.5. mg	CEB
Biperiden	tab 2mg	CEB
Levodopa + carbidopa	tab, 250 mg + 25 mg	CEB
Orphenadrine	tab, 50mg	CEB
10 MEDICINES AFFECTING THE BLOOD		
10.1 Antianaemic medicines		
Ferrous sulphate + Folic acid	tab, 200 mg + 0.5 mg	HVA

Ferrous fumirate	tab, 200mg	HEA
Ferrous sulphate	mixt, paed, 60 mg/5 mL	HEA
Folic acid	tab, 5 mg	HVA
Hydroxocobalamin	inj, 1 mg/mL, 1ml amp	CVB
Iron dextran	inj, 10%, 100mg/ml	CVB
Iron sorbitol	inj, (50 mg/mL), amp	DVB
iron sucrose	inj, 20mg/ml	CEB
Vitamin B12	inj, 1000mcg/ml, Vial	CVA
10.2 Medicines affecting coagulation		
Clopidogrel	tab, 300mg	CEB
Dabigatran	tab, 150mg	CEB
Enoxaparin	inj, 4000IU/ml	CVA
Heparin sodium	inj, 5,000, IU/mL, vial	CEB
Phytomenadione	inj, 1 mg/0.5 ml, ampoule	DVA
Phytomenadione	inj, 10mg/mL, ampoule	CEA
Protamine sulphate	inj, 10 mg/mL, ampoule	CEB
Rivaroxaban	tab, 20mg	CEB
Streptokinase	inj, 1500000IU/vial	CEB
Tranexamic acid	tab, 250 mg	CEB
Tranexamic acid	inj, 500mg, ampoule	CEB
Warfarin sodium	tab, 1 mg	CVB
Warfarin sodium	tab, 5 mg	CVB
10.3 Medicines to treat hyperkalemia		
Pottasium binding resins	podwer, 15g	DVA
11. BLOOD PRODUCTS AND PLASMA SUBSTITUTES		
11.1 Blood products		
Cryoprecipitate	inj, 30-40mls	DVA
Fresh frozen plasma	inj, 200-300mls	DVA
Random donor platelet	inj, 50-70ml	CEB
Red cell suspensions	inj, 280-420mls	DVA
	inj, 100-200mls	
Whole blood	inj, 450mls (405-495)	DVA
	inj, 100-225mls	
11.2 Plasma derived products		
Factor viii	inj, 250 IU, vial	CEB
Factor ix	inj, 500IU/10ml, vial	CEB
11.3. Transfusion alternatives		
Erythropoietin	inj, 4000IU/ml	CEB
IV Iron	inj, 20mg/ml	CEB
Haemacel	inj, 3.5%, 500ml	DVA
12 CARDIOVASCULAR MEDICINES		

12.1 Antianginal medicines		
Amlodipine	tab, 5mg	DVA
Atenolol	tab, 50mg	DVA
Glyceryl trinitrate	tab (sublingual), 500 mcg	DEB
Isosorbide dinitrate	tab, 10 mg	DEB
Nifedipine	tab, 10 mg	DVA
Nifedipine	tab, slow-release, 20 mg	DVA
Propranolol HCl	tab, 40 mg	DVA
12.2 Antiarrhythimic medicines		
Adenosine	inj, 3mg/ml, ampoule	CEB
Amiodarone	inj, 50mg/ml	CEA
Propranolol	tab, 40mg	DVA
Lignocaine	inj, 1%, 2 %	CEB
Verapamil	tab, 40mg	CEB
12.3 Antihypertensive medications		
Amlodipine	tab, 5mg	DVA
Atenolol	tab, 50mg or 100mg	DVA
Bendrofluazide	tab, 5mg	DVA
Bisoprolol	tab, 5mg	CVB
Captopril	tab, 12.5 mg	CVB
Carvedilol	tab, 12.5mg	CVA
Enalapril	tab, 2.5 mg	DVA
Enalapril	tab, 5 mg	DVA
Hydralazine HCl	inj, 20 mg amp PFR	DVA
Hydralazine HCl	tab, 25 mg	DEA
Hydrochlorothiazide	tab, 25mg	DVA
Indapamide	tab, 2.5 mg	CEB
Labetalol	inj, 5mg/ml, ampoule	CVA
Lisinopril	tab, 10mg	DVA
Losartan	tab, 25mg	CVB
Methyldopa	tab, 250 mg	DEA
Metoprolol	tab,50mg	CEB
Nebivolol	tab, 5mg	CEB
Nifedipine	cap, 10 mg	DVA
Nifedipine	tab, slow-release, 20 mg	DVA
Nimodipine	tab, 30mg	CEB
Nimodipine	inj,0.2mg/ml, amp	CVB
Telmisartan	tab, 40mg, 80mg	CVB
Prazosin	tab, 1 mg	CEB
Propranolol HCl	tab, 40 mg	DVA
Sodium nitroprusside	inj, 25mg/ml	CEB

Verapamil	tab, 40mg	CEB
12.4 Medicine used in heart failure		
Digoxin	tab, 250mcg, 62.25mcg	DVA
	inj, 250mcg/ml, ampoule	
	elixir, 50mg/ml	
Dopamine	inj, 40mg/ml, vial	CEB
Enalapril	tab, 5mg	DEB
Epinephrine	inj, 100mcg/ml, ampoule	DEB
Frusemide	tab, 40mg	HVA
Furosemide	inj, 10mg/ml, ampoule	DVA
Glyceryl trinitrate	tab (sublingual), 500 mcg	DEB
Isosorbide dinitrate	tab, 10 mg	DEB
Metoclopramide	inj, 5mg/ml, ampoule	DEA
Metolazone	tab, 5mg	CEB
Morphine	inj, 1mg/ml, amp	DVA
Spironolactone	tab, 25 mg	DVB
12.5 Antithrombotic medicine		
Acetylsalicyclic acid	tab, 75mg	DVA
12.6 Lipid Lowering Agent		
Artovastatin	tab, 20mg	CEA
Rosuvastatin	tab, 10mg	CEA
Simvastatin	tab, 20mg	CEA
12.7 Antihypotensive medicines		
Dopamine HCl	inj, 40 mg/mL, ampoule	CVB
Ephedrine sulphate	inj, 30 mgmL, ampoule	DVA
13 Dermatological medicines (Topical)		
13.1 Antifungal medicines		
Benzoic acid + Salicylic acid	oint, 6% + 3%, 500 g	HEA
Clotrimazole	cream, 1%, 20g	DEA
Econazole	cream, 1%,30g	DEA
Sodium thiosulphate	lotion, aq., 10%, 500 mL	DEA
Miconazole	cream, 2%, 30g	DEA
13.2 Anti-infective Medicines		
Calamine lotion + Sulphur 2%	lotion, aqueous, 500 mL	HEA
Chloherxidine	soln, 0.2%, 500ml	DVA
Gentian violet	paint, aq., 0.5%, 500 ml	HEA
Hydrogen peroxide	soln, 3%v/v, 500 mL	DEB
Iodine	soln, weak, 500 mL	DEA
Potassium permanganate	3%, 500 mL	HEA
Povidone iodine	soln, 10%, 500ml	DEA
Salicylic acid + Sulphur	oint, 5% + 5%, 500g (in YSP base)	HEA

Salicylic acid + Sulphur	ointn, 5% + 5%, 500 g (in EO base)	CEB
Silver sulphadiazine	cream, 1%, 500 g	CEB
Zinc ointment + Sulphur	oint, 5%, 500 g; paste	DEA
13.3 Anti-inflammatories and Antipruritic medicines		
Calamine lotion + Sulphur 2%	lotion, aq, 500 mL	HEA
Hydrocortisone	oint, 1%, 15 g	DEA
Betamethasone	oint, 0.15%, 15g	CEB
Calamine	lotion, aq, 500 mL	CEB
Clobetasol propionate	oint, 0.05%, 30g	CVB
13.4 Medicines affecting skin differentiation and proliferation		
Benzoyl peroxide	gel, 5%, 30 g	DEA
Crude coal tar 10%	oint, 500 g	CEB
Dithranol 0.5% in zinc + Salicyclic acid paste	paste, 500g	CEB
Podophyllum resin	paint, alcoh, 15%, 20 mL	DEA
Salicylic acid	lotion, 5%, 500 mL (in alcohol 70%)	DEA
Salicylic acid	oint, 10%, 500 g	DEA
Salicylic acid	oint, 20%, 500 g (in YSP base)	CEA
Salicylic acid 2% + Coal tar solution 15%	shampoo, 500 mL (in soap spirit)	DEA
Salicylic acid	collodion, 12%	DEA
Salicylic acid + crude coal tar 5%	oint, 500g(in YSP)	CEB
Zinc compound + coal tar solution 5%	paste, 500g	CEB
13.5 Scabicides and Pediculocides		
Benzyl benzoate	application, 25%, 500 mL	HEA
Lindane	cream/lotion 1%	CEB
Permethrine	cream, 5%w/w, 20g	DVB
13.6 Other topical preparations		
Emulsifying ointment	oint, 500 g	HEA
Ethyl Chloride	spray, 3%	HEA
Silver nitrate	pencil toughened, 40%	DEA
Yellow soft paraffin	oint, 500g	DEA
Zinc oxide (in EO base)	oint, 15%, 500 g	HEA
14 DIAGNOSTIC AGENTS		
14.1 Ophthalmic Medicines		
Fluorescein Sodium	Eye drops, 1%	DEA
14.2 Radiocontrast media		
Barium sulphate	susp oral, 98%, 340 g pack PFR,	DEA
	susp oral for CT; 21% package btle	CEB
	susp, for CT colonoscopy 40%;kit	
	enema, disposable, 93%, 400g pack	

Effervescent agent (carbex)	granules(oral), 25 g sachet	CEB
	soln(oral), bottle	
Ferumoxide	MRI-TAgent)	CEB
Gastrografin	susp, (oral/rectal) 100g	CEB
Golytely	electrolyte solution (Polyethylene gycol)	CEB
Magnevist	inj, 0.5mmol/ml, 100ml vial (gadopentetatedimeglumine; MRI-T1 Agent)	CEB
Prohance	(gadoteridol 379; MRI-T1 agent	CEB
Resolvist	Iron oxide anoparticles	CEB
Nullytely electrolyte solution	PEG 660g	CEB
Urografin	60%/ 70%	CEB
Ultravist/iopromide	300mg/ml, 370mg/ml	CEB
Visipaque	inj, 625mg/ml	CEB
Xenetic	inj, 250mg, 300mg, 350mg, vial	CEB
X-prep liquid	bottle, 130mg	CEB
15 DISINFECTANTS AND ANTISEPTICS		
Black disinfectant	soln, for dilution	HVA
Cetrimide + Chlorhexidine	soln, 15% + 1.5%	HVA
Chloherxidine	soln, 0.2%, 500ml	DEB
Glutaraldehyde	soln, buffered, 2%	DEA
Hydrogen peroxide	soln, 3%v/v, 500 mL	DEB
Povidone iodine	soln, 10%, 500ml	DVA
16 GASTROINTESTINAL MEDICINES		
16.1 Anti acids and Anti-ulcer medicines		
Cimetidine	tab, 400 mg	CVB
Bismuth chelate	liquid, 120 mg/5 mL, 560 mL	CEB
Magnesium trisilicate	tab, chewable	HEA
Omeprazole	tab, 10mg	DVA
16.2 Antiemetic medicines		
Cyclizine	tab, 25mg	CEB
Metoclopramide HCl	inj, 5 mg/mL, 2 mL amp	DEA
Ondansetron	tab, 4mg	DEA
Promethazine HCl	tab, 25 mg	DEA
	elixir, 5 mg/5 mL	
	inj, 25 mg/mL, 2 mL amp	
Prochlorperazine	tab, 5mg	CEB
16.3 Laxative and Cathartic medicines		
Bisacodyl	tab, 5mg	DEA
Glycerol	suppository (child) 2 g	DEA
Lactulose	soln, 3.1mg/5ml	CVA
Liquid paraffin	soln	HVA

16.4 Medicines used in non-infected diarrhoea		
Oral Rehydration Salts(ORS)	Powder, sachets	HVA
Resomal	Powder, sachets	DVA
Zinc	tab, 20mg	HVA
Codeine phosphate	tab, 15mg	DVA
Loperamide HCL	tab, 2mg	DEA
16.5 Antihaemorrhoid medicines		
Bismuth subgallate	Supp, 5g	DEA
Combination suppositories (hydrocortisone acetate, Lignocaine gel, Zinc oxide, Allantoin)	Sup	DEA
16.6 Antispasmodic medicines		
Atropine sulphate	inj, 600 mcg/ml, 1ml amp	DVA
Hyoscine butylbromide	inj, 20mg/ml, 1ml	DEA
17 HORMONES, OTHER ENDOCRINE MEDICINES AND CONTRACEPTIVES		
17.1 Adrenal hormones and synthetic substitutes		
Dexamethasone	inj, 4mg/ml,1 ml ampoule	DVA
Dexamethasone	tab,0.5mg	DEA
Hydrocortisone	inj, 100mg vial	CVB
Prednisolone	tab, 5mg	DVA
17.2 Contraceptive medicines		
17.2.1 Oral hormonal contraceptives		
Levonorgestrel	implant, 75mg	DVA
Levonorgestrel	tab, 0.75mg	DEB
Norgestrel + ethinylestradiol	tab, 0.3mg + 0.03mg	HVA
Norgestrel	tab, 0.75mg	HVA
17.2.2 Injectable hormonal contraceptives		
Medroxyprogesterone acetate	Inj, aq susp, 150mg/ml, 10ml vial	HVA
17.2.3 Intra-uterine devices (IUD)		
Copper containing IUD	wire, 176mg	DVB
17.2.4 Barrier contraceptives		
Female condoms	pack	DVA
Male condoms	pack	DVA
17.2.5 Implantable contraceptives		
Levonorgestrel releasing plant	Rod, 75mg	DVA
17.2.6 Oestrogen Medicine		
Oestrogens, conjugated	tab, 625mcg	CEB
17.2.7 Ovulation Inducers		
Clomiphene citrate	tab, 50mg	CEB
17.2.8 Progestogens		
Noresthiosterone	tab, 5mg	CEA

17.3 Insulin and other medicines used for diabetes		
Abiglutide	inj, 30mg/0.5ml	CEB
Canaglifozin	tab, 100mg	CEB
Dapaglifozin	tab, 10mg	CEB
Desmopressin	inj, 4mcg/ml	CEB
Dulaglutide	inj, 0.75mg/0.5ml	CEB
Empaglifozin	tab, 10mg	CEB
Exenatide	tab, 2mg	CEB
Glibenclamide	tab, 5 mg	DVA
Gliclazide	tab, 80mg	CEB
Glimepiride	tab, 2mg	CEB
Insulin, soluble	inj, 100 iu/mL, 10ml	DVA
Insulin zinc suspension	inj, 100 iu/mL, 10ml	DVA
Liraglutide	inj, 6mg/ml	CEB
Lixisenatide	inj, 20mcg/ml	CEB
Metformin HCl	tab, 500 mg	DVA
	tab,850mg	
Pioglitazone	tab, 50mg	CEB
Sitagliptin	tab, 25mg	CEB
Saxagliptin	tab, 2.5mg	CEB
Vildagliptin	tab, 50mg	CEB
17.4 Thyroid hormones and antithyroid medicines		
Carbimazole	tab, 5mg	CVA
Iodine	aqueous soln, oral, 30 mL	DEA
Levothyroxine	tab, 0.05mg	CVB
Propylthiouracil	tab, 50mg	CVB
Radioiodine		CEB
Thyroxine sodium	tab, 100mcg	CVA
18 Diuretics		
Mannitol	Inj, 15-20%	DVA
19 Immunologicals		
19.1 Immunological diagnostic agents		
Tuberculin	inj, 1ml vial	DVA
19.2 Sera Immunoglobulins		
Anti D immunoglobulin (RhoGAM)	inj, 250mcg/ml, ampoule	DVA
Anti-rabies Serum	inj, 30IU/ml, 1ml	DVA
Diptheria antitoxin	inj, 20000IU/vial	DVA
Polyvalent Snake Antivenom	Inj, 40000IU/vial	DVA
Tetenus antitoxin	inj, 20000IU/vial	DVA
19.3 Vaccines		
Astrazenecca	inj, 0.5ml	HVA

BCG vaccine	inj, 20 dose vial	HVA
Covid-19 vaccine	inj, 20 dose 10ml vial	HVA
Diptheria-Pertusisis-Tetenus (DPT)	inj, 20-dose 10ml vial	HVA
Human Papilloma Virus (HPV)	inj,10 single doses, 0.5ml vials	HVA
Johnson & Johnson	inj, 0.5ml	HVA
Malaria vaccine	inj, 20ml vial	HVA
Measles vaccine, live PFR	inj, 10 dose, 5ml vial	HVA
Moderna	injection	HVA
Poliomyelitis vaccine	oral susp, 20 dose dispenser	HVA
Tetaenus toxoid vaccine	inj, 10ml vial	HVA
Pentavalent vaccine (Diptheria, Tetenus, Pertussis, Hepatitis B, Heamophilus influenza)	inj, 2 dose vial	HVA
Pfizer	Injection	HVA
Inactivated Polio vaccine	inj, 0.5ml dose	HVA
Pneumococcal conjugate vaccine	inj, 0.5ml prefilled syringes	HVA
Rabies vaccine	inj, 1 dose (0.5ml) vial	DVA
Rotavirus vaccine	Inj, PFR	
Sinopharm	injection	HVA
Sinovac	injection	HVA
Yellow fever	inj, 10 dose, 5ml vial	CEB
20 Muscle relaxant (Peripheral acting) and cholinesterase inhibitors		
Alcuronium chloride	inj, 5 mg/mL, 2mL amp	CEB
Edrophonium chloride	inj, 10 mg/mL, 1 mL amp	CVB
Neostigmine	inj, 2.5 mg/mL, 1 mL	CEB
Orphenadrine	tab, 50mg	CEB
Suxamethonum chloride	inj, 50mg/ml, 2ml amp	DVA
Vecuronium bromide	inj, 10mg vial, PFR	CEB
21 OPHTHALMOLOGICAL PREPARATIONS		
21.1 Anti-infective agent		
Aciclovir	tab, 200mg	DVA
	tab, 400mg	
	eye oint, 3%, 4.5g	
Amphotericin B	eye drops, 0.15%	CEB
Ciprofloxacin	eye drop, 0.3%	DVA
Econazole	eye oint, 1% 15g	CEB
Erythromycin	eye oint, 0.5%, 3.5g tube	CEB
Ganciclovir	inj, 500mg PFR vial	CEB
	tab, 500mg	
Foscarnet	inj, 24mg/ml, 250ml bottle	CEB
Gentamicin	eye drops, 0.3%, 5 mL	HVA

Idoxuridine	eye drops, 0.1%, 5 mL	CEB
Miconazole	eye drops, 1%, 10 mL	CEB
Moxifloxacin	eye drop, 0.3%	CEB
Natamycin	ophthalmic susp, 5%	CEB
Neomycin + Dexamethasone	eye drop	HVA
Ofloxacin	eye drop, 0.3%	CVA
Povidone-iodine	eye drop, 2.5%	CVB
Tetracycline HCl	eye oint, 1%, 3.5 g tube	HVA
Tobramycin	eye drops	CVA
Valganciclovir	tab, 450mg	CEB
Voriconazole	eye drop, 1%, 2%	CEB
21.2 Anti-inflammatory and anti-histamine agents		
Dexamethasone	eye drops, 0.1%, 5 mL	CVA
Emadastine	eye drops, 0.05%,5ml	CEB
Fluoromethalone	eye drops 0.1%, 5ml	CEB
Flucinolone acetonide	implants, 0.59mg	CEB
Ketotifen	eye drops,0.025ml	CEB
Methylprednisolone acetate	inj, 40 mg/mL, 2 mL vial	CEB
Nedocromil	eye drops,2%, 5ml	CEB
Olopatadine 0.1%, 0.2%	eye drops, 0.1, 0.2%	HVA
Prednisolone	eye drops, 0.5%, 1% 5ml	CEB
Sodium Chromoglycate	eye drops, 0.2%	HEB
Triamcinolone acetonide	inj, 40mg/ml, 1ml vial	CEB
21.3 Local anaesthetics		
Amethocaine HCL	eye drops, 1%, 10ml	DEA
21.4 Miotics and antiglaucoma medicines		
5-fluorouracil	sub-conjuctiva 50mg/ml	CVB
Absolute alcohol	96%, Retrobulbar	CEB
Acetazolamide	tab, 250 mg	DVA
Acetazolamide	inj, 500 mg vial PFR	CEB
Aflibercept	inj, intravitreal 2mg/0.05ml	CEB
Apraclonidine	Topical eye	CEB
Bimatroprost	eye drops, 0.03%, 3ml	CEB
Brinzolamide	eye drops, 1%, 5ml	CEB
Bevacizumab	inj, intravitreal 400mg/16ml	CEB
Betaxolol	eye drops, 0.25%, 0.25ml	CEB
Brimonidine	eye drops, 0.2%, 5ml	CEB
Dorzolamide	eye drops, 2%, 5ml	CEB
Glycerol	oral soln, 50%	CEB
Latanoprost	eye drops, 0.005%, 2.5ml	CEB
Mitomycin C	sub-conjuctiva 4mg/ml	CEB

Pilocarpine HCl	eye drops, 2%, 4% 10 mL	CVA
Ranibizumab	intravitreal, 0.5mg, 0.3%	CEB
Timolol maleate	eye drops, 0.25%	CVA
Travoprost	eye drops, 0.004%, 2.5ml	CEB
21.5 Mydriatic and immunosupressant medicines		
Atropine sulphate	eye oint,0.5%-1%, 3.5 g tube	DVA
Cyclopentolate HCl	eye drops, 0.5%, 1%, 5 mL	DEA
Mycophenolate Mofetil	inj, 250mg/ml, 500mg/ml, 200mg/ml	CEB
Tropicamide + Phenylephrine	eye drops 0.75% + 2.5%	CEB
21.6 Others		
Ascorbic acid	tab, 200mg	DEB
Carmellose	eye drops, 0.5%, 10ml	DEB
Hypromellose	eye drops 0.3 %, 0.5%	DEB
Mannitol	inj, 20%	CVA
Sodium ascorbate	eye drops, 10%	DEB
Sodium Hyaluronate	Sub tenon, 2%	CEB
Tacrolimus	eye drops, 0.1%,0.03%	CVB
22 OBSTETRIC & GYNAECOLOGICAL MEDICINES		
22.1 Oxytocics		
Mifepristone	tab, 10mg	DVA
Misoprostol tab, 200mcg	tab, 200mcg	DVA
Oxytocin	inj, 10 IU/ml, 1ml	HVA
22.2 Antioxytocics		
Nifedipine	tab, 10mg	DVA
Nifedipine	tab, 20mg SR	DVA
22.3 Myometrial relaxants		
Salbutamol sulphate	inj, 1mg/ml, 5ml amp	DVA
22.4 Medicine used in pre-enclampsia and eclampsia		
Calcium gluconate	inj, 10%, 100mg/ml, vial	CVA
Dexamethone	inj, 4mg/ml, ml	DEB
Hydralazine	Inj, 20mg/ml, 1ml amp	DVB
Labetalol	inj, 5mg/ml, 20ml	CEB
Lignocaine	Inj, 1%	DVA
Magnesium Sulphate	inj, 500mg/ml, 10ml vial	HVA
Methylodopa	tab, 500mg	DVA
Nifedipine	tab, 10mg	DVA
22.5 Medicines used in primary PPH		
Oxytocin	inj, 10 IU/mL, 1 mL amp	HVA
Misoprostol	tab, 200mcg	DVA
23 PERITONIAL DIALYSIS SOLUTIONS		
Dianeal + dextrose	1.5% intraperitoneal dialysis, soln, 1L bottle	CVB

	4.25 % intraperitoneal dialysis, soln, 1L bottle	
24 MEDICINE FOR MENTAL AND BEHAVIOUR DISORDER		
24.1 Medicines used in psychotic disorder		
Chlorpromazine HCl	tab, 100 mg, 25mg	DVA
Chlorpromazine HCl	inj, 25 mg/mL, 2 mL amp	HEA
Fluphenazinedecanoate	inj, oily, 25 mg/mL, 2ml	DVA
Fluoxetine	cap, 10mg, 20mg	DVA
Haloperidol	tab, 1.5 mg, 5mg	DEA
Haloperidol decanoate	inj, oil, 50 mg/mL, 1 mL amp	DEB
Olanzapine	tab, 10mg	CVA
Risperidone	tab, 0.5 mg, 1mg, 2mg	DVA
Sodium Valproate	tab(crushable), 100mg, 500mg	CEB
24.2 Medicines used in mood disorders		
24.2.1 Medicines used in depressive disorders		
Amitriptyline HCl	tab , 25 mg	HVA
Amitriptyline HCl	inj, 10 mg/mL	CVA
Fluoxetine	tab, 20mg	DVA
Sertraline	tab, 50mg	
24.2.2 Medicines used in bipolar disorders		
Chlorpromazine HCl	tab, 25mg, 100mg	DVA
Haloperidol	tab, 1.5 mg, 5mg	DEA
Lithium	tab, 0.25 - 2g	CVA
24.2.3 Medicines used in anxiety		
Diazepam	inj, 5mg/ml, 2ml	DVA
	tab, 5mg	DEA
Lorazepam	tab, 1mg	HEA
24.2.4 Medicines used for disorders due to psychoactive substance use		
Thiamine	inj, 100ml	DEB
25. ANTIPARKISONISM MEDICINES		
Trihexyphenidyl	tab, 5mg	CEB
26 MEDICINES ACTING ON THE RESPIRATORY TRACT		
26.1 Anti-asthmatic and medicines for COPD		
Adrenaline	inj, 1/1,000, 1 mL amp	HVA
Aminophylline	tab, 100 mg	HVA
Aminophylline	inj, 25 mg/mL, 10 mL amp	DVA
Beclomethasone diproprionate	aerosol inhalation, 50mcg/dose, 200-dose unit	DVA
Dexamethone	inj, 4mg/ml, ml	DVA
Fluticasone proprionate	50mcg/metered spray 200 metered doses	CEB
formoterol	aerosol, 20mcg/2ml	CEB
Hydrocortisone	inj, 100mg vial	DVB

Ipratropium bromie	aerosol, 0.02%, 2.5ml	CEB
Magnesium Sulphate	Inj, 50%, 500mg/ml, 10ml	DVA
Prednisolone	tab, 5mg	DVA
Salbutamol sulphate	tab, 4 mg	HVA
	aerosol inhalation	DVA
	100 mcg/dose,200 - dose unit	DVA
	respirator soln, 1 mg/mL	DVA
Salmeterol	13g with 120 inhalations/canister	CEB
Sodium cromoglycate	spincap, 20 mg (for use with an insufflator)	CEB
Theophylline	tab, 250mg	CEB
Tiotropium	18mcg	CEB
27 SOLUTIONS CORRECTING WATER, ELECTROLYTES AND ACID-BASE DISTURBANCES		
27.1 Oral preparations		
Oral rehydration salts (ORS)	powder in sachet for I L	HVA
Potassium chloride	tab, 600mg, SR	DVA
27.2 Parenteral preparations		
Dextrose Normal Saline (D5NS)	i/v infusion, 0.9% NaCl + 5% dextrose, 1L pack	DEB
Glucose (dextrose)	inj, 50%, 50ml vial	DEB
Glucose (dextrose)	inj, 5% infusion, 1L	HVA
Glucose (dextrose)	inj, 10%, 100ml pack	HVA
Potassium chloride	inj, 20%,10ml	CVA
Sodium bicarbonate	inj, 8.4%, 50ml vial	DVA
Sodium chloride	inj, 0.9%, 0.45% infusion	HVA
Sodium lactate comp	Inj, infusion, 1L pack	HVA
Sodium lactate + glucose	inj, infusion, 1L (pead)	DEB
Sodium lactate + glucose	inj, infusion, 200ml (pead)	DVA
28 VITAMINS AND MINERALS		
Vitamin A	cap, 200,000 IU	HVA
Vitamin B Co. strong	tab	HEA
Nicotinamide	tab, 50 mg	DEA
Pyridoxine HCl	tab, 20 mg	HVA
Thiamine	inj, 100mg/ml	DEB
Vitamins, multiple	syrup	HEA
Vitamins, multiple	tab	HEA
Calcium gluconate	tab, chewable, 500 mg	CEB
Vitamins, multiple	inj, i/v, high-potency, 10ml	DEB

Calciferol, high-strength	tablet, 10,000 IU	CVB
Calcium gluconate	inj, 10%, 10 mL, amp	CVB
Copper supplements		CVB
Vitamin B12	tab, 0.005mg	HEA
Vitamin E	tab, 400IU	DEB
Vitamin K	tab, 10mg	DEB
Vitamin K	inj, 10mg/ml, 1mL amp	DEB
29 EAR, NOSE AND THROAT MEDICINES		
Acetic acid	ear drops, 2%	HEA
Ampicillin	cap, 250mg	DVA
Amoxycillin	cap, 250mg	HVA
Azithromycin	tab, 250mg	DVA
Betamethasone	oint, 0.15, 15 g	CEB
Beclomethasone dipropionate	nasal spray, 50mcg/spray	DEB
Ciprofloxacin	ear drops	CVA
Chloramphenicol	ear drops, 5%, 10 mL	DVA
Ceftriaxone	inj, 1g PFR	DVA
Cloxacillin	cap, 250mg	DEA
Cetirizine	tab, 10mg	DEB
Erythromycin	tab, 250mg	HVA
Flucloxacillin	cap, 250 mg	DVA
Gentian violet	paint, aq., 0.5%,500ml	HEA
Hydrocortisone	oint, 1%, 15 g	DEA
Liquid paraffin	soln, 500ml bottle	HVA
Metronidazole	tab, 200mg	HVA
Nystatin	Oral susp, 10000IU/ml, 20ml	DEA
Oxymetazoline HCL	nasal drops 0.1%, spray 0.1%	DEB
Prednisolone	tab, 5mg	DVA
30 MEDICINES SPECIFIC FOR NEONATAL CARE		
30.1 Medicines administered to the neonate		
Chlorhexidine digluconate	soln, 0.7%	HVA
30.2 Medicines administered to the mother		
Betamethasone	inj, 4mg/ml, ml	CEB
Dexamethone	inj, 4mg/ml, ml	DVA
31 MEDICINE FOR ARTHRITIS		
31.1 Medicines for gout		
Allopurinol	tab, 100 mg	DEA
Colchicine	tab, 500mcg	DVB
31.2 Medicines used in Rheumatoid arthritis		
Methotrexate	tab, 2.5mg	DVA
Gold sodium thiomalate	inj, 10mg/ml	CEB

Hydroxychloroquine	tab, 200mg	CEB
Leflunomide 10mg	tab, 10mg	CEB
Penicillamine	tab, 125mg	CEB
Sulfasalazine	tab, 500mg	CEB
31.3 Osteoarthritis Medicines		
Diclofenac	tab, 50mg	DEA
Diclofenac	topical, 1%	DEA
Duloxetine	tab, 30mg	CEB
Ibuprofen	tab, 200mg	HVA
Methylprednisolone acetate	40mg/ml,2ml	CEB
Naproxen	tab, 250mg	DEA
Triamcinolone acetate	inj, 40mg/ml1ml	DEA
Tramadol	tab, 50mg	DEA
32 NON-MEDICINAL THERAPEUTIC PRODUCTS USED TO TREAT NUTRITIONAL DISORDERS		
Corn Soya Blend		DVA
F-75 milk		DVA
F-100 milk		DVA
LikuniPhala		DVA
Ready to use therapeutic food (RUTF)	sachet, 260g	DVA
	sachet, 92 g	
33 ANTIDOTE		
Flumazenil	inj, 0.5mg/5ml	CVB
N-Acetylcesteine	tab, 200mg	CVB
	inj, 1g/5ml	CVB
Desferrioxamine	inj, 2g/vial	CVB
Activated charcoal	powder	DVA
Sodium bicarbonate	inj, 8.4%	DVA