THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF HEALTH
DEPARTMENT OF MEDICAL SERVICES

CLINICAL MANAGEMENT GUIDELINES

OF

BASIC ESSENTIAL PACKAGE OF HEALTH SERVICES
AT TOWNSHIP HOSPITALS AND STATION HOSPITALS

August 2021

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FOREWORD

The Ministry of Health is the largest and main health care provider to the population in Myanmar. Provision of health service is a complex and ever demanding issue requiring adequate health infrastructure, quality human resources for health, strong and efficient network of systems together with appropriate health care financing mechanism, among many other factors.

Although the Ministry of Health had received over tenfold rise in health budget since 2011, it is still insufficient to provide all health care services to every people in need without financial hardship. This is due to several factors including increasing population, changing epidemiological situation and life style related diseases and conditions. For that reason, the Ministry tried to identify the health benefit package explicitly as a guaranteed minimum health care services to be given to beneficiaries since 2016 and it is known as Basic Essential Package of Health Services (BEPHS).

Basically, there are three main components in BEPHS namely clinical, public health and disease control in terms of out-patient and in-patient services. Public Health and Disease Control Services are more or less in program-oriented in nature with updated standard operating procedures and guidelines, but not the same as in clinical services.

I would like to express my sincere appreciation to the professionals from the Department of Medical Services for their tremendous effort in making the first edition of "Clinical Management Guidelines of Basic Essential Package of Health Services at Township Hospitals and Station Hospitals" into fruition. It will be distributed to every public hospital in the country.

With these guidelines, I am confident that clinical services rendered at primary care level will be much more standardized and will enhance the quality and effectiveness of clinical services for the population in need. We will further modify and improve the guidelines as we go along.

I would like to congratulate every person who had contributed in this great output. Applying these guidelines, our clinical services will be much more effective and efficient in the very near future in serving our population.

Dr. Thet Khine Win
Union Minister
Ministry of Health

FOREWORD

Essential package of health services (EPHS) is the first step to achieve the long-term goal of Universal Health Coverage (UHC). UHC aims to reduce financial hardship by improving access to essential, affordable health services. To overcome current challenges of Myanmar health system which are related to the availability and distribution of resources, National Health Plan (NHP) (2017-2021) was launched to pave the way forward UHC. NHP has the goal to establish Basic EPHS first and then, the package will expand to a more comprehensive set of services over a period of time.

The first step in formulating basic EPHS is choosing appropriate healthcare services for the package. This has been addressed through a series of workshops attended by relevant stakeholders. For implementation of Basic EPHS, Standard Operating Procedure (SOP) and clinical management guidelines are essential to calculate costing and to provide supply side readiness. Technical Working Group (TWG) was formed by relevant specialists, Township Medical Officers (TMO) and Station Medical Officers (SMO). These TWG members developed the clinical management guideline of BEPHS and editorial board, composed by Professor and Head of each subject, finalized the guidelines.

I do hope that TMOs and SMOs will make optimal use of these guidelines to enhance their capacity to ensure for delivering Basic EPHS. These guidelines will also be a standard for clinical management of many common diseases. It will also support the Ministry for further step to implement Basic EPHS in the townships. The Department of Medical Services also would like to acknowledge and thank to concerted effort of Editorial Board, TWG members, individuals, and organizations/ institutions that have supported to develop this important guideline for the way forward to UHC in the country.

Dr. Myat Wunna Soe
Director General
Department of Medical Services
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ACKNOWLEDGEMENTS

The formulation of Clinical Management Guidelines of this Essential Package of Health Services (EPHS) Basic Essential Clinical Services would not materialize without the initiatives and guidance from HE Dr. Thet Khine Win, Union Minister for Health, and Dr. Myat Wunna Soe, Director General of Department of Medical Services. Our sincere gratitude goes to all the participants who attended the various workshops and meetings for sharing thoughts, generating ideas, and contributing to the development of this package and guidelines.

These include representatives from the Ministry of Health's various Departments and Programs, from Medical Universities and institutions, from health authorities at State/Region level, Township level and Station level, as well as individual experts. In addition, we would like to thank to the development partners that provided the financial support, which made this inclusive and participatory package possible.

Last but not least, we would like to express its utmost appreciation to all the contributors and editors including Professors and Heads of specific clinical departments, technical working group for EPHS, National Health Plan Implementation Monitoring Unit (NIMU), Medical Care Division of Department of Medical Services for the information they shared, facilitation they made, and consultation they provide.

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ACRONYMS

ABC - Airway, Breathing, Circulation
ABCDE - Airway, Breathing, Circulation, Disability, Exposure
ACLS - Advance Cardiovascular Life Support
AED - Automated Electrical Defibrillator
AIDS - Autoimmune Deficiency Syndrome
AKI - Acute Kidney Injury
ALS - Advanced Life Support
AN - Antenatal
AP - Anteroposterior
ARDS - Acute Respiratory Distress Syndrome
ARF - Acute Renal Failure
ARI - Acute Respiratory Infection
AROU - Acute Retention of Urine
ASV - Anti-Snake Venom
AVPU - Alert, Verbal, Pain, Unresponsive

BEPHS - Basic Essential Package of Health Services
BLS - Basic Life Support
BMI - Body Mass Index
BMV - Bag and Mask Ventilation
BP - Blood Pressure
BT - Bleeding Time
BURP - Backwards Upwards Rightwards Pressure
BURP - Backwards Upwards Rightwards Pressure
BVM - Bag Valve Mask
BPH - Benign Prostatic Hyperplasia

CAD - Coronary Artery Disease
CP - Complete Picture
C&S - Culture and Sensitivity
CBC - Complete Blood Count
CNS - Central Nervous System
COAD - Chronic Obstructive Airway Disease
COPD - Chronic Obstructive Pulmonary Disease
CPAP - Continuous Positive Airway Pressure
CPR - Cardiopulmonary Resuscitation
CRP - C-reactive Protein
CS - Cesarean Section
CSF - Cerebro Spinal Fluid
CXR - Chest X-Ray
CT - Clotting Time
CTscan - Computerized Tomography Scan

D&C - Dilatation and Curettage
DBP - Diastolic Blood Pressure
DI - Deciliter
DVT - Deep Vein Thrombosis
DBP - Diastolic Blood Pressure

ECG - Electrocardiogram
EHO - Ethnic Health Organization
EmLSCS - Emergency Lower (Uterine) Segment Caesarean Section
EMS - Emergency Medical Services
EPI - Expanded Programme on Immunization
ESR - Erythrocyte Sedimentation Rate
ETT - Endotracheal intubation
EUA - Examination Under Anesthesia

FBC - Full Blood Count
FFH - Fall from Height
FHS - Fetal Heart Sound
FiO_2 - Fraction of Inspired Oxygen

GA - General Anesthesia
G&M - Grouping and Matching
GCS - Glasgow Coma Scale
GI - Gastro-Intestinal
GP - General Practitioner
GTN - Glyceryl Trinitrate
GVT - Government

Hb - Hemoglobin
HELLP - Haemolysis, Elevated Liver Enzyme, Low Platelet Count
HIV - Human Immunodeficiency Virus
HRH - Human Resources for Health
Hb - Hemoglobin
HCT - Hematocrit Test

ICU - Intensive Care Unit
IM - Intramuscular
Inj - Injection
IPPV - Intermittent Positive-pressure Ventilation
IUD - Intrauterine Contraceptive Device
IV - Intravenous

LA - Local Anesthesia
LFT - Liver Function Test
LMA - Laryngeal Mask Airway
LSCS - Lower (Uterine) Segment Caesarean Section
LV - Left Ventricle

MBD - Maturity by Date
Mcg - Micrograms
Mg - Milligrams
MoHS - Ministry of Health and Sports
MOI - Mechanism of Injury
MP - Malaria Parasite
MVA - Manual Vacuum Aspiration

NIBP - Non-Invasive Blood Pressure
NIMU - NHP Implementation Monitoring Unit
NPA - Nasopharyngeal Airway
NS - Normal Saline
NSVD - Normal Spontaneous Vaginal Delivery
NTSI - Necrotizing Soft Tissue Infection
NV - Neurovascular
NGO - Non-Governmental Organization
NHP - National Health Plan

OA - Osteoarthritis
OPA - Oropharyngeal airway
ORS - Oral Rehydration Solution
OSA - Obstructive Sleep Apnea

PA - Posteroanterior
$PaCO_2$ - Partial Pressure of Carbon Dioxide
PCV - Pneumococcal Conjugate Vaccine
PE - Pre-eclampsia
PEF/PEFR - Peak Expiratory Flow Rate
PMCT - Prevention of Mother-to Child Transmission
PO - Per Oral
POD - Pouch Of Douglas
PV - Per Vagina
PVD - Peripheral Vascular Disease
POP - Plaster Of Plaris
PPH - Postpartum Haemorrhage
PR - Pulse Rate

RDT - Rapid Diagnostic Test
Rh - Rhesus (Rh) Factor
RIG - Rabies Immunoglobulin
RIF - Right Iliac Fossa
RL - Ringer's Lactate
ROSC - Restoration Of Spontaneous Circulation
RR - Respiratory Rate
RSI - Rapid Sequence Intubation
RTA - Road Traffic Accident
RV - Right Ventricle

SaO_2 - Arterial Oxygenation
SBP - Systolic Blood Preesure
SGA - Small For Gestational Age
SIRS - Systemic Inflammatory Response Syndrome
SL - Sublingual
SOP - Standard Operating Procedure
SPC - Suprapubic Cystostomy
SpO_2 - Peripheral Oxygen Saturation
STS - Serologic Test for Syphilis

TBSA - Total Burn Surface Area
TSB - Total Serum Bilirubin
TT - Tetanus Toxoid

U & E - Urea and Electrolytes
UHC - Universal Health Coverage

VCCT - Voluntary Confidential Counselling and Testing
VE - Vaginal Examination
VF - Ventricular Fibrillation
VT - Ventricular Tachycardia

WBCT - Whole Blood Clotting Test
WCC - White Cell Count
Wk - Week

\# - Fracture

CHAPTER-1

Introduction

Universal Health Coverage (UHC) is defined as ensuring all people having access to promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship.

With this definition, it is to extend the population coverage to fulfill equity (to meet the non-covered), expand the service package, and reducing the cost incurred for these services. Thus, an Essential Package of Health Services (EPHS) has been defined as the package of services that the government is providing or is hoping to provide to its people in an equitable manner, with improved efficiency and quality[1]. There is no universal essential package of health services that applies to each and every country in the world and many countries have defined an essential package of services by their own country's context. Usually, it has to be based upon disease burden, level of poverty, inequality, social preferences, health financing status of that country, and many others. EPHS is also expected to achieve other goals including, political empowerment, accountability, public assurance, and more effective health care to all people.

As the Myanmar National Health Plan (NHP) 2017-2021 aims to strengthen the country's health system and pave the way towards UHC, its main goal is to extend access to a Basic Essential Package of Health Services (BEPHS) to the entire population by 2020-2021 while increasing financial protection.[2]

1. Wright.J.,Health Finance and Governance Project, July 2015. Essential package of health services 24 Countries Snapshots: Abt.Associates.
2. Myanmar National Health Plan (2017-2021). Ministry of Health and Sports 2017

The NHP is being operationalized nationwide to deliver the Basic EPHS based on existing capacity. Investments are being done to expand Townships' capacity by improving service availability and readiness.

The BEPHS should be:	
Effective	it should include services and interventions that will result in the greatest improvements in population health.
Realistic	it should include services and interventions for which access can be guaranteed for everyone by a given year, irrespective of who delivers those services and interventions.
Affordable	it should be affordable for the country, considering the different sources of funding and the condition that no-one should suffer financial hardship when using the services and interventions.
Safe (Quality)	it should ensure service quality to reduce variations among all types of service providers by developing standard treatment guidelines and protocols like this one.

Clinical Management Guidelines of BEPHS

The basic EPHS emphasizes the critical role of primary health care and the delivery of essential services and interventions at the Township level and below starting within the community.

The clinical component of the basic EPHS to be provided at township and station hospitals have been identified in 2018 after a series of consultation meetings between the respective health care providers at township and station hospitals and clinical specialists based on the burden of disease and cost-effectiveness. The guidelines and standard operating procedures (SOP) for these services have been developed by a working group including respective specialists, Township Medical Officers, and Station Medical Officers, relevant officials from the Department of Medical Services, and NHP Implementation Monitoring Unit (NIMU) of the MoH. These SOP/Guidelines have been developed in a user-friendly format.

The basic clinical packages, its guidelines, and SOP will be important inputs into other critical activities including:

- The prioritization in terms of service for operationalizing at the local level
- The quality of care for the strengthening of the health system; service delivery

Supply chain management will be based according to EPHS once identified and costed. Procurement of medicines and equipment will cater to the contents of EPHS for both primary health care and clinical package.

This has also been prepared for the private sector (GPs) and EHOs thus to provide Basic EPHS for primary care level there should be a basic guideline for the minimum standard of care and procedures. Similarly, at the Station Hospitals and Township Hospitals level, the service readiness has to be prepared to deliver the standardized BEPHS all over the country. With this, a full set of Standard Operation Procedures have to be developed for the operationalization of BEPHS at the clinical settings at the primary care level.

CHAPTER-2

Basic Essential Clinical Services & Components

Station and township hospitals are an integral part of hospital care services for the most of the rural population in Myanmar. It is simply because rural people are more accessible to primary care hospitals rather than district hospitals and tertiary hospitals. Doctors and nurses in those hospitals have been providing emergency care, maternal and childcare, and also trauma care associated with road traffic accidents and also surgical and obstetric emergencies. In addition, station hospitals and township hospitals are also dealing with common health problems - both infectious and non-communicable diseases.

Following clinical services are included in BEPHS of the Township hospitals;

No	Main Elements	Essential Clinical Service Components
1.	Essential Emergency Care	• Cardiac arrest • Shock • Severely injured patient • Burns and scalds • Acute poisoning • Emergency airway obstruction • Acute pulmonary edema • Convulsion • Acute severe asthma • Acute exacerbation of Chronic Obstructive Pulmonary Disease (COPD) • Snake bite • Dog bite
2.	Essential Medical Care	• Acute Gastroenteritis • Upper respiratory tract infections • Urinary tract infections • Vitamin B1/Thiamine Deficiency
3.	Essential Surgical Care	• Acute appendicitis and appendicular abscess • Cellulitis and Abscess • Wound management
4.	Essential Obstetric Care	• Antenatal care • Normal labour • Postnatal Care • Antepartum haemorrhage • Postpartum haemorrhage • Severe Pre-eclampsia and eclampsia • Caesarean Section • Bleeding in early pregnancy • Ruptured ectopic pregnancy
5.	Essential Paediatric Care	• Sick Newborn Care • Sick young infants and children • Diarrhoea in children • Acute Respiratory Infection in children • Dengue Hemorrhagic Fever • Paediatric ear infections
6.	Essential Orthopedic Care	• Acute fractures • Acute dislocation of joints • Acute musculoskeletal and joint infections • Soft tissue injuries
7.	Essential Anesthesia Care	• Spinal anesthesia • Ketamine anesthesia • Local anesthesia • Obstetric anesthesia

No	Main Elements	Essential Clinical Service Components
8.	Essential Mental Health Care	• Persons with agitated and/or aggressive behaviour • Alcohol withdrawals
9.	Essential Dental Care	• Simple dental extractions • Oral prophylaxis • Dental restorations
	Supportive Services	
10.	Laboratory Service	• Type C laboratory service (Table-28)
11.	Radiology Service	• Basic radiology service
12.	Blood Transfusion Service	• Basic transfusion service

Total number of clinical services at the township level = 47

Supportive services = 3

Elements of Basic Essential Clinical Services and their components for Station hospitals

No.	Main Elements	Essential Clinical Service Components
1.	Essential Emergency Care	• Cardiac arrest • Shock • Severely injured patient • Burns and scalds • Acute poisoning • Emergency airway obstruction • Acute pulmonary edema • Convulsion • Acute severe asthma • Acute exacerbation of Chronic Obstructive Pulmonary Disease (COPD) • Snake bite • Dog bite
2.	Essential Medical Care	• Acute Gastroenteritis • Upper respiratory tract infections • Urinary tract infections • Vitamin B1/Thiamine Deficiency
3.	Essential Surgical Care	• Cellulitis and Abscess • Wound management
4.	Essential Obstetric Care	• Antenatal care • Normal labour • Postnatal Care • Antepartum haemorrhage • Postpartum haemorrhage • Severe Pre-eclampsia and eclampsia • Bleeding in early pregnancy

No.	Main Elements	Essential Clinical Service Components
5.	Essential Paediatric Care	• Sick Newborn Care • Sick young infants and children • Diarrhoea in children • Acute Respiratory Infection in children • Dengue Hemorrhagic Fever • Paediatric ear infections
6.	Essential Orthopedic Care	• Acute fractures • Acute dislocation of joints • Acute musculoskeletal and joint infections • Soft tissue injuries (*Only initial care and referral – for orthopaedic services excluding definitive treatment which required X-ray confirmation)
7.	Essential Mental Health Care	• Persons with agitated and/or aggressive behaviour • Alcohol withdrawals
	Supportive Services	
8.	Laboratory Service	• Type C laboratory service (Table-28)
9.	Blood Transfusion Service	• Basic transfusion service

Total number of clinical services at the station level = 37

Supportive services = 2

Since Radiology services are not available in all station hospitals, definitive clinical services requiring diagnostic radiology are not included in BEPHS of station hospitals. As such, definitive treatment for acute fracture and joint dislocation cannot be provided in station hospitals.

Similarly, operation theatre facilities are not uniform throughout the country. Therefore, some surgical procedures and anesthesia service components are excluded from the BEPHS of station hospitals. Although type-C laboratory services will be provided in station hospitals, it will be with the exception of certain tests. Blood transfusion service is not included in BEPHS of station hospitals.

It is crucial to note that if the service is excluded from the package, it only means that access to this service cannot yet be guarantee for all. Station hospitals and township hospitals will continue to serve all the clinical services as usual with their utmost capacity utilizing the available resources. For instance, station medical officer could perform emergency surgical or emergency obstetric procedures like emergency appendectomy, or emergency LSCS if facilities permit. However, it will not be included in BEPHS of station hospital.

Most of the clinical services in BEPHS emphasize on emergency and initial care. While managing emergency care, healthcare providers also need to provide timely appropriate referral and safe transfer services to higher level care as severity of their diseases might need further diagnostic procedures, close monitoring, and definitive treatments.

CHAPTER-3

Clinical Management Guidelines for Emergency Care

Basic Essential Emergency Services

- Acute fractures
- Cardiac Arrest
- Shock
  - » Oxygen therapy
  - » Venus Cut down
- Seriously injured patient
  - » Emergency chest tube insertion
  - » Suprapubic Cystotomy
- Burn and Scald
- Acute Poisoning
- Airway Obstruction
  - » Endotracheal incubation
  - » Emergency cricothyroidotomy
- Acute Pulmonary Edema
- Convulsion
- Acute Severe Asthma
- Acute exacerbation of COPD
- Snake Bite
- Dog Bite

OBJECTIVES

1. To reduce preventable morbidity and mortality of population in the region by upgrading emergency care services in township and station hospitals
2. To provide initial lifesaving procedures and treatments at township and station hospitals as an essential health package
3. To establish the standard guidelines in initial lifesaving treatments

Summary of the current situation of lifesaving emergency care in township and station hospitals

1. The hospitals are receiving and providing initial treatments with available resources to the local population with emergency medical problems.
2. The hospitals are arranging referral and transfer services to a higher facility with available resources.
3. The current resources for life-saving care to emergency medical problems are still underdeveloped in equipment, facility, and human resources.
   a. No dedicated resuscitation area and equipment installed.
   b. Knowledge and skills of medical doctors and nurses in initial resuscitation is fair and need both facility and training.
   c. A standard guideline is necessary to provide emergency care to the local population with upgraded facilities and capacities.
   d. A standard guideline is necessary to facilitate patient referral and transport to higher-level health facilities.
4. Many of preventable morbidity and mortality can be reduced by providing essential lifesaving treatment in township and station hospitals as a package supported by MoH.

Advantages of upgrading emergency care in the townsthip level

1. Patients received lifesaving care close to their residing places
2. Proper initial care promotes the community's trust in local health care facilities and reduces unnecessary deaths
3. Referral and transfer services will be safe
4. Reduce overload to higher-level hospitals if patients are treated with essential facilities at the primary care level

The standard guideline for emergency care

The guidelines described are to be established by consensus agreement between township and station medical officers, emergency care specialists, and authority of MoH. The tasks responsible by NHP-EPHS clinical care guideline developers include:

1. Local data collection and analysis of currently available infrastructures, equipment, human resources, and system practiced.
2. Installation of necessary equipment and drugs to local hospitals.
3. Provide human resources for implementation to be effective.
4. Training programs for EPHS specific and Clinical specific skills. [Note: The treatments described in the guideline are not rigid and adaptable with the locally available resource.]

Guidelines for Establishing Essential Package for Emergency Care in township and station hospitals

Introduction

The community has a right to get lifesaving emergency care services at township and station level hospitals under Universal Health Coverage. Prevention of preventable morbidity and mortality in a Primary Health Care setting should be upgraded through the provision of essential lifesaving treatments and safe transfer of patients to higher-level care services. This guideline briefly describes how to establish and improve those services in hospitals.

Emergency Unit setting in township hospitals

Location: The emergency unit should be at the front-line area of the hospital compound for easy access to the ambulance carrying a patient with an emergency health condition. The clear signage as EMERGENCY should be shown.

Design: Functional areas: (1) Resuscitation area (2) minor procedure room

Guidelines for patient referral and transfer services

Referral and transfer services are not included in the essential package, but arrangement and preparation should be done at township and station hospitals whenever a patient needs further treatment at higher-level hospitals.

List of Equipment and Medicine for emergency/lifesaving treatment

No.	Equipment
1.	Patient trolley
2.	Medicine trolley
3.	Equipment trolley
4.	Drip stands
5.	Spine board + head immobilizer
6.	Patient monitor
7.	ECG machine
8.	Defibrillator/AED
9.	Pulse oximeter
10.	Glucometer
11.	Nebulizer
12.	Minor surgical set
13.	Oxygen cylinders + flow meter (O_2 concentrator if supply is difficult)
14.	Suction machine
15.	Laryngoscope
16.	BP cuff and stethoscope
17.	Wooden fracture splints
18.	Bed sheet for pelvic binding
19.	Bag Valve Mask
20.	Oropharyngeal airway sets
21.	Endotracheal tubes
22.	IV cannula
23.	Infusion sets
24.	Urinary catheters
25.	Suction tips and tubes

No.	Medicine
1.	Inj; Adrenaline
2.	Inj: Atropine
3.	Inj: Antibiotics
4.	Inj: Analgesics

No.	Medicine
5.	Inj; Anesthetics (Local)
6.	Inj: Chlophenaraminemeleate
7.	IV fluids (N/S, D/S, R/L)

3.1. Cardiac Arrest

A sudden cardiac arrest requires immediate action for survival. Globally, American Heart Association Guidelines (Updated 2015) are used to save lives in a patient with cardiac arrest.

All health care workers need to be able to manage a patient in cardiac arrest. This means that they must have the ability to confirm the cardiac arrest and the undertaking of basic life support (BLS) until help arrives. As a medical doctor in a hospital, you are likely to form part of that 'help' and therefore need to be competent in the provision of Advanced Life Support (ALS). All the township and station level hospitals should be prepared to provide advanced life support care.

Basic Life Support (BLS)

- In a limited resource setting, BLS can restore the circulation until the patient gets advanced care in hospitals.

Advanced Cardiac Life Support (ACLS)

- The advanced care can be started at the hospital emergency unit by trained doctors and nurses. But in township and station hospitals, transferring patients who gain restoration of spontaneous circulation (ROSC) for post-arrest care is necessary.

Type of cardiac arrest

1. Witnessed Cardiac arrest (higher success rate)
2. Non-witnessed cardiac arrest

Diagnosis of cardiac arrest

Confirm cardiac arrest if a patient has

- No pulse
- No respiration or abnormal breathing
- No response (loss of consciousness)

Chain of Survival

The survival rate in cardiac arrest patient directly proportionate with

- Early recognition of cardiac arrest
- Early CPR
- Early defibrillation
- Post arrest care

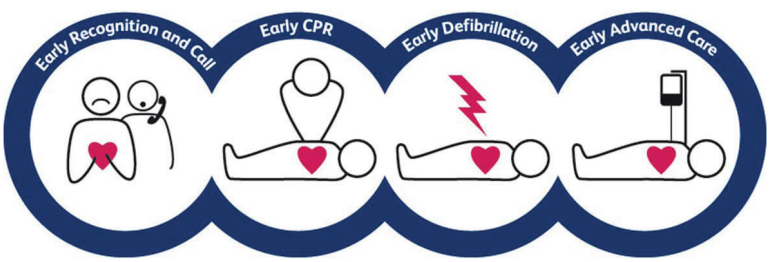


Figure 1: Chain of Survival

BLS Healthcare Provider

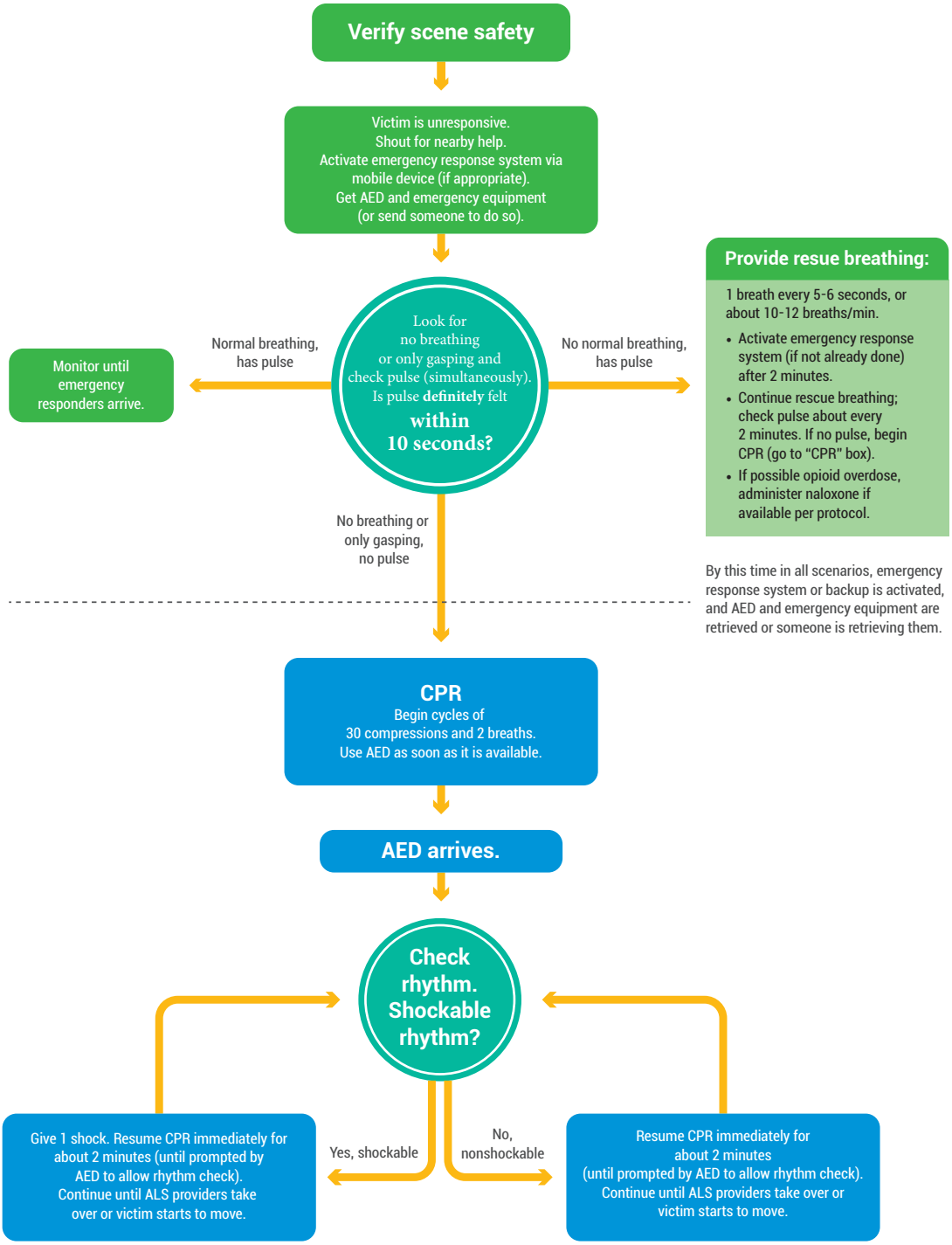


Figure 2: Adult Cardiac Arrest Algorithm – 2015 Update

Effective CPR

Ratio → 30 chest compression + 2 rescue breaths (30:2)

Rate → 100-120 compression per minute

Depth → 1/3 of chest diameter: Allow full chest recoil between compressions

Ventilation by Bag-Valve-Mask. Ensure oxygen sources connected in a hospital setting.

AED /defibrillation

Automated Electrical Defibrillator should be used as early as possible if available. For hospital settings with trained staff, a manual defibrillator is more compatible as it can be used as a monitor and for other purposes.

Advanced Cardiac Life Support in cardiac arrest (Asystole, VT/VF)

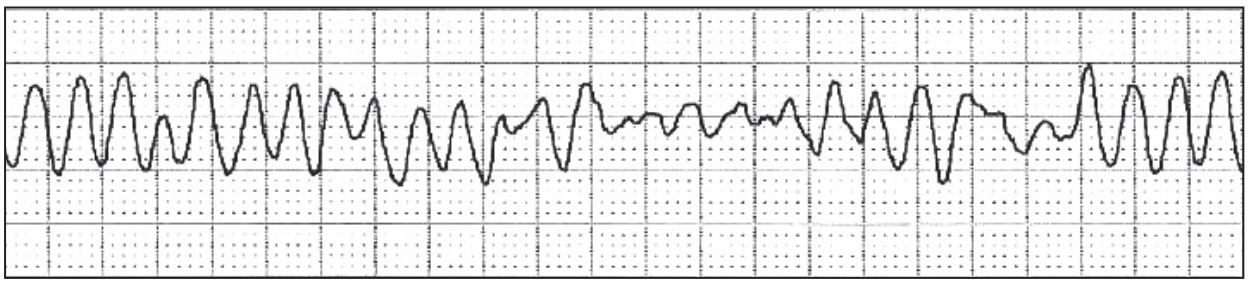
The use of defibrillation and IV adrenaline (epinephrine) is the key step in ACLS.

The rhythm of ECG on the defibrillator monitor is checked to decide defibrillation.

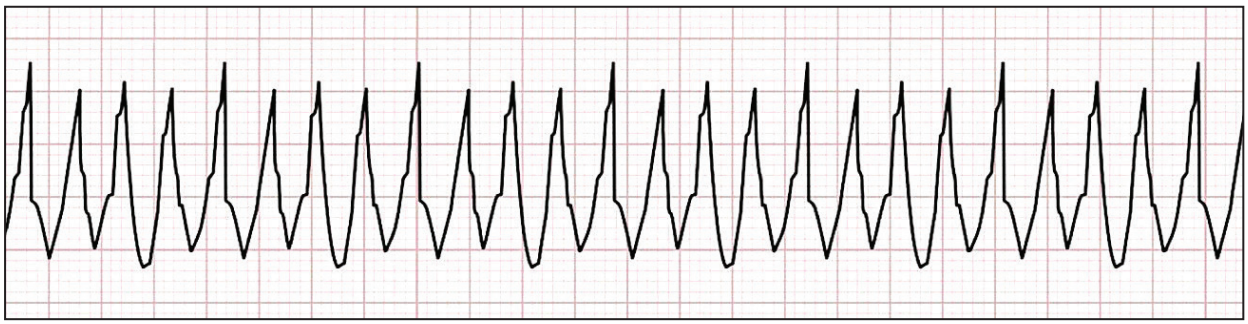
- Non-Shockable rhythm – Asystole and other rhythms.
- Shockable rhythms include Ventricular Fibrillation (VF) and Ventricular Tachycardia (VT).

Note:

ACLS management needs a team of hospital staff.



Ventricular Tachycardia (above picture)



Asystole (above picture)

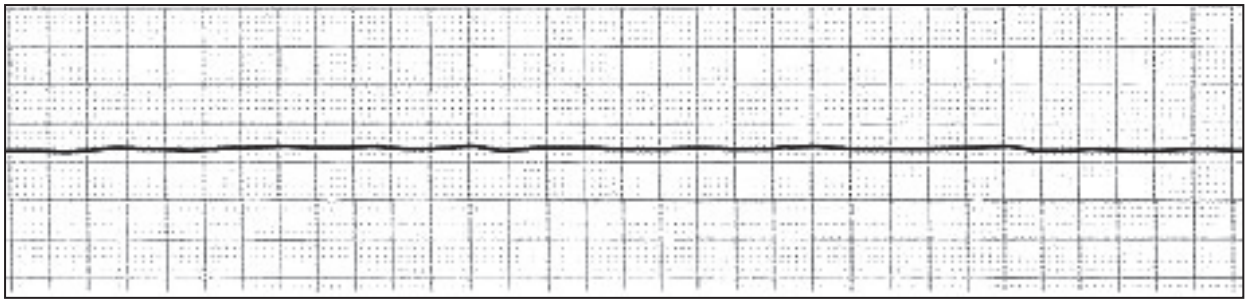
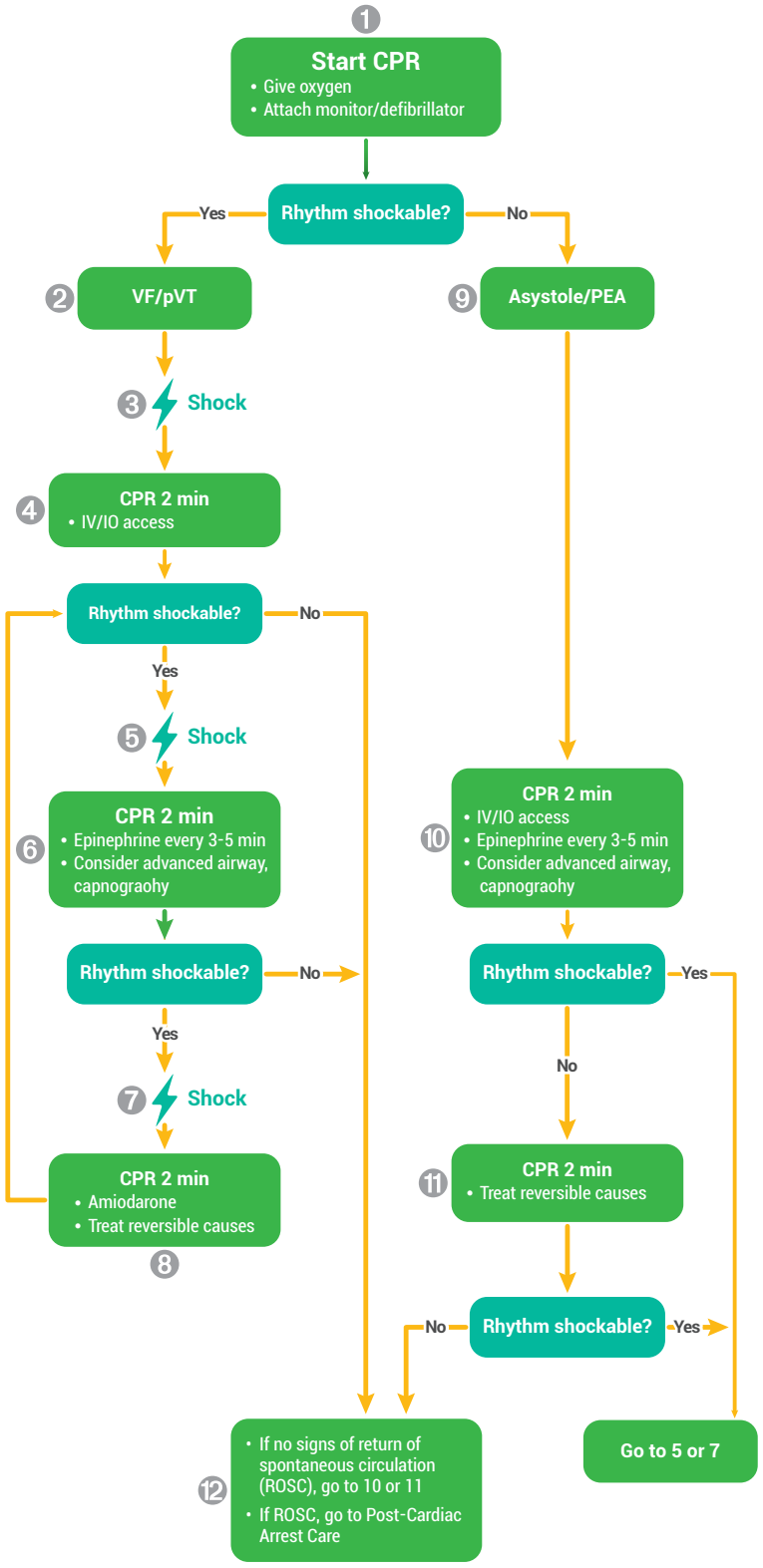


Figure 3: Ventricular Fibrillation, Ventricular Tachycardia, and Asystole Ventricular Fibrillation

Attempt defibrillation by giving one shock (150–200 J biphasic or 360 J monophasic). Immediately resume CPR (30:2). Continue CPR for two minutes then pause briefly to check the monitor for rhythm. If VF/VT persists, shock again. (follow the ACLS algorithm- see below)



CPR Quality

- Push hard {at least 2 inches [5 cm]) and fast {100-120/min} and allow fast complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Rotate compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression -ventilation ratio.
- Quantitative waveform capnography - If $PETCO_2$ <10 mm Hg, attempt to improve CPR quality.
- Intra-arterial pressure - If relaxation phase (dia-stolic) pressure <20 mm Hg, attempt to improve CPR quality.

Shock Energy for Defibrillation

- Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available, Second and equivalent, and higher closes may be considered.
- Monophasic: 360 J

Drug Theraphy

- Epinephrine IV/IO dose: 1 mg every 3-5 minutes
- Amiodarone IV/IO dose: First dose: 300 mg bolus. Second dose: 150 mg.

Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Wave capnography or capnometry to comfirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breath/min) with continuous chest compressions.

Return of Spontaneous Circulation(ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in PETCO2 (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneuothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

Figure 4: Adult Cardiac Arrest Algorithm – 2015 Update

Drugs used in ACLS

IV access should be done at the start of CPR by other staff for the administration of drugs used in ACLS and fluid resuscitation.

Adrenaline 1 mg IV at every 2-3 minutes during CPR until ROSC regains.

Amiodarone 300 mg IV in the first dose and 150 mg IV in further doses if available.

Advanced Airway

Advanced airway (ETT) should be considered after 2-3 cycles of CPR. Ventilation by Bag Valve Mask (BVM) through ETT can be continuous during CPR every 5-6 seconds.

Treatment of reversible causes

It is important to treat the reversible causes of cardiac arrest. Diagnosis of the possible cause of arrest should be done during life support procedures. Survival rate increases with the correction of causes of arrest.

Table 1: Causes of Cardiac Arrest and Treatment

Medical Condition	Treatment
Hypoxia	Oxygen therapy
Hypovolemia	Fluid resuscitation
Hypothermia	Warming
Hypo/Hyperkalemia	Treatment of Hypo/Hyperkalemia and referral
Tension pneumothorax	Immediate decompression
Toxin	Treatment of intoxication
Thrombosis: coronary and pulmonary	Rapid transfer to higher-level care
Thrombosis: coronary and pulmonary	Rapid transfer to higher-level care

Post arrest Care and transfer to higher-level care

When a pulse or heart rate and blood pressure on a monitor, the patient regains the restoration of spontaneous circulation. Many of the cases still need breathing support. Post arrest care needs proper facilities which may be difficult to arrange in township and station hospital level. But the patient should be transferred to ICU care in the higher-level hospital quickly. The trained providers (nurse or doctor) and facilities to treat the next arrest along transport should be available.

Remarks

The training programs for medical doctors and nurses of township and station hospitals include; Basic Life Support and use of AED, ACLS, Use of the defibrillator, Basic and Advanced airway management

List of Equipment and Medicine

No.	Equipment
1.	Patient trolley
2.	Medicine trolley
3.	Oxygen cylinders + flow meter
4.	Drip stands
5.	Endotracheal tubes
6.	Patient monitor
7.	ECG machine
8.	Pulse oximeter
9.	Bag-Valve-Mask
10.	Defibrillator/AED
11.	BP cuff and stethoscope
12.	IV cannula
13.	Infusion sets

No.	Medicine
1.	Inj; Adrenaline
2.	Inj: Amiodarone
3.	Inj: Epinephrine
4.	IV fluids

3.2. Shock

Justification for EPHS

The shock caused by different etiologies is the commonest presentation of a patient with life-threatening conditions. Systematic approach and management can save lives and initial management should be available in all basic health centers and a safe referral system to advanced further care should be arranged. Almost all patients with profound shock need close monitoring.

Definition

Shock is a clinical condition characterized by failure to adequately perfuse and oxygenate vital organs.

Clinical signs of shock

1. Hypotension – Systolic blood pressure < 90 mmHg
2. Tachycardia – heart rate > 100 / min
3. Altered consciousness and / or fainting
   a. Poor peripheral perfusion
   b. Cool peripheries
   c. Clammy/sweaty skin
   d. Pallor
   e. Reduce capillary return
   f. Warm peripheries in the early phase of septic shock
4. Oliguria - urine output < 50 ml/hr. in adult
5. Tachypnoea

Classification/ Causes of shock

1. Pump failure
   a. Cardiogenic shock: myocardial infarct, arrhythmias, valve dysfunction, myocarditis
   b. Secondary: pulmonary embolism, tension pneumothorax, cardiac tamponade
2. Peripheral circulatory failure
   a. Hypovolemia
      i. Bleeding
      ii. Fluid loss
      iii. Heat exhaustion
   b. Anaphylaxis
   c. Sepsis
   d. Neurogenic
   e. Endocrine failure: Addison's disease or hypothyroidism
   f. Iatrogenic: drugs, eg: antihypertensive, anesthetics

Primary management of shock patient

General management

- Assessment and resuscitation simultaneously
- ABC (airway, breathing, circulation) are priorities
- High flow oxygen by mask
- Adequate IV access and take blood samples (FBC, glucose) depending on facilities available in township and station level.
- Monitor vital signs (BP, PR, RR, SpO_2)
- Monitor ECG, take 12 lead ECG and chest X-Ray (If available)
- Urinary catheterization and monitor urine output hourly
- Control any external bleeding by applying pressure to the wound
- IV crystalloids 0.9% saline infusion 20 ml/kg as a bolus for shock associated with reducing effective circulating blood volume
- Look for and treat specifically the causes of shock

Specific management

Anaphylactic shock

- Stop further administration of suspected agents (eg: drugs)
- Give 100% oxygen
- Open and maintain airway: if upper airway oedema is present, get senior help immediately. Emergency intubation or surgical airway may be required
- Give 0.5mg adrenaline intramuscular (IM) (0.5 ml of 1:1000 solution), repeat after 5 min if there is no improvement
- In profound shock or immediately life-threatening situations such as cardiac arrest, follow the cardiac arrest guidelines
- IV fluid 1-2 L 0.9% saline if hypotension does not respond to adrenaline rapidly
- Antihistamine H1 blocker: Chlorpheniramine 10-20 mg slow IV
- H2 blockers: Ranitidine 50 mg IV
- IV hydrocortisone 100-200 mg slow IV
- Admit/observe for at least 4-6 hours after all symptoms have settled

Septic shock

Septic patients have a systemic inflammatory response syndrome (SIRS) as a consequence of infection.

SIRS:

This requires 2 or more of

1. Body temperature of > 38°C or < 36°C
2. Heart rate > 90 / min
3. Respiratory rate > 20 breaths /min or $PaCO_2$ < 4.3 kPa
4. WCC >12x10^9/L or < 4x10^9/ L or > 10% immature forms

Severe Sepsis:
Septic patients with evidence of organ hypoperfusion.

Septic Shock:
Septic patients with hypotension unresponsive to intravenous fluid resuscitation.

Management of Septic Shock

1. Give high flow oxygen
2. IV access and take blood samples and send for investigations.
3. Initial fluid resuscitation of 20 ml/kg of 0.9% normal saline
4. Look for the obvious source of infection
5. Give IV antibiotics
   a. The choice of antibiotics depends on the cause and local policies
   b. IV Ceftriaxone for meningococcal infection
   c. Combination therapy is required if there is no obvious source (eg: Amoxi-cillin/clavulanic acid + gentamycin + metronidazole)
6. Inotrope support: IV infusion Noradrenaline 0.5 – 20 mcg / min
7. Early referral to the hospital with the higher-level hospital.

Cardiogenic shock

It occurs when there is insufficient cardiac output to meet the metabolic demands of the tissues.

The most common causes:
AMI (extensive), impairs right ventricular contractility, mechanical dysfunction (valvular disease, pulmonary embolism, cardiac tamponade, myocardial contusion), cardiotoxic drugs.

Clinical Features

- Hypotension, tachycardia, cool mottled skin, oliguria, altered mental state.
- LV failure presents with evidence of pulmonary edema, tachypnea, rales, wheezing, frothy sputum.
- Jugular venous distension in RV failure due to infarction, tamponade, or pulmonary embolism.
- A cardiac murmur in acute valvular dysfunction or septal defects.

Diagnosis

To differentiate cardiogenic shock from shock due to hypovolemia or distributive causes is difficult in township and station hospital-level facilities.

Investigations

1. ECG: Arrhythmia, ischemia or infarction, electrolyte abnormalities, or drug toxicity
2. Chest X-ray: pulmonary edema, widen mediastinum, abnormal cardiac shadow, etc.

Emergency care and disposition

Airway management, circulatory stabilization, and arrangements for definitive cardiac care must be done simultaneously.

Early consultation with a specialist physician is essential

1. Supplemental oxygen
2. Temporary ventilatory support by Bag Valve Mask and endotracheal intubation should be considered as necessary
3. IV access for mild hypotension without pulmonary congestion, a small fluid challenge 250 to 500 ml may be considered
4. Consider Inotrope support
   a. Dobutamine 2.5 -20 mcg/kg/min for mild to moderate hypotension
   b. Dopamine 2.5-20 mcg/kg/min may be added and titrated to the desired effect with the lowest dose possible
   c. Norepinephrine infusion 2 mcg / min and titrated for severe hypotension
   d. Do not give beta-blockers in cardiogenic shock
5. Arrange for safe transfer to a higher-level hospital

Hypovolemic shock

The normal total circulating volume of an adult is approximately 70% of the ideal body weight. Loss of circulating blood volume from any cause leads to a decrease in arterial blood pressure, venous return, and ventricular stroke volume. Acute haemorrhage after a traumatic injury carries a mortality rate of 30-40%. The initial goals of therapy are control of bleeding and intravascular volume resuscitation.

Causes of intravascular volume loss

Haemorrhagic hypovolemia

Causes			
Thorax	**Abdomen/ Pelvic/ Retroperitoneum**	**Orthopedic**	**Extremity and skin surface**
Pulmonary parenchyma trauma	Solid-organ injuries (liver, spleen, kidney)	Pelvic fracture	Major vascular injuries
Pulmonary vascular injury	Vascular (trauma, aneurysmal rupture)	Large bone fracture	Large soft tissue injuries
Intercostal vascular injury	GI haemorrhage (oesophageal varices, ulcers, vascular anomalies, etc.)	Multiple fractures	
Aortic disruption	Gynecologic disorders (rupture ectopic pregnancy, peripartum haemorrhage, abnormal uterine bleeding, ovarian cyst rupture, etc.)		
Massive hemoptysis			

Non-hemorrhagic hypovolemia

Causes
GI disorders: vomiting, Diarrhoea, ascites, third space loss (perforation, pancreatitis, etc.)
Burns
Environmental exposure or neglect
Renal salt wasting

Clinical features of hypovolemic shock

1. The clinical appearance of the patient with acute circulating volume loss depends upon
   a. the cause, rate, volume, and duration of bleeding
   b. the presence of other acute disorders
   c. the effects of current medications
   d. the patient's baseline physiologic status
2. The source of bleeding in the trauma patient is usually obvious.
3. Signs of hemodynamic response to acute haemorrhage: tachycardia, hypotension
4. Signs of poor peripheral perfusion: cool, pale, clammy extremities, weak peripheral pulses, and prolonged capillary refill
5. Narrowing of pulse pressure due to arterial and venous vasoconstriction
6. Alter mental status due to cerebral hypoperfusion
7. Associated head injury or intoxication can mask signs of cerebral hypoperfusion
8. Patients with excellent baseline physiologic status (eg: young athletes) may appear stable and not have tachycardia or hypotension even with significant haemorrhage

9. Elderly patients may not have a tachycardic response to blood or fluid loss due to underlying heart disease or medications such as beta-blockers
10. Bradycardia or lack of tachycardia may occur in about 30% of patients with intra-abdominal haemorrhage from the increased vagal tone in response to hemoperitoneum
11. In pregnant trauma patient, compression of the inferior vena cava by the gravid uterus can decrease central venous return and worsen hypotension and tachycardia in the setting of less severe haemorrhage
12. Reduced urine output due to renal hypoperfusion and compensatory fluid reabsorption
13. Hypotension in the setting of trauma does not always indicate haemorrhage.
14. Other life-threatening conditions, such as primary myocardial dysfunction, airway compromise, hypoxemia due to lung injury, pericardial tamponade, tension pneumothorax, spinal cord injury, and toxicological syndrome, should be kept in mind
15. However, hypotension always warrants a careful search for occult haemorrhage.

Management of hypovolemic shock

1. Airway control, ventilation, and oxygenation
   a. Intubate and ventilate if spontaneous ventilation is not adequate
   b. Quickly treat immediately life-threatening injuries such as tension pneumothorax, massive hemothorax, foreign body in the airway
   c. Give oxygen 100% by mask at flow rate 10-15 L/min
2. Vascular access and monitoring, investigations
   a. 2 or more IV access with large bore cannula in peripheral lines
   b. Get blood samples for investigations, grouping and matching, measure glucose
   c. Continuous ECG heart rate monitoring, pulse oximetry, blood pressure, mental status, and peripheral perfusion status (capillary refill time)
   d. Imaging: chest X-ray, abdominal and pelvic X-ray, ultrasound, etc: to identify the source of fluid loss (if not available prepare to transfer to the facilities)
3. Fluid resuscitation
   a. Isotonic crystalloid solution: initial bolus 1-2 L normal saline, assess the response, then give second bolus 1-2 L
   b. If the hemodynamic status is not stabilized after the second bolus, the blood loss exceeds 15 % to 20% of total blood volume or there is significant ongoing blood loss or both
   c. Control the external blood loss if any, by applying pressure packing or suturing
4. Blood transfusion
   a. The trauma patient still in shock with minimal hemodynamic improvementafter 2-3 L of crystalloid infusion needs a blood transfusion
   b. When possible, type and cross-matched blood is preferable
   c. If a patient's clinical status does not permit full cross-matching, type-specific blood is the next option, followed by type O negative blood
   d. Whole blood or packed RBC preparation can be transfused

5. Correct the cause of shock

   a. Identify and control the source of haemorrhage

   b. Early consultation with a trauma team or surgeons since initial stabilization and resuscitation is essential.

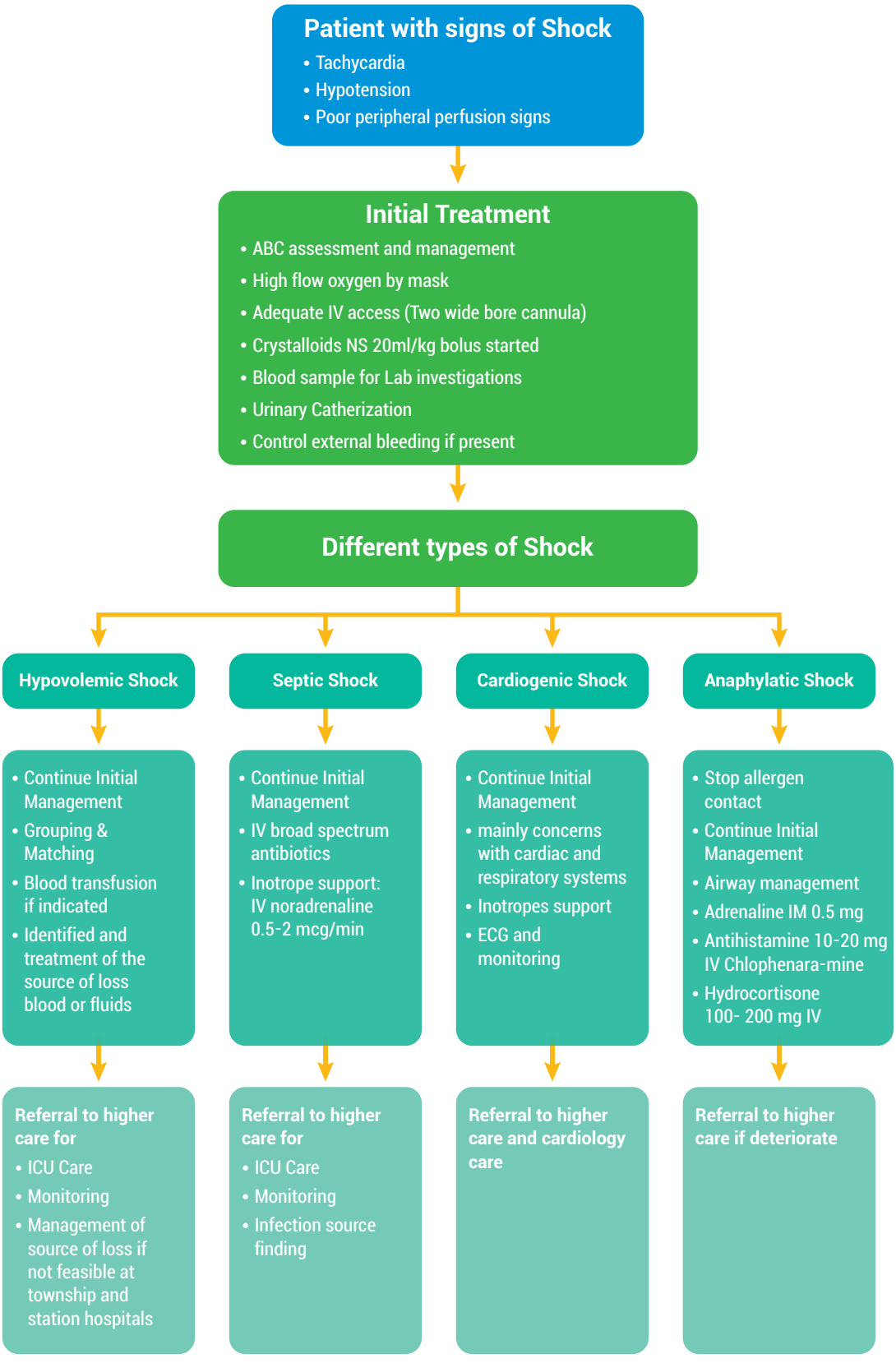


Figure 5: Management of Shock

List of Equipment and Medicine

No.	Equipment
1.	Patient trolley
2.	Medicine trolley
3.	Oxygen cylinders + flow meter
4.	Drip stands
5.	Endotracheal tubes
6.	Patient monitor
7.	ECG machine
8.	Pulse oximeter
9.	Bag-Valve-Mask
10.	Defibrillator/AED
11.	BP cuff and stethoscope
12.	IV cannulae
13.	Infusion sets
14.	Chest X-Ray
15.	Catheter
16.	Large bore cannula

No.	Medicine
1.	Inj; Adrenaline
2.	Inj: Amiodarone
3.	Inj: Epinephrine
4.	IV Crystalloids 0.9% saline
5.	IV Chlorphenamine
6.	IV Ranitidine
7.	Inj: Hydrocortisone
8.	IV Antibiotics; Ceftriaxone, Amoxicillin/ clavulanic acid + gentamycin + metronidazole
9.	IV Noradrenaline
10.	IV Dobutamine, Dopamine

3.2.1. Oxygen Therapy

The primary goal of oxygen therapy is to prevent or correct hypoxemia or tissue hypoxia.

Oxygen therapy:
is a means to provide oxygen according to target saturation rates to achieve normal or near-normal oxygen saturation levels for acute and chronically ill patients.

The target range
(SaO_2) for a normal adult is 92% to 98%. For patients with COPD, the target SaO_2 range is 88% to 92%.

Indications for oxygen therapy

1. Patients with clinically suspected hypoxemia or hypoxia based on a medical history and physical examination
2. Patients with shock, myocardial infarction, cardiogenic pulmonary edema, acute lung injury, ARDS, pulmonary fibrosis, cyanide poisoning or carbon monoxide inhalation
3. Patients during the perioperative period
4. Adults, children, and infants (older than 1 month) when SaO_2 or SpO_2 is less than 90% while at rest breathing room air
5. In neonates, oxygen therapy is recommended if SaO_2 is less than 88%

The contraindications:
There are no contraindications to oxygen therapy if indications for therapy are present.

General Guideline for oxygen therapy

1. Complete respiratory assessment for hypoxia. The goal is to use the least amount of oxygen to maintain levels between SPO_2 92% and 98%.
2. Choose an oxygen delivery system based on a patient's requirements. (Low flow/ High flow) Selection of a delivery system is based on
   - the level of oxygen support required (controlled or non-controlled)
   - the severity of hypoxia and
   - disease processes.

   Other factors include age, presence of underlying disease (COPD), level of health, presence of an artificial airway, and environment (home or hospital).
3. Once oxygen is applied, reassess patient in 5 minutes to determine the effects on the body. If required, adjust O_2 levels. Consider changing the O_2 delivery device if O_2 saturation levels are not maintained in the target range.
4. The underlying cause of hypoxia must be treated to obtain the target O_2 concentration. Other supportive treatments like positioning patient, suctioning, deep breathing and coughing exercises, balanced fluid intake can improve oxygenation.
5. If hypoxia continues, the patient is transferred to specialty consultation and higher-level care at district or tertiary hospitals

Table 2: Oxygen delivery systems

Oxygen is delivered by (1) Low flow system and (2) High flow system.

Equipment	Uses
A nasal cannula (Nasal prongs) 	Used for short- or long-term therapy for a patient who needs a low flow **Advantages:** • Easy to use, low cost, and disposable. • It can provide 24% to 40% O_2 concentration. • The most common type of oxygen equipment. • Can deliver O_2 at 1 to 6 liters per minute (L/min). • It is convenient as a patient can talk and eat while receiving oxygen. May be drying to nares if a level is above 4 L/min. **Limitations:** Easily dislodged, not as effective is a patient is a mouth breather or has blocked nostrils or a deviated septum or polyps. May be drying to nares if a level is above 4 L/min.

Equipment	Uses
Simple Face Mask 	Low flow system **Advantages:** Can provide 40% to 60% O_2 concentration. Flowmeter should be set to deliver O_2 at 6 to 10 L/min. Used to provide moderate oxygen concentrations. Efficiency depends on how well the mask fits and the patient's respiratory demands. Readily available on most hospital units. It provides higher oxygen for patients. **Disadvantages:** Difficult to eat with a mask on. Mask may be confining for some patients, who may feel claustrophobic with the mask on.
Non-Rebreather Mask 	High flow system **Advantages:** With a good fit, the mask can deliver between 60% and 80% FiO_2 (fraction of inspired oxygen). The flow meter should be set to deliver O_2 at 10 to 15 L/min. The flow rate must be high enough to ensure that the reservoir bag remains partially inflated during inspiration. **Disadvantages:** These masks have a risk of suffocation if the gas flow is interrupted. The bag should never totally deflate. The patient should never be left alone unless the one-way valves on the exhalation ports are removed The mask will interfere with talking and eating.
Partial rebreather mask 	High Flow System **Advantages:** Can deliver 10 to 12 L/min for an O_2 concentration of 80% to 90%. Used short term for patients who require high levels of oxygen. **Disadvantages:** The partial re-breather bag has no one-way valves, so the expired air mixes with the inhaled air. The mask may be hot and confining for the patient and will interfere with eating and talking.

Equipment	Uses
Venturi Mask 	High flow system **Advantages:** The system can provide 24% to 60% O_2 at 4 to 12 L/min. Delivers a more precise level of oxygen by controlling the specific amounts of oxygen delivered. The port on the corrugated tubing (base of the mask) sets the oxygen concentration. Delivers humidified oxygen for patient comfort. It does not dry mucous membranes. **Disadvantages:** The mask may be hot and confining for some patients, and it interferes with talking and eating. Need a properly fitting mask. Nurses may be asked to set up a high-flow system. In other instances, respiratory therapists may be responsible for regulating and monitoring the high-flow systems.

List of Equipment and Medicine

No.	Equipment
1.	Oxygen cylinders + flow meter
2.	Pulse oximeter
3.	A nasal cannula (Nasal prongs)
4.	Simple Face Mask
5.	Non-Rebreather Mask
6.	Partial rebreather mask
7.	Venturi Mask

No.	Medicine
1.	Nil

3.2.2. Venous Cut Down

It is a procedure in which venous access may be rapidly obtained by cutting through skin and soft tissue exposing a peripheral vein and cannulating it.

Indication:
In shock patient with other peripheral venous accesses are failed.

It is more convenient if ready-made cut down sets are supplied.

Technique:
In a supine position, the Saphenous vein of the ankle can be accessed.

Saphenous vein approach

1. Incision transverse skin incision is made~2 cm anterior and superior to the medial malleolus after skin preparation and infiltration with lignocaine.
2. Subcutaneous tissue is opened by sharp or blunt dissection on either side of the vein (Locate subcutaneously and approximately 3-5 mm in diameter) and then isolate and mobilize the vein,
3. Pass two ligatures beneath the vein. Tie distal ligature.
4. Incise the vein with the No.10 scale while retracting the proximal ligature.
5. Advance plastic cannula into the vein.
6. Tie the proximal silk suture around the vein and catheter.
7. Suture the cannula to the skin at the existing point. Suture skin. Confirm patency.
8. Sterile gauze dressing was applied.

List of Equipment and Medicine

No.	Equipment
1.	No.10 scale
2.	No.2/0 silk suture with cutting needle
3.	18G Canula
4.	5 cc syringe
5.	Dressing tray
6.	Feeding tube (No:4,5,6) or canula
7.	Curved Haemostat
8.	Surgical gloves

No.	Medicine
1.	2% Lignocaine

Note

It is more convenient if ready-made cut down sets are supplied.

3.3. Seriously Injured Patient

Definition

Seriously injured patients are patients with life-threatening injuries either multiple injuries (e.g., bilateral femoral fractures, chest injury and head injury, major burns) or single lethal injury (e.g., Severe isolated head injury, stab wound heart or major vessels). In some cases, individual injury is not serious but a combination of multiple minor or moderate injuries make physiological deterioration leading to death.

Mechanism of injury should be considered for assessing superiority. The patients sustain the following mechanisms are always serious.

- Fall from height more than 15 feet
- Pedestrian hit by a car at 20 km per hour
- Car to car collision at more than 30 km per hour
- Thrown out or run over by a car

Management Guidelines

The management of trauma patients should start at the scene of an accident and during transport by the Prehospital team. In the regions where pre-hospital EMS (ambulance) services are not available, the management is usually started at the hospital.

When a seriously injured patient is received, life-threatening problems should be identified first through the ABCDE approach and simultaneously resuscitation is done.

Ideally, find out what is killing the patient and treat instantly what is killing the patient. The primary survey should be completed within 5 minutes.

Primary Survey and Resuscitation

For individual procedures in detailed steps are described in later chapters.

A → Airway and cervical spine control

Assess clear and protect airway by

- Simple procedure – jaw thrust, suctioning
- Put oropharyngeal or nasopharyngeal airway
- Insert endotracheal tube if indicated

  Consider surgical airway (needle cricothyroidotomy or surgical cricothyroidotomy) in failed intubation.
- Stabilize the neck and put-on hard trauma cervical collar to protect the spine.

B → Breathing and oxygenation

Give 100% high flow oxygen with a mask. Assist ventilation if needed.

Assess breathing problems- chest expansion, tracheal deviation, chest wounds, abnormal chest wall movement, air entry to lungs, percussion notes of the chest, surgical emphysema to exclude pneumothorax, hemothorax, or combined.

Identify tension pneumothorax and immediate needle decompression at second intercostals space at the midclavicular line by a wide-bore needle. Prepare for a proper chest tube drain later.

C → Circulation and control of bleeding

Assess clinically on blood volume status by pulse rate, blood pressure, capillary refill time. If the patient is in shock, it is a mainly hypovolemic hemorrhagic shock in a trauma patient. Place two large bore (18-16 G) IV line and start a rapid infusion of fluid bolus (20 ml /Kg or 1-2 Liter of crystalloid –Normal Saline or Ringer Lactate). Stop external bleeding wounds by applying direct pressure on the wound and pressure bandaging. (Applying tourniquet is not indicated)

Haemorrhage from pelvic fractures is often controlled by the application of pelvic binder.

Reassess the response of fluid resuscitation, if no response to first fluid bolus, try the second dose of bolus fluid. Then consider matched blood transfusion.

D → Disability

Perform neurological assessment Pupil size and reaction to light.

AVPU in prehospital setting Glasgow Coma Scale (GCS) – if GCS is less than 8, there is a risk of airway obstruction for that endotracheal intubation is indicated.

E → Exposure

Log roll patient while maintaining neck stabilization in line neutral position to inspect the Spine, back, flank, buttock, and also per rectal examination if necessary.

Secondary Survey

Start a Secondary survey when the patient is stable after resuscitation. It is to examine the patient head to toe for the rapid identification of injuries in different regions. During the secondary survey and treatment, if the patient becomes unstable, always go back to a primary survey to restart the ABCDE approach. Systematic examination starts from the head, neck, chest, abdomen, pelvis, and limbs. Any wounds, fractures, and dislocations are identified and managed.

Initial Treatments

Wound Management	All open wounds should be clean and wash with a copious amount of distilled water or Normal Saline under analgesia and covered with proper dressings. Fractures and dislocations should be well immobilized with available splinting devices.
Analgesia in a trauma patient	Adequate pain relief is often forgotten or deferred. Providing Morphine IV diluted in saline to 1mg/ml is with antiemetic is an ideal analgesic. Nerve blocks, immobilization, or splintage of fractures also reduce pain.
Tetanus prophylaxis and antibiotics	In any patient with wounds, consider tetanus prophylaxis. Give prophylactic IV antibiotics for open fractures and penetrating wounds. Choice of antibiotics follows local guidelines or broad- spectrum one, Cephalosporins and flucloxacillin are a better choice in a patient with multiple wounds.
X Rays	Multiple injured patients often requires multiple X rays depending on the parts of the body injured. In hemodynamically unstable patient and unconscious patient, three essential X rays include • Cervical spine X rays (Lateral view) • Chest X rays (PA) • Pelvic X rays (AP) If the facilities are not available or the patient needs early definitive care, do not delay the referral by taking X-rays.

Definitive Care

Seriously injured patients need definitive care by specialists like surgeons, orthopedic surgeons, or Intensive Care. Referral to higher-level hospitals should be arranged and the patient should be transported when vital signs are stable enough to refer.

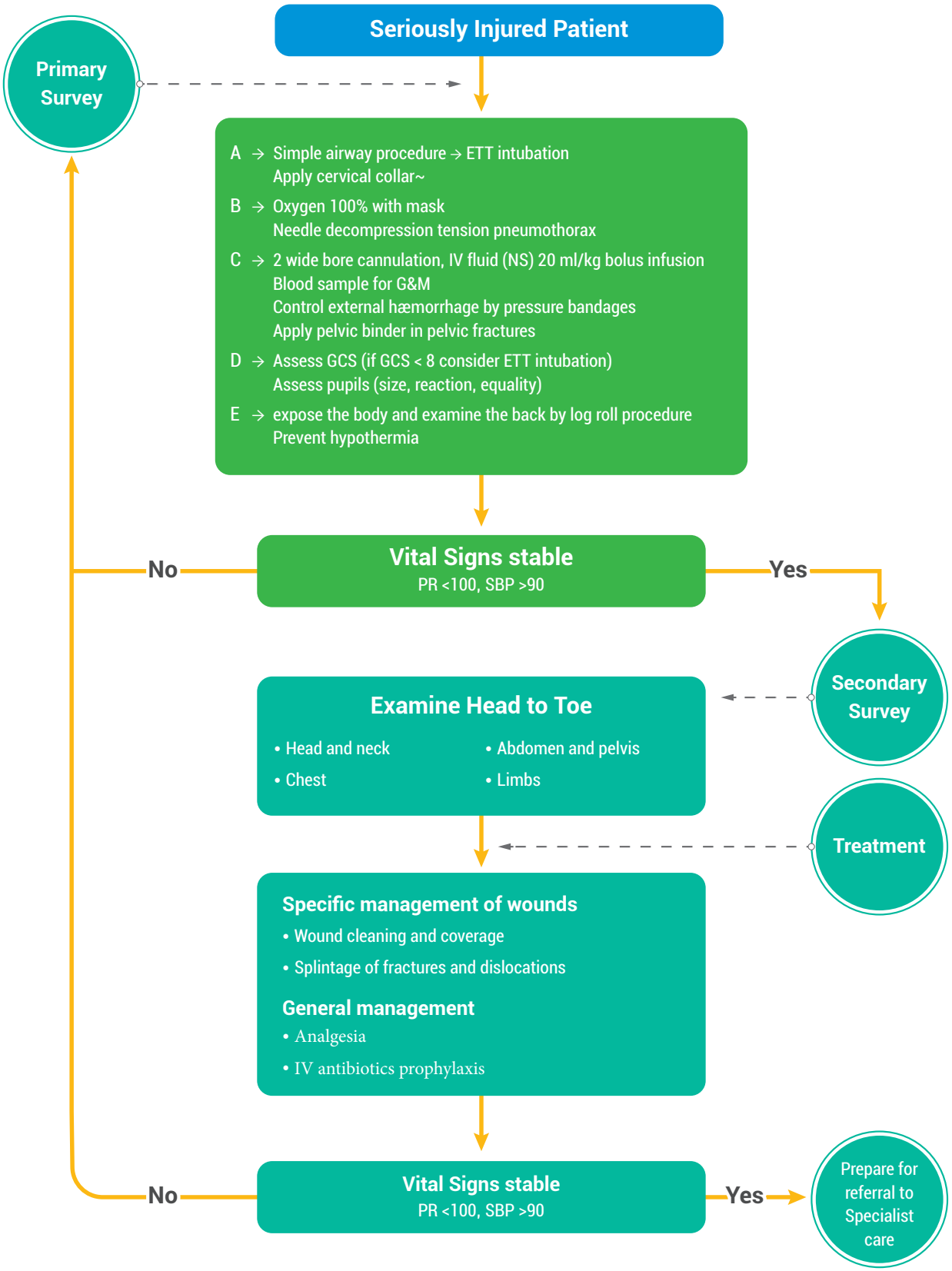


Figure 6: Management Guidelines for Seriously Injured Patients at Township and Station Hospitals.

List of Equipment and Medicine

No.	Equipment
1.	100 % Oxygen with Face Mask
2.	Cervical collar
3.	Bag-Valve-Mask
4.	Oropharyngeal airway sets
5.	Endotracheal tubes
6.	X rays
7.	Wide bore cannulation
8.	Catheter

No.	Medicine
1.	IV Crystalloids–Normal Saline, Ringer Lactate
2.	Analgesia; IV Morphine with antiemetic
3.	IV Antibiotics; Cephalosporins and flucloxacillin

3.3.1. Emergency Chest Tube Insertion

Indications

1. Pneumothorax
2. Haemothorax
3. Traumatic haemo-pneumothorax
4. Empyema thoracic
5. Massive pleural effusion

Diagnosis:

History, Examination

Clinical features:

Acute dyspnea
Unilateral chest pain
Trachea shift to the opposite side
Reduced breath sound
Reduced chest movement
Hyperresonance on percussion on the affected side

Chest X-Ray

Features of Pneumothorax, etc.

Preparation

- Explain the procedure to the patient.
- Check the side on X-ray and sign a consent form
- Ensure continual monitoring of pulse oximetry
- If feasible, position the patient at 45° with the arm abducted

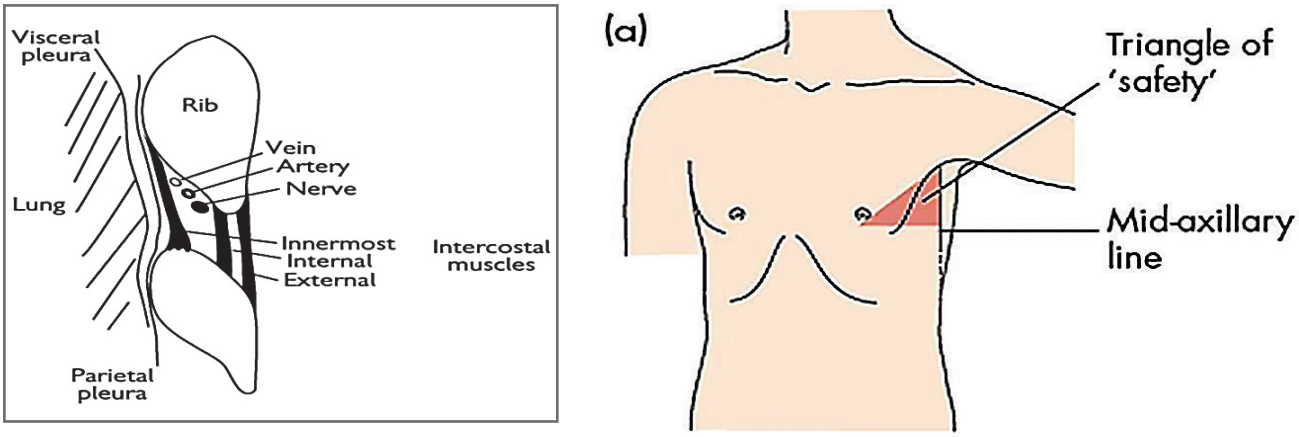


Figure 7: Anatomy of the Intercostal Space

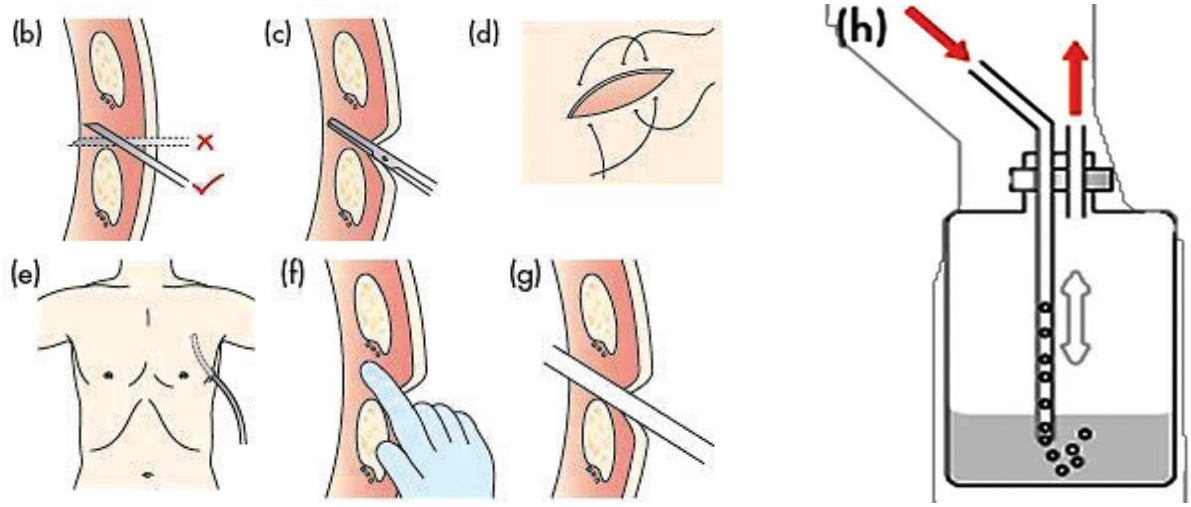


Figure 8: Insertion of Chest Drain:

(a) Triangle of Safety;

(b) Penetration of the Skin, Muscle and Pleura;

(c) Blunt Dissection of the Parietal Pleura;

(d) Suture Placement;

(e) Gauging the Distance of Insertion;

(f) Digital Examination along the Tract into the Pleural Space;

(g) Withdrawal of Central Trochar and Positioning of Drain;

(h) Underwater Seal Chest Drain Bottle.

Technique

1. The usual insertion site is the 5th intercostal space in the mid-axillary line.
2. It may extend anteriorly to the anterior axillary line.
3. Prepare and drape the skin, gown, and glove.
4. Infiltrate site for tube insertion with a local anesthetic, ensuring anesthesia at all layers down to and including parietal pleura and the periosteum of the ribs posterior to the line of the incision.
5. A 2 cm transverse skin incision is made, and the intercostal space (see Figure 8) is dissected bluntly.
6. Firmly and carefully pass a blunt-ended clamp over the lower rib through the pleura (you will feel a POP as the tissue gives) and spread to widen the hole.
7. Place a finger into the pleural space to ensure there are no adhesions.
8. Pass a chest tube into the pleural space, guiding it superiorly for a pneumothorax and basally for a haemothorax.
9. Secure the drain with at least one strong suture and connect immediately to an underwater seal bottle.

Tips and pitfalls

1. Misplacement: Subcutaneous (more common in obese patients), intraparenchymal; always check for an air leak on coughing and a swing to confirm that the chest tube is in the pleural space, particularly if no effusion draining.
2. Trauma to other structures (diaphragm, spleen, liver, heart, aorta, lung parenchyma, intercostal arteries).
3. Entry sites too low (a common mistake, remember you are much less likely to cause damage if you are too high than if you are too low), too posterior or trocar used instead of blunt dissection.
4. Stay on the top of the lower rib to avoid injuring the intercostal artery and causing a haemothorax.
5. Surgical emphysema: Implies there is a massive air leak not being drain effectively by the chest tube. Is the tube blocked, kinked, pulled out so that holes are communicating with skin, in too far so that it is wedged in a fissure, in the subcutaneous tissue rather than the pleura?
6. Wound infection, empyema.
7. Pain

List of Equipment and Medicine

No.	Equipment
1.	Intercostal drain • 28 FG for pneumothorax • 32 FG for empyema thoracic, haemothorax
2.	Underwater seal containing water to up to mark
3.	Connection tubing
4.	Roberts or other instruments for blunt dissection
5.	Line clamp
6.	No '0' silk on a large handheld needle
7.	10 cc syringe and 18 G Cannula
8.	11-blade scalpel
9.	Sterile drape, gloves and gown, gauze swabs

No.	Medicine
1.	20 mL 1% lidocaine
2.	20 mL saline
3.	Solutions for skin preparation

3.3.2. Suprapubic cystostomy procedure

This refers to the placement of the drainage tube into the urinary bladder just above the pubic symphysis. Suprapubic catheterization is indicated in both emergency and elective settings.

Indications

- For acute urinary retention when urethral catheterization is not feasible (urogenital trauma, BPH, false urethral tract, urethral stricture, bladder neck contracture, genital malignancy)
- Urethral injury with AROU

Contraindications

- The percutaneous approach is contraindicated in non-distended bladder and bladder malignancy
- Skin infection, coagulopathy, osteomyelitis of the pubic, fracture of the symphysis pubis
- With caution - Old scar in lower abdomen with possible intestinal adhesion

Preparation

- Prepare the patient's abdomen in the supine position
- Place the drapes to ensure that the midline of the abdomen is identified.

Technique

- Locate the site for insertion, two fingers breadth above the pubic symphysis in the midline.
- Infuse the local anesthetic into the skin and the subcutaneous tissues.
- Continue to advance the needle through all the layers of the anterior abdominal wall until urine is aspirated.
- The introduction of a suprapubic catheter can only be safely performed following the aspiration of urine.
- Place a 1-cm incision at the site of injection using a blade and deepen it through the subcutaneous fat.
- Trocar and cannula method
- If using a blind trocar, push the trocar in its sheath through the skin incision angle at 90 degrees to the skin. Apply with rotational movements as you advance the trocar. A sudden loss of resistance will indicate penetration of the rectus sheath. This does not indicate access to the bladder. The trocar will need to be advanced further to ensure the bladder.
- Confirm access to the bladder by withdrawing the trocar from its sheath to observe a flow of urine. If no urine is seen, replace the trocar in the sheath and advance further until urine is obtained. Insert the catheter quickly through the sheath into the bladder and inflate the balloon. Remove the sheath and secure the catheter with a non-absorbable suture

List of Equipment and Medicine

No.	Equipment
1.	10cc syringe
2.	11- blade
3.	Trocar and cannula set with variable sizes (Different gauges)
4.	Drip set
5.	2/0 silk
6.	Urine bag

No.	Medicine
1.	Local anaesthetic agent (1% lignocaine)

3.4. Burn and Scald

Assessment and management of burns and scald go hand in hand and are simultaneous in practice.

History

- Find out exact mechanism including the temperature of the water, duration of contact, the concentration of chemical, voltage
- Factors suggestive of inhalation injury
- Associated injuries
- Document timing of the injury, first aid, and resuscitation

Assessment of Burn

Estimate the area of the burn	Estimating the depth of burn
• Rule of nines • Lund and Browder Chart • Patients hand is approximately 1% total body surface area • Draw a picture	• Epidermal. Erythema only • Superficial dermal. Pink, wet or blistered, sensate, blanches and refills • Deep dermal. Blotchy red, wet, or blistered, no blanching insensate • Full thickness. White or charred, leathery, no blanching, insensate

Signs of inhalation injury

- Singed nasal hair
- Burns to face or oropharynx.
- Sooty sputum
- Drowsiness or confusion due to carbon monoxide inhalation
- Respiratory effort, stridor, or hoarseness

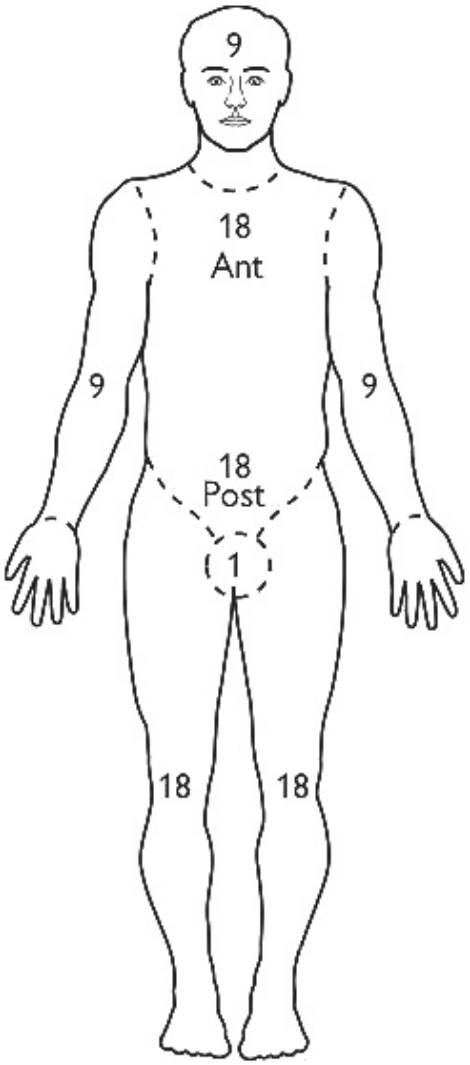
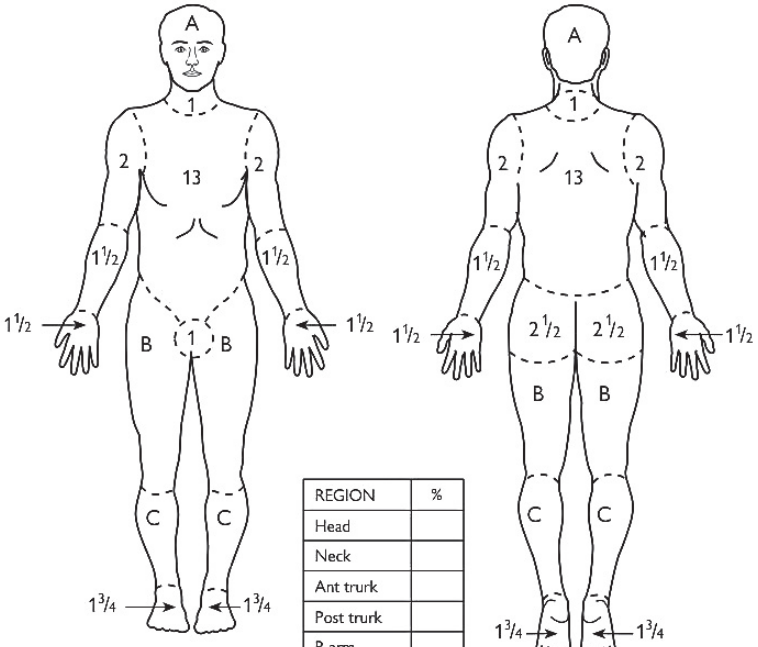


Figure 9: Rule of Nines



REGION	%
Head	
Neck	
Ant trunk	
Post trunk	
R arm	
L arm	
Buttocks	
Genitalia	
R leg	
L leg	
Total	

AREA	0	1	5	10	15	Adult
A = ½ of head	9½	8½	6½	5½	4½	3½
B = ½ of one thigh	2¾	3¼	4	3½	3½	4¾
C = ½ of one lower leg	2½	2½	2¾	3	3¼	3½

Figure 10: Lund and Browder Chart

Management of Burn

Immediate first aid

- Stop the burning process
- Cool the wound with running water

Resuscitation

A → Airway maintenance which cervical spine control

B → Breathing and ventilation

C → Circulation with haemorrhage control

D → Disability and neurological status

E → Exposure and environmental control

F → Fluid resuscitation. Child >10%, Adult >15% (Total Burn Surface Area [TBSA] burned)

- » Two large peripheral IV lines
- » Send blood for FBC, clotting
- » Give 3-4 ml Hartmann's solution/kg/% TBSA burned. Half of this is given over the first 8 hr following injury, half over the next 16 hr
- » Children need additional maintenance fluid
- » Monitor resuscitation with urinary catheter (aim for Urine output 0.5-1 ml/kg/hr in adult and 1-1.5 ml/kg/hr in children
- » Consider ECG, pulse, BP, respiratory rate, pulse oximetry

Criteria for admission and referral to appropriate higher-level hospitals

- » 10 % TBSA burn in adult, > 5% TBSA in children
- » Burn to face, hand, feet, perineum, genitalia, major joint
- » Electrical or chemical burns
- » Associated inhalational injury
- » Any burn associated with major trauma

- Intubate before transfer if inhalational injury present
- IV morphine analgesia
- Tetanus prophylaxis

List of Equipment and Medicine

No.	Equipment
1.	Blood bags and accessories
2.	18 G cannula
3.	Non-adherent dressing (e.g., Sofratulle) ~ Maximum 30 nos per patient
4.	Urinary catheter and bag

No.	Medicine
1.	Ringer lactate solution
2.	Normal saline solution
3.	Inj Gelofusin
4.	Injection ATT
5.	Injection morphine
6.	Injection Pantoprazol
7.	Injection Ceftriaxone
8.	Topical silver sulphadiazine ~ Maximum 30 nos per patient
9.	Povidone-iodine solution

3.5. Acute Poisoning

Acute poisoning management guidelines frequently focus on the agent involved. The guidelines make an adaptation of treatment recommendations to an individual patient in a particular location difficult. A risk assessment-based approach ensures the clinician addresses potentially time-critical management priorities in an appropriate order but avoids unnecessary investigations or interventions.

Risk assessment-based approach to a poisoned patient includes:

Resuscitation

Acute poisoning is a dynamic medical illness and patients may deteriorate within a few minutes or hours of presentation. Altered conscious state, loss of airway protective reflexes, and hypotension are common threats to life in the poisoned patient.

As in all life-threatening emergencies, attention to airway, breathing, and circulation are paramount. These priorities are usually managed along conventional lines. Basic resuscitative and supportive care measures ensure the survival of the vast majority of patients.

- Airway - may need simple airway to endotracheal intubation
- Breathing - oxygenation and assist breathing if necessary
- Circulation - IV access and fluid resuscitation
- Detect and correct
  - » Hypoglycemia - Bedside serum glucose estimation should be performed as soon as possible in all patients with altered mental status. If the serum glucose is less than 4.0 mmol/L, 50 mL of 50% dextrose should be given intravenously (5 mL/kg 10% dextrose in children)
  - » Seizures - Toxic seizures are generalized, and can usually be controlled with intravenous benzodiazepines (e.g., diazepam, midazolam, lorazepam, or clonazepam)
  - » Hyper/hypothermia - is associated with a number of life-threatening acute poisonings and is associated with poor outcome. The reversal of the condition should be immediate.
- Emergency antidote administration - antidotes are sometimes indicated (if the agent is known or by clinical suspicion through the presentation of patient- toxidromes) during the resuscitation phase of management. But in township and station hospitals, availability of specific antidotes may be difficult and referral to higher-level hospitals is required.

Risk assessment

Resuscitation is a greater priority, but risk assessment should occur as soon as possible in the management of the poisoned patient to predict the likely clinical course and potential complications for the individual patient in a particular presentation.

The five key components of the history and examination in risk assessment are:

- Agents (s) – if possible, the type of agent used should be identified or sent to a higher-level hospital or poison center.
- Dose (s)

- Time since ingestion
- Clinical features and progress (Toxidromes)
- Patient's factors (weight/co-morbidities)

In a poisoned patient with altered mental status, indirect history is taken by

- Asking an ambulance officer or family to search the agents
- Counting missing tablets
- Checking medical records for previous prescriptions
- Questioning relatives about agents potentially available to the patient.

The information collected should be documented in a referral letter.

Supportive care and monitoring vital signs

Decontamination and Enhanced elimination

A variety of GI decontamination procedures have a reasonable expectation that by reducing the dose absorbed. These procedures do not provide significant benefits and are no longer considered routine. The decision to decontaminate is one of clinical judgment in which the potential benefits are weighed against the potential risks and the resources required to perform the procedure. Procedures used for decontamination include: induced emesis, gastric lavage, activated charcoal, and whole bowel irrigation. They are not the primary procedures in the emergency unit of township and station hospitals.

The risks of GI decontamination procedures include

- Pulmonary aspiration
- GI complications – bowel obstruction, perforations
- The distraction of staff from resuscitation and supportive care priorities

Antidotes – specific treatment of poisoning

Not all poisons have antidotes to reverse the effects. Management of acute poisoning is mainly by resuscitation and supportive care.

Notes

Expert opinion is essential in treating a patient with antidotes.

Table 3: Recommended antidotes for common poisoning in Myanmar

Poisons	Antidotes
Beta-blockers	Glucagon/ Atropine
Carbon monoxide	Oxygen
Ethylene glycol	Ethanol
Iron salts	Desferrioxamine
Methanol	Ethanol
Opioids	Naloxone
Organophosphates	Atropine, Pralidoxime
Paracetamol	N-Acetylcysteine
Sulphonylureas	Glucose
Tricyclic antidepressants	Sodium Bicarbonate
Warfarin	Vitamin K
Snakebite	Specific Anti snake venom

Referral guidelines

A proper medical disposition is required for all patients who present with poisoning or potential exposure to a toxic substance. Those who have deliberately self-poisoned also require psychiatric and social review. Patients must be transferred to the unit capable of providing an adequate level of monitoring and supportive care depending on the severity of the presentation. Consultation to a specialist physician in a district hospital or Toxicology Department of the respective higher-level hospital for poison information and referral requirements may help the decision of medical doctors in township and station hospitals.

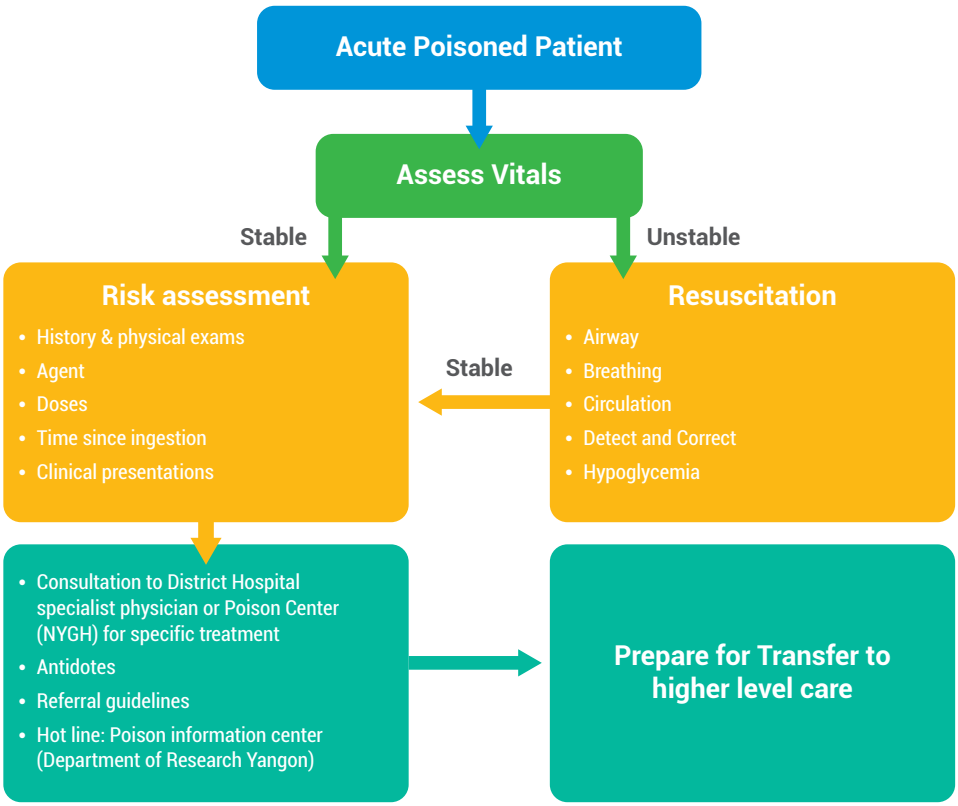


Figure 11: Guideline for Management of Acute Poisoning

List of Equipment and Medicine

No.	Equipment
1.	Oxygen
2.	Endotracheal intubation
3.	Glucometer

No.	Medicine
1.	IV fluid; NS
2.	IV 50% dextrose
3.	IV Benzodiazepines
4.	Inj Atropine
5.	Ethanol
6.	Inj Naloxone
7.	Inj N-Acetylcysteine
8.	Inj Glucose
9.	Inj Sodium bicarbonate
10.	Inj Vitamin K
11.	Specific Antisnake venom Inj

3.6. Airway Obstruction

3.6.1. Simple Airway Procedure

Indications

- To open the partially or completely obstructed airway
- To protect the potential airway obstructions

Airway Foreign body removal

Methods of removal:

Visualization → Removal

Foreign body in larynx

Major symptoms are:

- Cough
- Stridor
- Croup
- Dyspnea
- Aphonia
- Diagnosed by lateral neck X-ray, CXR (PA)

Management

- Heimlich maneuver
- Tracheostomy

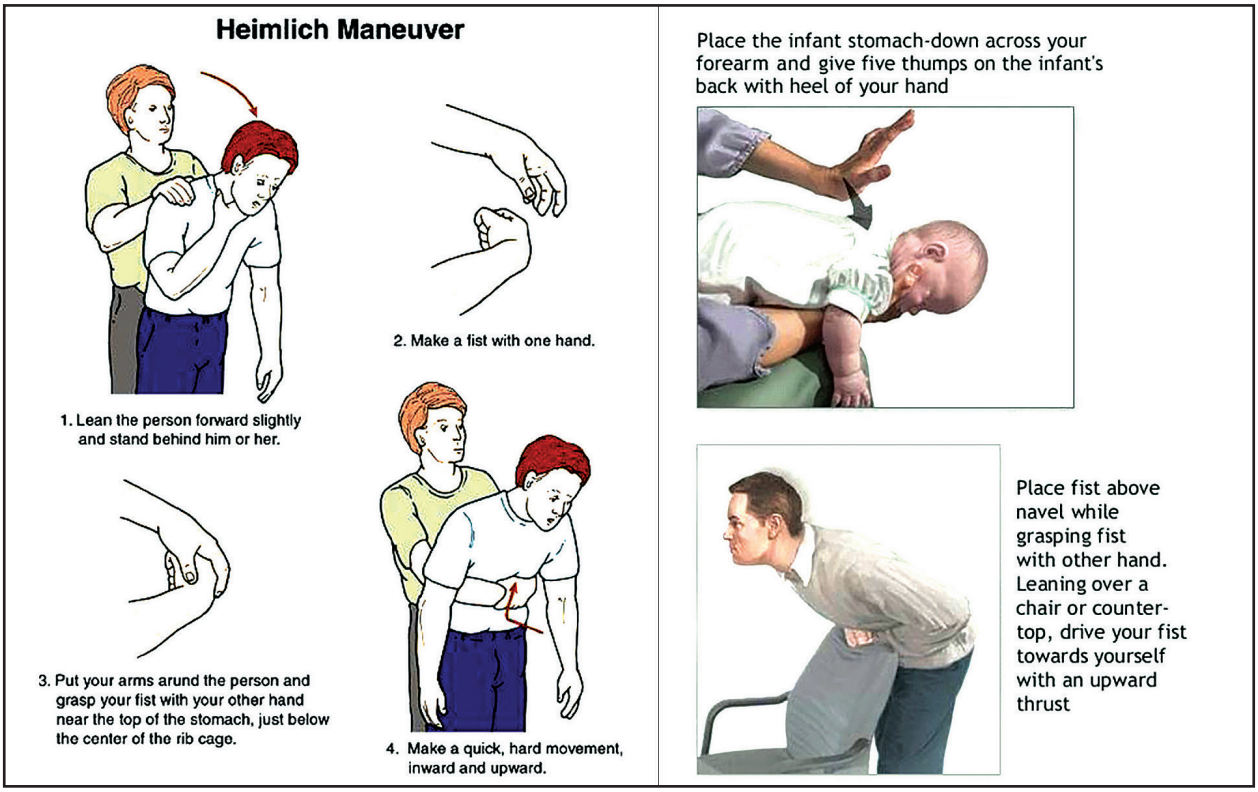


Figure 12: Heimlich maneuver

Suction

Obstruction of the airway can occur from a pooling of secretions, blood, vomit, or other debris in the airway. Perform suctioning of the airway with an appropriate size suction device and in conjunction with airway opening maneuvers.

Procedure

1. Ensure that suction tubing is attached to the suction outlet, via a suction bottle for collection of secretions/vomits.
2. Tubing should be a large bore, to facilitate the passage of blood or vomits.
3. The suction tip should be a rigid, surgical sucker with large bore openings.
4. In conjunction with basic airway opening maneuvers, gently insert the suction tip into the pharynx and mouth and remove secretions. It may be necessary to clear the tip to remove large particulate matter.
5. The placement of an oropharyngeal airway will prevent the patient from biting down on the suction tip if this is a problem.
6. In patients with clenched teeth, the airway can be suctioned with the aid of a flexible suction tip passed down a nasopharyngeal airway.

   Falling tongue is the commonest cause of airway obstruction in unconscious patient.

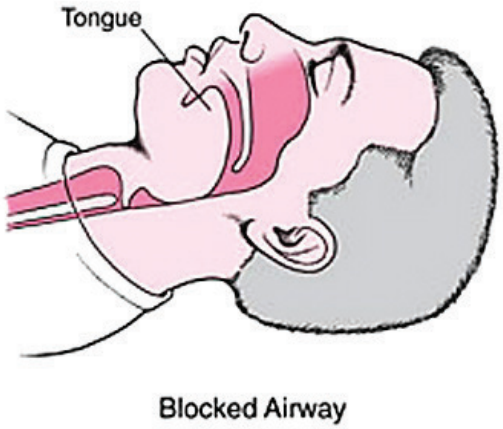


Figure 13: Falling Tongue is the Commonest Cause of Airway Obstruction in Unconscious Patient

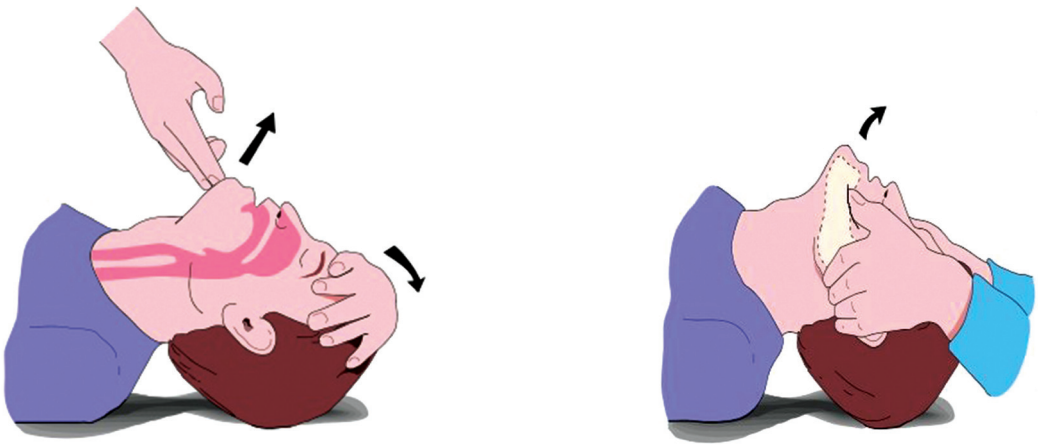
Chin lift and Jaw thrust

Head Tilt-Chin Lift (Figure 14-a):

This maneuver should only be used if the doctor is confident there is no risk of injury to the cervical spine injury in a trauma patient. Standing on the patient's right-hand side, the doctor's left hand is used to apply pressure to the forehead to extend the neck. The volar surfaces of the tips of the index and middle finger are used to elevate the mandible which will lift the tongue from the posterior pharynx.

Jaw Thrust (figure 14-b):

Where there is a risk of c-spine injuries, such as a patient who is unconscious as a result of a head injury, the airway should be opened using a maneuver that does not require neck movement. The jaw thrust is performed by having the doctor standing at the head of the patient looking down at the patient. The middle finger of the right hand is placed at the angle of the patient's jaw on the right. The middle finger of the left hand is similarly placed at the angle of the jaw on the left. Upward pressure is applied to elevate the mandible which will lift the tongue from the posterior pharynx.



(a) Head Tilt Chin Lift (b) Jaw Thrust

Figure 14: Head Tilt and Chin Lift and Jaw Thrust Procedure Can Open the Airway

Oropharyngeal airway (OPA) insertion

When the patient is unconscious, there is always a danger his tongue will slide to the back of his throat and block his airway. This situation can be prevented by inserting an oropharyngeal airway. The airway is a hollow tube through which air can freely pass in and out. The oropharyngeal airway is only used with an unconscious patient and only if the patient has spontaneous breathing.

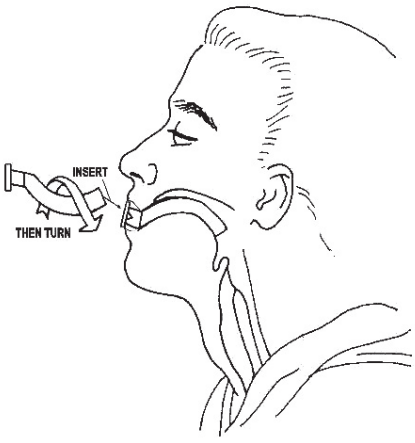
Procedure

Measure the size of OPA from the corner of the mouth to angle of the mandible and select an appropriate size (the color of OPA indicates the size easily) most men usually need size 3 (Yellow) and women size 2 (Green). An incorrect size airway may make the obstruction worse.

- Open the patient's mouth and suction out fluid, vomitus, or blood
- Insert OPA upside down for 4-5 cm (halfway) then rotate it 1980 degree and insert it until the flange is at the teeth.
- In children use laryngoscope as a tongue depressor and insert OPA in a correct way up to avoid trauma to the palate
- Recheck the airway and breathing and give high flow Oxygen
- Ventilate patient by BVM if breathing is inadequate
- Suction can be done through the hollow in OPA to clear the airway

Precautions

- Be aware of or suspect spinal injury in an unconscious injured patient. and maintain in-line stability if an oropharyngeal airway is used.
- Do not insert the oropharyngeal airway if the patient is conscious or semiconscious since the casualty may still have a gag reflex. If the airway causes the casualty to gag, he may vomit and inhale some of the vomitus. Remove the airway anytime the casualty regains consciousness or begins to gag. The casualty may push the oropharyngeal airway out of his mouth as he regains consciousness.
- Do not tie or tape the airway in place. In the case with gag reflex is present or the patient's jaw is clenched, consider Nasopharyngeal Airway.



Colour	Size	Length
Pink	0	40mm
Blue	0	50mm
Black	0	60mm
White	1	70mm
Green	2	80mm
Yellow	3	90mm
Red	4	100mm
Orange	5	110mm

Figure 15: Size Measurement and Putting OPA

Nasopharyngeal airway (NPA) insertion

Nasopharyngeal airway has advantages over the oropharyngeal airway (OPA) as it can be used in patients with an intact gag reflex, trismus, or oral trauma. Despite this, itis used less frequently than the OPA. This may be due to fears over intracranial placement in cases of possible basal skull fracture.

Procedure

- Select appropriate size (from nostril to angle of the jaw), usually, average men size 6 -7 and women size 5-6). The flange end will prevent displacement into the nose or nasopharynx.
- Lubricate the airway with water or a water-soluble lubricant.
- Insert the tip of NPA into one nostril and direct it posteriorly, aiming the tip at the tragus of the ear.
- NPA is slide easily into the nose until the flange abuts the nostril and the tip is just visible in the pharynx.
- Recheck the airway and breathing and give a high flow of 100 % oxygen.

Precautions and contraindications

- Never force an NPA into the nostril. any bleeding produced will aggravate the airway problem.
- Insertion of an NPA is contraindicated in patients with severe head or facial injuries or have evidence of basilar skull fractures due to the possibility of direct intrusion into brain tissue.
- Coagulopathy and bleeding disorders (patients on warfarin or heparin)
- Upper airway lesions
- Irritable airways (eg: uncontrolled cough, chest tightness, wheeze, bronchospasm)
- Pulmonary oedema
- A latex allergy (use latex-free NP airway)
- Recent oesophageal or tracheal surgery

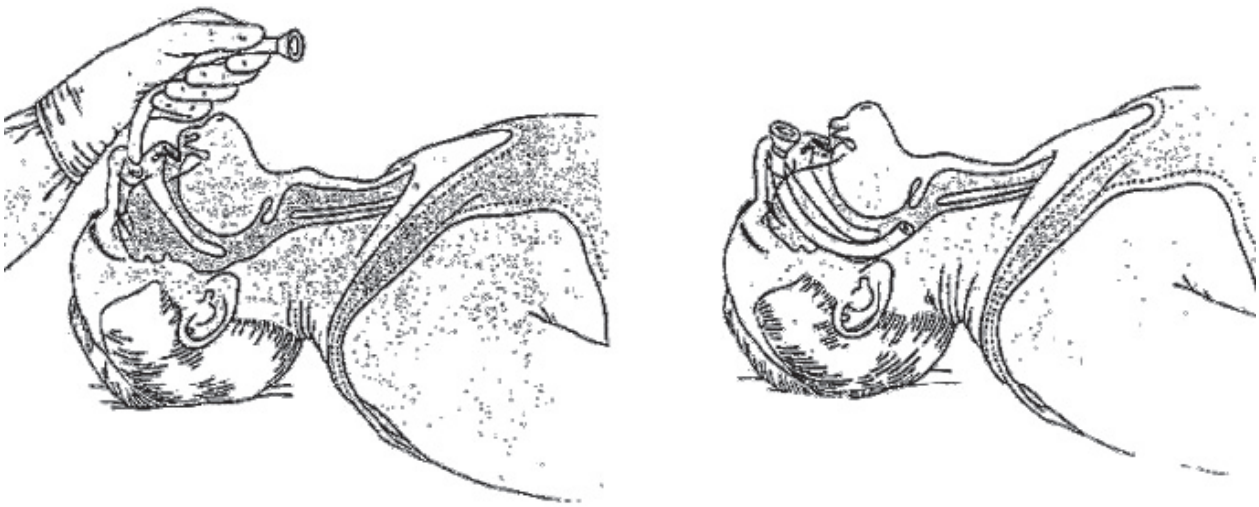


Figure 16: Insertion of Nasopharyngeal Airway Technique

Advanced Airway Procedure

3.6.2. Endotracheal Intubation

Intubation is the most definitive means of securing a patient's airway. Intubation involves passing the ET tube through the glottic opening and sealing the tube with a cuff inflated against the tracheal wall or uncuffed in the case of infants.

Indications

Four main groups (4 Ps)

1. Patency, airway obstruction, burns, neck hematoma
2. Protection – of the airway from aspiration and potential risk of obstruction in low conscious level (GCS <8)
3. Positive pressure ventilation- to correct insufficient oxygenation and ventilation.

   Examples- Flail chest, Pulmonary edema, COAD exacerbation
4. Predicted deterioration – early intubation may be preferable for potential need of urgent intubation in a less favorable situation (e.g., CT scan room) or progressive edema)

Rapid Sequence Intubation (RSI)

RSI is defined as the simultaneous administration of powerful sedative agents and paralytic agents to facilitate intubation and decrease the risk of aspiration.

Steps – 7 Ps

1. Preparation – prepare personnel, equipment, and medications
2. Pre-oxygenation- to prolong the time available for intubation, breathing oxygen 100% for 3-5 minutes.
3. Pretreatment
4. Paralysis with induction –administration of sedative agents (Propofol, Ketamine, etomidate) and follow rapidly by muscle relaxants (Succinylcholine)
5. Positioning and protection –cricoid pressure to prevent regurgitation of gastric contents and position the patient for laryngoscopy.
6. Place the tube- intubate patient and confirm tube placement.
7. Post intubation management – CXR, analgesia, sedation

Relative contraindications to RSI

1. Anticipated difficult airway – difficult Bag Valve Mask ventilation. Awake intubation is more preferred.
2. Inadequate familiarity and comfort in technique
3. Unnecessary (e.g., Cardiac arrest patient)

Steps in intubation

1. Ensure proper preparation
2. Patient neck in “Sniffing Position”
   (immobilization of neck in C-spine injury)
3. A laryngoscope is held in the left hand and introduce into the mouth on the right side of the tongue.
4. Advance the laryngoscope slowly down to the base of the tongue.
5. Identify epiglottis and lift the scope in direction of the handle of scope.
6. View the vocal cord
7. Without losing the view of the vocal cord, ask the assistant to hand over the ET tube in the right hand.
8. Introduce the tube and passing through the vocal cord. Visualize the tip of the tube passing the cord.
9. Ask the assistant to remove the stylet and place the tube in the final position. (grading 22 at the level of incisor teeth.)
10. Inflate the cuff and secure the tube. (Tape or sling)
11. Check the tube position, clinically by auscultation and CXR

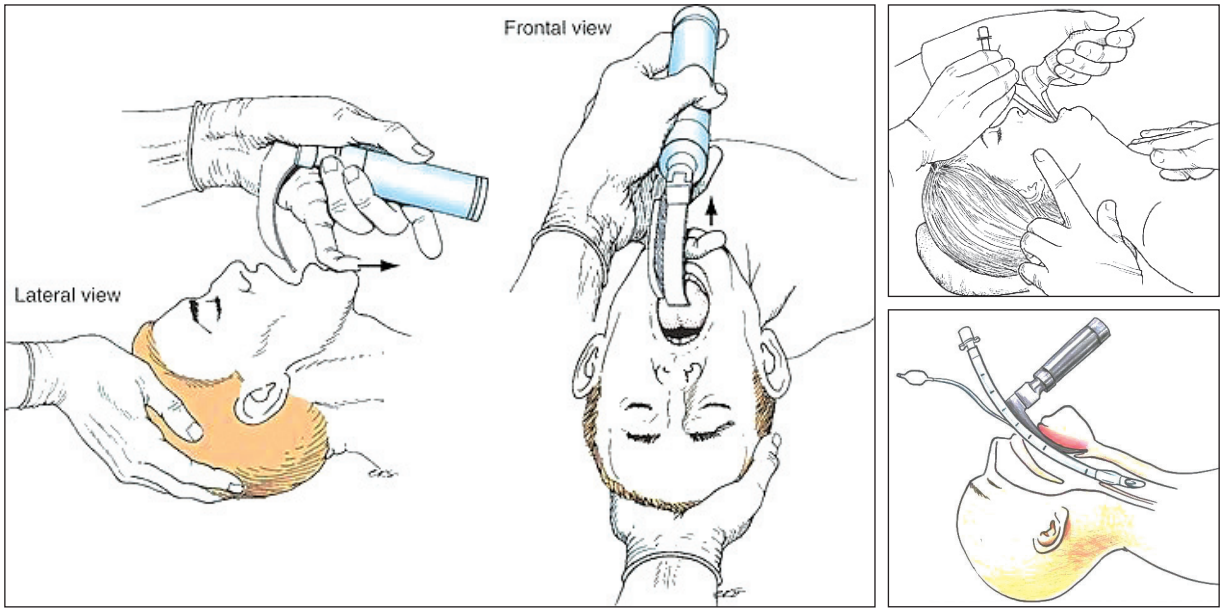


Figure 17: Endotracheal Intubation Technique

Tips for intubation

BURP method

- Put the tube in Backwards, Upwards, Rightwards Pressure on the larynx to facilitate visualization of the cord during laryngoscopy.
- Use of Bougie/ET tube introducer (Note: This procedure needs training)

List of Equipment and Medicine

No.	Equipment
1.	Oxygen
2.	Suction machine and tips
3.	Bag-Valve-Mask
4.	Oropharyngeal airway sets
5.	Nasopharyngeal airway sets (latex free)
6.	Endotracheal tubes
7.	Laryngoscope
8.	CXR
9.	BP cuff and stethoscope

No.	Medicine
1.	Sedative agents (Propofol, Ketamine, etomidate)
2.	Muscle relaxants (Succinylcholine Inj)
3.	Analgesics

3.6.3. Emergency Cricothroidotomy

Indications

Emergency needs for a surgical airway

1. Major maxillofacial injury
2. Oral burns
3. Fractured larynx
4. Need for a tracheal toilet in the extubated patient

Needle cricothyroidotomy

1. Pass a 12G (brown or larger) needle directly through the cricoid membrane.
2. Oxygenate using jet insufflation until a formal airway can be established.

Preparation

1. Explain the procedure to the patient where appropriate
2. The trauma patient's C-spine should be immobilized in the neutral position

Landmarks

The cricoid membrane is a small diamond-shaped membrane, palpable just below the prominence of the thyroid cartilage.

Technique

1. Preparation and drape put on sterile gloves.
2. If the patient is conscious and maintaining their airway, infiltrate local anesthesia using an aseptic technique.
3. Stabilize the thyroid cartilage with the left hand.
4. With your right hand, make a 2cm transverse incision (smaller for mini tracheostomy) through the skin overlying the cricothyroid membrane and then straight through the cricothyroid membrane.
5. Now turn the scalpel blade 90° within the airway so that it acts as a temporary retractor.
6. Place an artery forceps through the incision and open it, remove the scalpel, and insert a size 6.0 ET tube.
7. Suction the tube, secure, and connect to a source of oxygen.
8. Some mini-tracheostomy kits use the Seldinger technique; aspirating air freely is a sign that the needle is in the trachea and that a guidewire can be gently passed down the lumen.

Complications

- Bleeding
- Loss of airway
- Recurrent laryngeal nerve injury
- Vocal cord injury

List of Equipment and Medicine

No.	Equipment
1.	Mini tracheostomy, size 6.0 ET tube or 12G cannula in emergencies
2.	Artery forceps
3.	10mL syringe
4.	Blue needle and a green needle
5.	2 or 3/0 silk on a large handheld needle
6.	11-blade scalpel
7.	Sterile gloves and gown
8.	Sterile drape
9.	Gauze swabs

No.	Medicine
1.	10 mL 1% lidocaine
2.	20 mL saline
3.	Solution for skin preparation

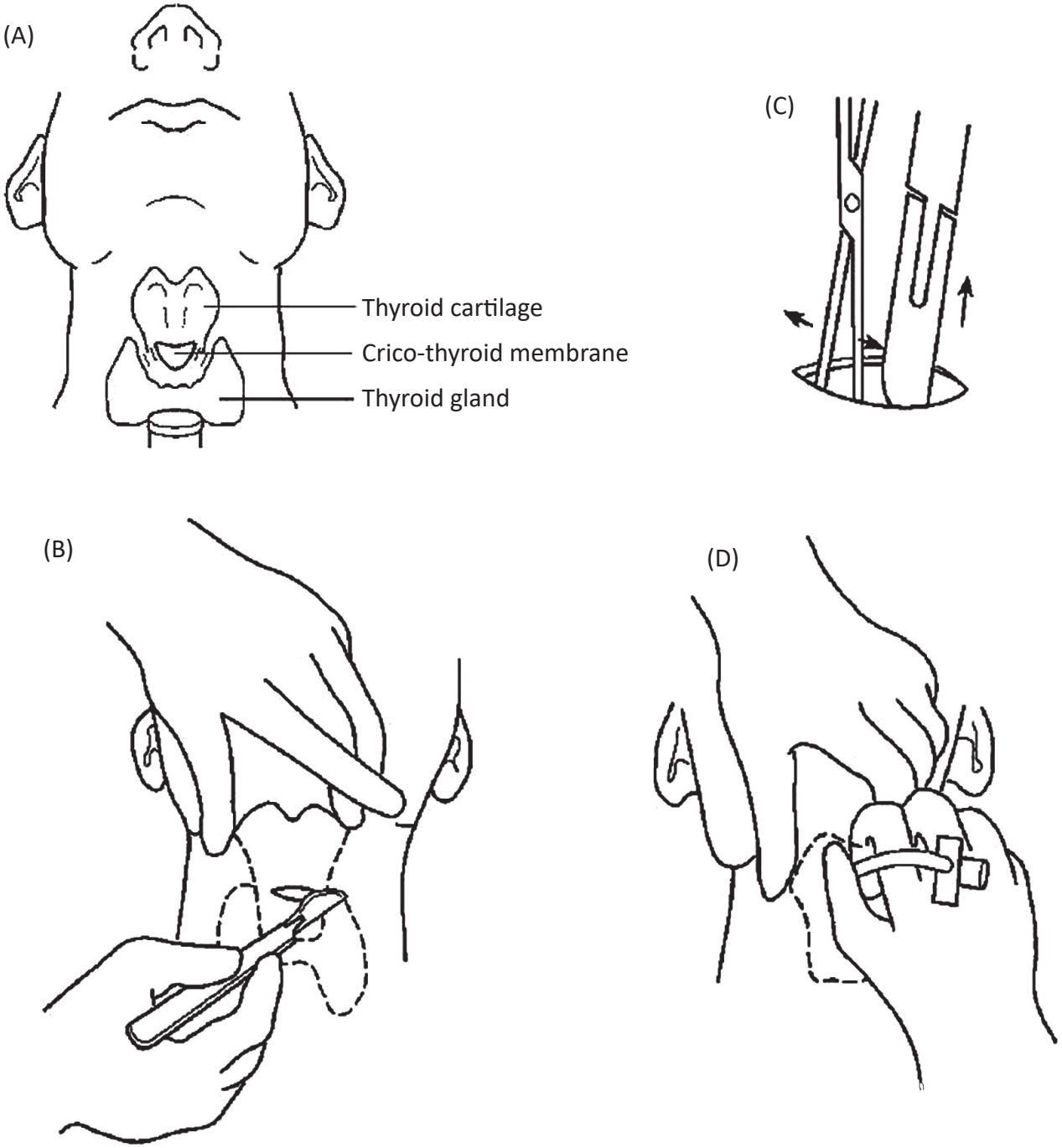


Figure 18: Technique of cricothyroidotomy. (a) Structures involved. (b) Incision.
(c) Keeping cricothyroidotomy patient. (d) Inserting mini-thyroidostomy

3.7. Acute Pulmonary Oedema

Clinical Features

Symptoms	Signs
Dyspnoea	Gallop' rhythm, with a third heart sound
Poor exercise tolerance	Bilateral basal crepitations
Fatigue	Wheeze (cardiac 'asthma')
Orthopnoea	Cyanosis
Paroxysmal nocturnal dyspnoea (PND)	Decrease BP, narrow pulse pressure
Nocturnal cough (pink frothy sputum)	Pulsus alternans
	Displaced apex (LV dilatation)
	Right Ventricle (RV) heave (pulmonary hypertension)
	Signs of valve disease

Clinical assessment

- Airway, Breathing, Circulation
- Assess the factors that may precipitate or aggravate heart failure in pre-existing heart diseases
  - » Myocardial ischaemia or infarction
  - » Intercurrent illness
  - » Arrhythmia
  - » Inappropriate reduction of therapy
  - » Administration of a drug with negative inotropic (β-blocker) or fluid- retaining properties (NSAIDs, glucocorticoids)
  - » Pulmonary embolism
  - » Conditions associated with increased metabolic demand (pregnancy, thyrotoxicosis, anaemia)
  - » Intravenous fluid overload

Investigation

- SPO_2
- ECG
- CXR (PA) if available

Management of acute cardiogenic pulmonary oedema

- Prompt 45-degree sitting position
- Oxygen - 60-100% (Target oxygen saturation >92%)
- Morphine - 5-10 mg by slow IV plus 10 mg of metoclopramide
- Furosemide - 40 mg – 80mg IV (repeat the dose prn)
- Nitrate - Give nitrate – sublingual GTN 1-2 tab, or IV infusion at 10 ug/min and doubled every 10 min according to response and tolerability (usually dose up- titration is limited by hypotension). A dose of >100 ug/min is rarely needed
- If cardiogenic shock (SBP<90mmHg), Dobutamine (non-vasodilating inotrope) infusion 2.5ug/kg/min, doubling dose every 15 min according to response or tolerability (dose titration usually limited by excessive tachycardia, arrhythmias, or ischemia). A dose>20 ug/kg/min is rarely needed

For peripheral IV. infusion: 1mg/1ml

Remove 20ml from 250ml bag of Glucose 5% or Sodium Chloride 0.9%, add 1 vial of dobutamine (250mg in 20ml)=250mg in 250ml dobutamine solution.

Table 4: Dobutamine Infusion Chart

Patient's weight															
	50kg	55kg	60kg	65kg	70kg	75kg	80kg	85kg	90kg	95kg	100kg	105kg	110kg	115kg	120kg
Dose (mcg/kg min)	Administration rate (mls per hour) of 250mg in 250ml solution														
2.5	7.5	8.25	9	9.75	10.5	11.3	12	12.8	13.5	14.3	15	15.75	16.5	17.25	18
5	15	16.5	18	19.5	21	22.5	24	25.5	27	28.5	30	31.5	33	34.5	36
7.5	22.5	24.8	27	29.3	31.5	33.8	36	38.3	40.5	42.8	45	47.25	49.5	51.75	54
10	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72
12.5	37.5	41.3	45	48.8	52.5	56.3	60	63.8	67.5	71.3	75	78.75	82.5	86.25	90
15	45	49.5	54	58.5	63	67.5	72	76.5	81	85.5	90	94.5	99	103.5	108

Table 5: Nitroglycerin Infusion Chart

Dilutiontable		
Diluent Volume	Quantity of Nitroglycerin Injection (5mg/ml)	Approximate final concentration
250 ml	25 mg (5ml)	100 mcg/ml
250 ml	50 mg (10ml)	200 mcg/ml
250 ml	100 mg (20ml)	400 mcg/ml
500 ml	50 mg (10 ml)	100 mcg/ml
500 ml	100 mg (20 ml)	200 mcg/ml
500 ml	200 mg (40 ml)	400 mcg/ml

"Rule of Thumb"
NTG 100 mg/250 cc 1cc/hr = 6.6 mcg/min NTG 50 mg/250 cc 1cc/hr = 3.3 mcg/min

List of Equipment and Medicine

No.	Equipment
1.	Oxygen
2.	Pulse oximeter
3.	ECG
4.	CXR
5.	Syringe pump or infusion pump

No.	Medicine
1.	Injection frusemide
2.	SL GTN/ Injection nitrate
3.	Injection Dobutamine
4.	Injection Morphine
5.	Injection Metoclopramide

3.8. Convulsion

(Joint - care with emergency medicine)

- A seizure can be defined as the occurrence of signs and/ or symptoms due to abnormal, excessive, or synchronous neuronal activity in the brain.
- 'Epilepsy' is the tendency to have unprovoked seizures

Status Epilepticus

- This means seizures lasting for >30min, or repeated seizures without intervening consciousness. Mortality and the risk of permanent brain damage increase with the length of the attack.

Investigations

- Bedside blood glucose
- ECG, FBC
- Pulse oximetry
- Blood for MP and RDT

Management

- Open the airway by laying the patient on semi-prone position with the head slightly lower to prevent aspiration
- Oxygen
- Correct hypotension
- Thiamine 250mg IV should be given if alcoholism or other malnourished states appear likely
- Treat the hypoglycemia (together with thiamine in any patient suspected of alcohol excess)
- IV Diazepam 10 mg slowly or rectally, repeat 15 min later if necessary (should not exceed 2-5mg/min)
- If seizure continued, Diazepam infusion: e.g., 100mg in 500mL of 5% dextrose; infuse at about 40mL/h (max 3mg/kg/24h) until seizures respond.
- Close monitoring, especially respiratory function, is vital.
- Consider referring to appropriate higher-level hospital.

List of Equipment and Medicine

No.	Equipment
1.	Oxygen
2.	Glucometer & Strips
3.	ECG
4.	CXR
5.	Syringe pump or infusion pump
6.	Pulse Oximeter

No.	Medicine
1.	Dextrose saline
2.	Injection Diazepam
3.	Injection Dexamethasone
4.	Injection Thiamine

3.9. Acute Severe Asthma

Initial Assessment

Table 6: Initial Assessment of acute severe asthma

Immediate Assessment of acute severe asthma	
Acute severe asthma	
• PEF 33-50% predicted (<200 L/min) • A heart rate of ≥ 110 beats/min	• Respiratory rate of ≥ 25 breaths/min • Inability to complete sentences in 1 breath
Acute severe asthma	
• PEF 33% predicted (<100 L/min) • SpO_2 <92% (60 mmHg) (especially if being treated with oxygen) • Normal or raised $PaCO_2$ • Silent chest • Cyanosis	• Feeble respiratory effort • Bradycardia or arrhythmias • Hypotension • Exhaustion • Delirium • Coma

Investigation

- CXR if available (after stabilization with initial treatment)
- Pulse oximetry
- ECG

Management

Immediate treatment

- Supplemental O_2 to maintain oxygen saturation 94–98%
- Salbutamol 5mg nebulized with O_2
- Hydrocortisone 100mg IV or prednisolone 40–50mg PO

  Reassess every 15min:

  - If PEF <75%, repeat salbutamol nebulizers every 15–30min.

  If improving

  - Continue nebulized salbutamol every 4–6 h
  - Prednisolone 40–50 mg PO OD for 5–7 days

- Monitor peak flow and O_2 saturations, aim 94–98% with supplemental if needed
- If PEF >75% 1h after initial treatment, consider discharge with outpatient follow-up

Referral

- Consider referral for ventilation support if deteriorating despite treatment
- Deteriorating PEF
- Persistent/worsening hypoxia
- Exhaustion, feeble respiration
- Drowsiness, confusion, altered conscious level
- Respiratory arrest

List of Equipment and Medicine

No.	Equipment
1.	PEFR meter
2.	Pulse oximeter
3.	ECG
4.	CXR
5.	Nebulizer
6.	Oxygen

No.	Medicine
1.	Nebulized solutions – salbutamol
2.	IV hydrocortisone
3.	Oral Prednisolone

3.10. Acute Exacerbation of Chronic Obstructive Pulmonary Disease (COPD)

Clinical Assessment

- Increasing cough, breathlessness, or wheezes
- Decreased exercise capacity

Investigation

- CXR if available (after stabilization with initial treatment)
- Pulse oximetry
- ECG

Management

- Controlled oxygen therapy if SaO_2<88%
  - » Start at 24 – 28%, aim oxygen saturation 88 – 92%
- Nebulized bronchodilators:
  - » Salbutamol 5mg/4h and ipratropium 500mcg/6h
- Steroids:
  - » IV hydrocortisone 200mg stat and oral prednisolone 30mg OD (continue for 7–14 days)
- Antibiotics: if evidence of infection (in patients who present with increased dyspnea, increased amount & purulence of sputum)
  - » Amoxicillin 500mg/8h PO for 5-7 days
  - » Alternatively, doxycycline 200mg stat and 100mg/12h PO for 5-7 days
- Local antibiotic sensitivity patterns for Streptococcus pneumoniae, Haemophilus influenzae & Moraxella catarrhalis must be taken into account when choosing an antibiotic agent.

Referral

- Consider referral for ventilation support if deteriorating despite treatment

List of Equipment and Medicine

No.	Equipment
1.	Oxygen
2.	Nebulizer
3.	Pulse Oximeter

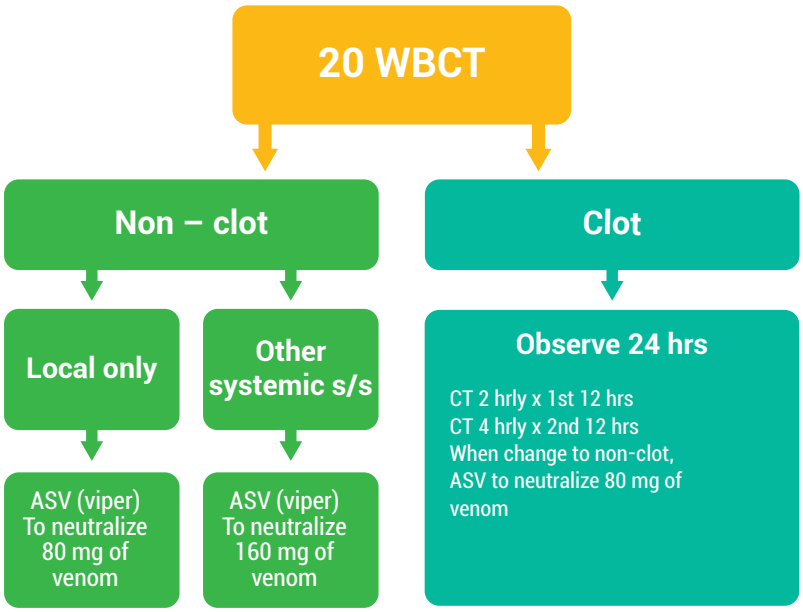
No.	Medicine
1.	Salbutamol 5mg (Neb solution)
2.	Inj; Hydrocortisone
3.	Oral Prednisolone 30mg
4.	Oral Amoxicillin 500mg
5.	Oral Doxycycline 100 mg

3.11. Snake Bite

Initial assessment

- Assess the vital signs
- Identification of snake
- Bedside test
- Whole blood clotting time
- Urine albumin

Viper Bite



Notes

Check the leaflet of products before deciding the ASV dosage.

Recent ASV (MPF both equine and ovine) 1 ml can neutralize 1 mg of venom.

Aware hypersensitivity reaction to Anti-venom and anti-shock measures must be available readily.

Figure 19: Algorithm for ASV Dosage in Confirmed Russell's Viper Snake Bite (MOH, 2016)

Table 7: Local and systemic envenoming signs of Russell's viper snake bite

Local envenoming signs	systemic envenoming signs
Local swelling	Spontaneous bleeding
Swelling after bites on the digits	Non-clotted blood
Rapid extension of swelling	Epigastric pain/ renal angle pain
Enlarged tender regional lymph nodes draining the bitten limb	Oliguria/ anuria
	Heavy proteinuria

Table 8: Neurotoxic envenoming signs of Cobra bite

Neurotoxic envenoming signs of Cobra bite	
• Ptosis	• Broken neck sign
• Slurring speech	• Shallow and rapid respiration
• Inability to open the mouth and protrude the tongue	• Flaccid paralysis
• Increased salivation	

Unidentified Cases

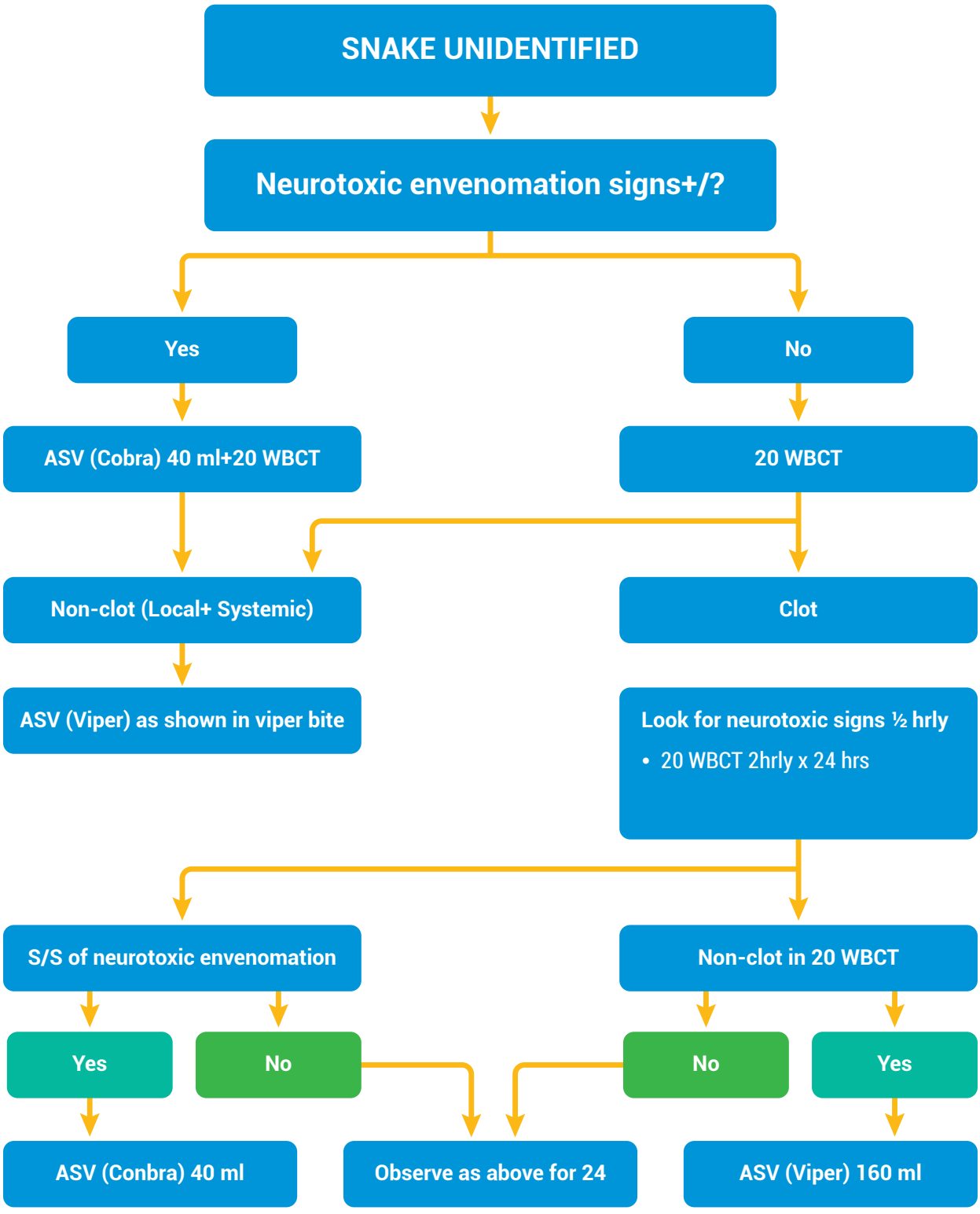


Figure 20: Algorithm for Snake Unidentified (MOH, 2016)

Notes

Green snake bite is possible with non-clot 20WBCT and severe local swelling.
In that case, urine albumin is usually negative.

Monitoring

- Monitor for BP, PR, fluid status, urine output, and bleeding manifestations
- Monitor urine albumin and urea

Indications for repeating more anti-venom

- If blood remains incoagulable after 6 hrs
- If the patient continues to bleed (repeat ASV in 1-2 hrs)
- Deteriorating cardiovascular signs like hypotension, shock, arrhythmias (repeat ASV in 1-2 hrs)
- Persistence of neurotoxic symptoms and signs in 1-2 hrs after ASV
- 40 mg of ASV for cobra and 80 mg of ASV for viper can be repeated if the above indications are present
- The total maximum dose is quite variable, usually, the maximum dose for Russell Viper is 240-320 mg MPF ASV generally

Referral

- A referral will be considered (after initial management) if complicated e.g., AKI

Management of anaphylaxis

- Fluid replacement using colloids or crystalloids
- IM adrenaline 0.1 % solution, 1 in 1,000, 1 mg/ ml (0.5 mg for adults and 0.01 mg/ kg body weight for children)
- IV chlorpheniramine maleate (10 mg for adult and 0.2 mg/ kg for children)
- IV hydrocortisone (100 mg for adult and 2 mg/ kg for children)

Management of neurotoxic envenoming

- Baseline observation (respiration, ptosis, muscle power)
- Keep Ambu-bag ready for emergency resuscitation in case of respiratory arrest
- Consider referral

Wound Management

- Antiseptic – Povidone Iodine or Soap and water
- IM – ATT
- Antibiotics: IV Flucloxacillin + Amoxicillin 500mg 8Hrly x 7 days

  If Penicillin allergy, IV ceftriaxone 1G 12 Hourly x 7 days

List of Equipment and Medicine

No.	Equipment
1.	Ambu bag
2.	Oropharyngeal airway

No.	Medicine
1.	ASV viper
2.	ASV cobra
3.	Injection flucloxacillin + amoxicillin 500mg
4.	Injection ceftriaxone 1G
5.	Medicine for anaphylaxis • IM adrenaline • IV chlorpheniramine maleate • IV hydrocortisone
6.	Injection ATT
7.	Antiseptic – Povidone Iodine

3.12. Dog Bite

Risk Assessment

Table 9: Guidelines for Risk Assessment of Rabies Exposure (WHO)

Category	Severity and Site of the Wound	Action
Category (I): No-Risk	• Touching or feeding of animals • Lick on intact skin	• Reassurance only • No vaccine needed
Category (II): Moderate Risk	• Nibbling of uncovered skin • Minor scratches or abrasion without bleeding	• Wound management • Start Vaccination: Day 0*
Category (III): High Risk	• Single or multiple wounds on head and neck • Single or multiple transdermal bites/ scratches/ Laceration with bleeding • Scratches with bleeding • Licks on broken skin • Contamination of mucous membrane of eyes, mouth, nose or wounds with saliva or discharges from rabid animals	• Wound management • Infiltrate RIG into the wound • Start Vaccination at the same time: Day 0*
Day 0* denotes the day of first vaccination, not necessarily a day of bite.		

Notes

Administer RIG along with vaccine in all category III bites and category II bites in case of immune-compromised/Immune-suppressed patients (persons on steroids, chloroquine, and chemotherapy of malignant diseases, and HIV/AIDS patients.)

Zagreb Regimen (Intramuscular)

For health center where 2-3 dogs bitten persons a day

- One IM Dose – 1 ml

Thai Redcross Regimen (Intradermal)

- For health center where there is more than 2-3 dog bitten persons a day
- One ID Dose – 0.1 ml
- Can give RIG within 7 days of after a vaccine

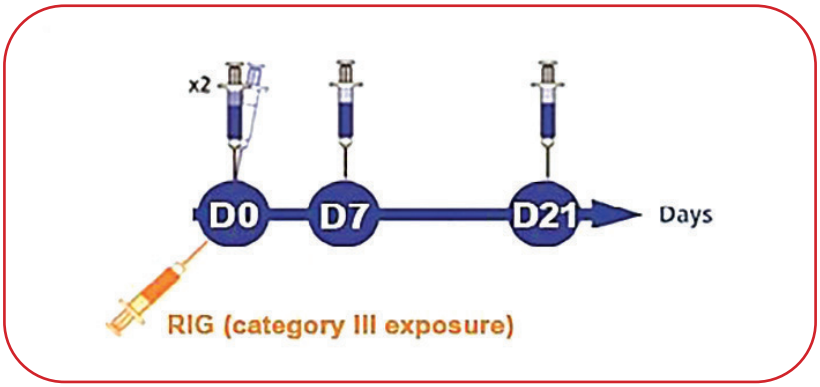


Figure 21: Zagreb Schedule

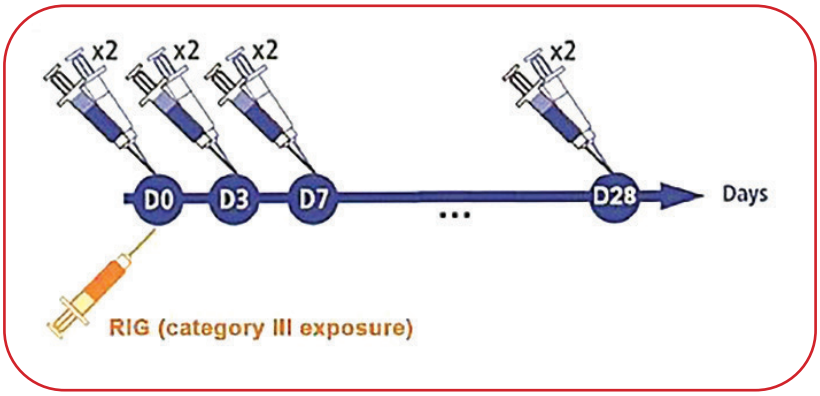


Figure 22: Thai Red Cross Schedule

- Injection of 0.1 ml of reconstituted vaccine is given per ID site one on each deltoid area (left and right arms), one inch above the insertion of deltoid muscle on days 0, 3, 7 and 28. Day 0 is the day of first dose administration of IDRV and may not be the day of rabies exposure/dog bite.
- One ID Dose – 0.1 ml
- Can give RIG within 7 days after vaccine

General guidelines for use of intradermal vaccination

- Intradermal injections must be administered by trained staff.
- 1ml syringe with hypodermic needle (e.g., Insulin Syringe) should be used for intradermal administration.
- Always use a new syringe for each patient.
- Reconstituted vaccines must be used as soon as possible or within 6 hours if kept at +2 to + 8ºC. Vaccine when given intradermal should raise a visible and palpable bleb in the skin. If a bleb is not raised, repeat the injection slightly away from the first one. (The technique is similar to BCG inoculation).
- If the dose is inadvertently given subcutaneously or intra-muscularly or in the event of spillage, a new dose should be given intradermal in nearby site.
- One injection = 0.1 ml of rabies vaccine
- Dog bite victims who are immune-compromised or immune suppressed (patients on chloroquine, steroids and chemotherapy for malignant diseases, and HIV/AIDS patients) should not be given vaccine by ID route. They should be given rabies vaccine of TCO or EEO by intramuscular route.

If already vaccinated

- Only 2 times for booster dose
- Day 0 and Day 3
- If previously IM prefer IM
- If previously ID prefer ID

Passive immunization

- Rabies immunoglobulin (ERIG) (Anti-rabies serum 1000 IU), Favirab, Equirab
- Dose – 40 IU/ kg body wt., around the wound as much as possible, for the remaining IM away from the vaccine administration (anterior thigh) (OR)
- Rabuman Berna (Human anti-rabies Ig)
- Dose- IM 20 IU/kg, around the wound as much as possible, for the remaining IM away from the vaccine administration (anterior thigh)

Adjuvant care

- Report every rabid case and dog bite case to Township Medical Officer
- Treat the patient with established rabies as encephalitis with nutrition and coma care
- Isolate the patient to prevent transmission

Wound management

- Clean the bitten parts with antiseptic (e.g., Povidone Iodine) or Soap and Water
- IM – ATT
- Antibiotics: IV or PO Flucloxacillin + Amoxicillin 500 mg 8 Hrly x 7 days

  If Penicillin allergy, IV ceftriaxone 1G 12Hrly or PO cefixime 200 mg BD x 7Ds
- Wound debridement if necessary (Suturing is not recommended generally)

List of Equipment and Medicine

No.	Equipment
1.	Syringe (1cc syringe needle removable for ID)

No.	Medicine
1.	Injection 0.1 ml of reconstituted vaccine
2.	Immunoglobulin (Anti-rabies serum 1000 IU)
3.	Rabuman Berna (Human anti-rabies Ig)
4.	Inj – ATT
5.	Antibiotics: IV and PO Flucloxacillin + Amoxicillin 500 mg
6.	IV Ceftriaxone
7.	Oral cefixime 200 mg

CHAPTER-4

Clinical Management Guidelines for Essential Medical Care

Basic Essential Medical Services

- Acute Gastroenteritis/Diarrhoea
- Respiratory Tract Infection
- Urinary Tract Infection
- Vitamin B1/Thiamine deficiency

4.1 Acute Gastroenteritis/Diarrhoea

Management:

Dehydration assessment

Table 10: Dehydration Assessment

Signs and Symptoms	Severity and Site of the Wound		
	None or Mild	Moderate	Severe
Quality of radial pulse	Normal	Thready or weak	Feeble or impalpable
Quality of respiration	Normal	Deep	Deep and rapid
Skin elasticity	Pinch retracts immediately	Pinch retracts slowly	Pinch retracts very slowly (>2 sec)
Eyes	Normal	Sunken	Very sunken
Tears	Present	Absent	Absent
Mucous membranes	Moist	Dry	Very dry
Urine outputs	Normal	Reduced	None passed in many hours

Rehydration

No signs of dehydration

- Oral rehydration salt (ORS) solution ad lib at home (liquid should be administered in small amounts frequently, every 15-30 minutes)

Moderate dehydration

- ORS + IV Ringer's lactate solution or IV NS 10 ml/kg/hour

Severe dehydration

- Life-threatening condition
- IV access
- IV Ringer's lactate solution or IV NS should be given rapidly until the radial pulse is palpable and BP is raised above 90/60 mmHg.
- Then subsequent fluid therapy depends on the amount of ongoing stool loss.
- ORS as soon as the patient can drink

Antibiotics

- Antibiotic therapy is not typically indicated for the treatment of acute watery diarrhea in adults as most cases resolve spontaneously.
- Antibiotics are considered if patient is systemically unwell (fever, look toxic) or immunocompromised, diarrhea is severe and prolonged or dysentery.

Table 11: Features of severe diarrhea and high-risk host features

Features of severe diarrhea	Action
Fever ≥ 38.5°C (101.3°F)	Age ≥ 70 years
Signs or symptoms of hypovolemia	Serious comorbidities, such as cardiac disease, immunocompromising condition (including advanced HIV infection)
≥ 6 unformed stools per 24 hours	
Severe abdominal pain	
Need for hospitalization	

Table 12: Choice of antibiotics in patients with acute diarrhoea

Features of severe diarrhea	Action
Community acquired watery diarrhea	Azithromycin 500 mg OD for 3 days or Ofloxacin 200 mg bd for 3 days
Traveler's diarrhea	Azithromycin 500 mg OD for 3 days
If suspected Cholera (Rectal swab to confirm Dx)	Doxycycline 300 mg (single dose) or Azithromycin 1g (single dose) or Ciprofloxacin 1 g (single dose)
If suspected Dysentery	Azithromycin 500 mg OD for 3 days

Microbiological assessment

- Laboratory studies are not typically needed.
- Routine microscopy of fresh stool can be useful in some cases in identifying Entamoeba trophozoites containing RBCs, or cysts.
- Dark field microscopy can identify the motile Vibrios to diagnose cholera.

List of Equipment and Medicine

No.	Equipment
1.	Materials for IV access

No.	Medicine
1.	ORS
2.	IV solution – Ringer's Lactate and Normal saline
3.	Oral Azithromycin
4.	Oral Ofloxacin
5.	Oral Doxycycline
6.	Oral Ciprofloxacin
7.	Oral Loparamide

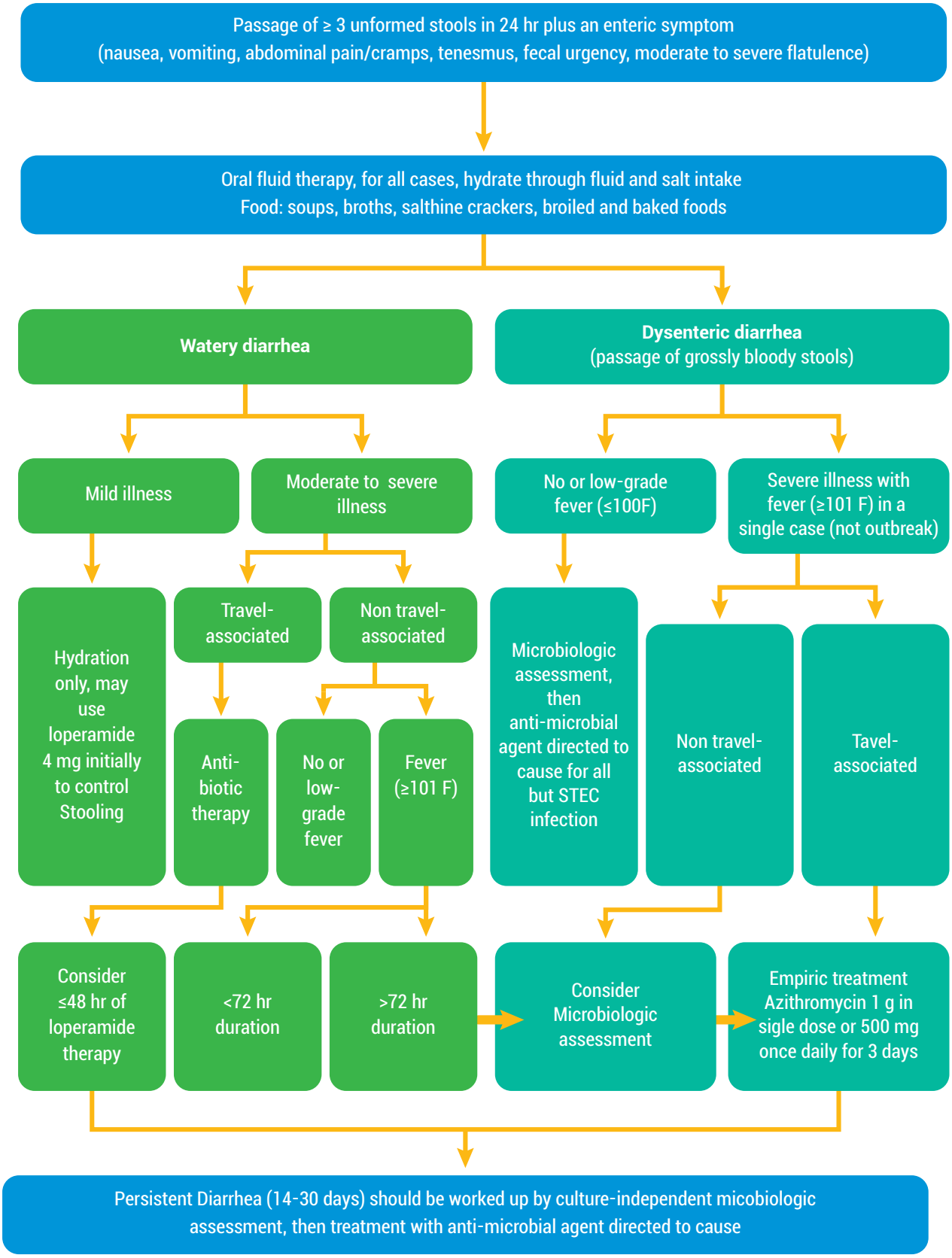


Figure 23: Approach to empiric therapy and diagnostic-directed management of the adult patient with acute diarrhea (suspect infectious etiology)[1]

1. *illness severity; Severe = total disability due to diarrhea, Moderate = able to function but forced change in activities due to illness, Mild = no change in activities

4.2. Respiratory Tract Infection

4.2.1. Upper Respiratory Tract Infection

- Common Cold
- Acute Sore Throat
- Acute cough / Acute bronchitis

Supportive care

- Antipyretics – paracetamol 500mg tds /as required
- More fluid and Nutrition
- Rest

Antibiotics

No antibiotic prescribing strategy or a delayed antibiotic prescribing strategy should be agreed for patients with the following conditions:

- Common Cold
- Acute Sore Throat
- Acute cough / Acute bronchitis

Antibiotics should be considered in the following patients; Acute sore throat/ Acute tonsillitis with 3 or more of the followings;

- Tonsillar exudate
- Tender anterior cervical lymphadenopathy or lymphadenitis
- History of fever (over 38°C)
- Absence of cough

Antibiotics for acute sore throat (if indication +)

First choice:
Amoxicillin 500 mg tds for 5 days

Alternative:
Doxycycline 200 mg on first day and 100 mg OD for 4 days (5 days course in total)

Referral

Referral needs to be considered if:

- If the patient has symptoms and signs suggestive of serious illness and/or complications (particularly pneumonia, mastoiditis, peritonsillar abscess, peritonsillar cellulitis, intra-orbital and intracranial complications)
- If the patient is at high risk of serious complications because of preexisting comorbidity. This includes patients with significant heart, lung, renal, liver disease
- If the patient is older than 65 years with acute cough and two or more of the following criteria, or older than 80 years with acute cough and one or more of the following criteria:
- Type-1 (or) Type-2 diabetes
- History of congestive heart failure
- Current use of oral glucocorticoids

4.2.2. Pneumonia

An acute lower respiratory tract illness associated with fever, symptoms and signs in the chest, and abnormalities on the chest X-ray.

Assessment

Clinical features

Symptoms

- Fever, rigors, malaise, anorexia
- Tachypnea, cough
- Purulent sputum (classically 'rusty' with pneumococcus), haemoptysis
- pleuritic pain

Signs

- Fever, tachypnea, herpes libialis (pneumococcus)
- Cyanosis
- Confusion (may be the only sign in elderly)
- Tachycardia, hypotension
- Signs of consolidation (diminished expansion, dull percussion note, #tactile vocal fremitus/ vocal resonance, bronchial breathing), crepitation and/or a pleural rub Investigations
- CXR if available
- Oxygen saturation (pulse oximeter)
- Urea

Severity:

Calculate the core adverse features 'CURB – 65' score

- Confusion (abbreviated mental test < 8 or new disorientation in person, place, or time)
- Urea > 7 mmol/L
- Respiratory rate > 30/min
- BP < 90/60 mmHg
- Age > 65 years

Score:

- 0-1 → Home treatment if possible
- 2 → Hospital therapy
- 3 → Indicates severe pneumonia (consider ICU treatment, referral after initial management)
- Other features increasing the risk of death are co-existing disease: bilateral/ multi-lobar involvement

Management

Antibiotics:

Orally if not severe and not vomiting; if severe given by IV

No.	Equipment
Mild (CURB 0-1)	PO Amoxicillin 500mg TDS 5 days or PO Doxycycline 200mg loading then 100mg OD for 5 days or PO Clarithromycin 500mg BD 5days
Moderate (CURB 2)	PO Amoxicillin 500mg-1g TDS +Clarithromycin 500mg BD or PO Doxycycline 200mg loading then 100mg OD for 7 days or PO Levofloxacin 500mg OD for 7days
Severe (CURB >2)	IV Co-amoxiclav 1.2g 3times daily + IV Azithromycin 500mg OD (1st dose and then consider referral) or IV Cefuroxime 1.5g 3 times daily + IV Azithromycin 500mg OD or IV Ceftriaxone 1-2g daily + IV Azithromycin500mg OD
• Oxygen: keep O_2 saturation > 94% • IV fluids: may be required in patients with anorexia, dehydration, shock. • Analgesia if pleurisy – e.g., paracetamol prn	

Referral:

Consider referral in severe pneumonia (for ICU care) after initial management

List of Equipment and Medicine

No.	Equipment
1.	Chest X-Ray
2.	Oxygen
3.	Pulse Oximeter

No.	Medicine
1.	Oral Antibiotics – Amoxicillin, Doxycycline, Clarithromycin, Levofloxacin
2.	Injection – Co-amoxiclav, Azithromycin, Cefuroxime, Ceftriaxone
3.	IV Fluid
4.	Antipyretics – Oral paracetamol 500 mg

4.3. Urinary Tract Infection

Diagnosis

- Lower UTI
  - » Abrupt onset of the frequency of micturition and urgency
  - » Burning pain in the urethra during micturition (dysuria)
  - » Suprapubic pain during and after voiding
  - » Intense desire to pass more urine after micturition (strangury)
  - » Urine may be cloudy and have an unpleasant odor
- Upper UTI/ Acute pyelonephritis
  - » Prominent systemic symptoms – fever, rigors, vomiting, hypotension and loin pain or tenderness

Investigation

- Urine dipsticks (for nitrite and leucocytes)

Management

- Antibiotics are recommended in all cases of proven UTI.
- A fluid intake of at least 2 L/day is usually recommended.

Table 13: Antibiotics regimens for UTI in Adults

Scenario	Drug regimen	Duration
Cystitis (Lower UTI)	Cefalexin 250mg 4 times daily or Ciprofloxacin 250mg BD	3 days 7-10 days in men
Acute Complicated Pyelonephritis (Upper UTI)	PO Ciprofloxacin 500mg BD or PO Co-amoxiclav 625mg TDS	7 days 10-14 days
Acute Complicated Pyelonephritis (Upper UTI)	IV Ceftriaxone 1G OD or IV Piperacillin/ Tazobactam 3.375 - 4.5g 6 hourly (initial dose and consider referral)	

Referral

- Consider referral for Complicated UTI
- Acute pyelonephritis not responding to initial treatment
- Septicemic shock
- Acute renal failure
- Associated co-morbidity
- Immunosuppressed condition

List of Equipment and Medicine

No.	Equipment
1.	Urine dipstick and RE

No.	Medicine
1.	Injection – Cetriaxone, Piperacillin, Tazobactam
2.	Oral – Cefalexin, Ciprofloxacin,Co-amoxiclav
3.	Antipyretics – paracetamol 500mg

4.4. Vitamin B1/Thiamine deficiency

- Vitamin B1, also known as thiamine, is an essential micronutrient.
- Deficiency can result in three distinct clinical presentations.

Deficiency

Chronic
Dry beri beri → peripheral neuropathy

Acute
Wernicke encephalopathy
Wet beri beri → heart failure

Suspect case of thiamine deficiency

- A suspect case of thiamine deficiency in the field as a person having at least two of the following signs:
- Bilateral oedema of the lower limbs;
- Dyspnea with exertion or at rest;
- Paraesthesia of the extremities (hands or feet) or drop in muscular strength
- Loss of balance or ataxic gait

Dry beri beri

- Dry beri beri occurs with chronic deficiency and is characterized by adistal peripheral polyneuropathy.
- Daily oral dose 10 mg for 1 week followed by 3-5mg per day for at least 6 weeks
- Response is not uniformly good
- Dietary advice

Wet beri beri (heart failure)

- Acute or chronic deficiency can also lead to wet beriberi which presents as high-output cardiac failure with edema and orthopnea, or low-output cardiac failure with lactic acidosis and peripheral cyanosis (also known as Shoshin beri beri).
- IV B1 50-100 mg slowly, followed by daily oral dose 3-5 mg of thiamine per day for at least 6 weeks
- Dietary advice

Wernicke-Korsakoff syndrome

- The syndrome is manifested by a confusional state, disorientation, ophthalmoplegia, nystagmus, diplopia, and ataxia (Wernicke encephalopathy), with severe loss of memory for recent events and confabulation (the invention of accounts of events to cover the loss of memory) (Korsakoff psychosis) occurring following recovery.
- Patients with suspected Wernicke encephalopathy require immediate parenteral administration of thiamine
- A recommended regimen is IV thiamine 500 mg of thiamine, infused over 30 minutes, three times daily for two consecutive days and IV or IM 250 mg once a day for an additional five days, in combination with other B vitamins followed by PO B1 100mg OD until discharge followed by daily oral dose 3-5mg of thiamine per day for at least 6 weeks

List of Equipment and Medicine

No.	Equipment
1.	3 cc syringe
2.	Drip set

No.	Medicine
1.	Oral thiamine
2.	IV thiamine (B1)

CHAPTER-5

Clinical Management Guidelines for Essential Surgical Care

Basic Essential Surgical Services

- Acute Appendicitis
- Appendicular abscess
- Cellulitis and abscess
- Wound management

5.1. Acute Appendicitis

Definition

It is an acute inflammation of the Appendix. Acute appendicitis is essentially a clinical diagnosis.

Diagnosis

A detailed history and careful examination of the patient carry more weight in making the diagnosis than radiological investigations, although these investigations can be useful to rule out alternative diagnoses.

Signs and Symptoms

Symptoms	Signs
Murphy's Triad	Tenderness and rebound tenderness in RIF
Pain	Exclude the differential diagnosis
Start from epigastrium or umbilical region and shift to Right lilac Fossa (RIF)	Exclude complicated appendicitis, e.g., appendicular abscess, appendicular mass, a burst appendix
Vomiting	
Fever	
Low-grade fever or may be afebrile	

Treatment of Appendicitis

- Plan for operation (Emergency appendicectomy)
- Pre-operative care
  - » Nothing by mouth
  - » IV fluid (According to daily requirement)
  - » IV antibiotics (Metronidazole and a broad-spectrum antibiotic or ceftriaxone)
- Emergency appendectomy
- Postoperative care
  - » In the absence of general peritonitis, start oral fluids and a light diet as tolerated when the patient is fully awake.
  - » If the appendix was perforated, and particularly in a high-risk patient, continue antibiotics for 5 days. These should be intravenous until the gut function returns.
  - » Remove any drain after 2–3 days unless there is still profuse discharge.
  - » Monitor the wound if pyrexia develops and exclude chest and urinary infection.

Complications and Management

(a) Wound infection

- Develops occasionally in patients with mild appendicitis but has a higherincidence in those who have had a gangrenous or perforated appendixremoved. Anaerobic Bacteroides and aerobic coliform organisms are usually responsible.
- Examine the wound regularly and remove some of the skin suture or clips if there is evidence of infection, to allow any pus to drain.

(b) Pelvic abscess

- If pyrexia develops, always carry out a rectal examination. The pelvic infection produces localized heat, 'bogginess', and tenderness. Continue antibiotics.

(c) Appendicular abscess

Clinical Features

- Soft
- Tender
- Fever
- Chills and rigor

Following an attack of appendicitis, if the infection is not controlled properly, an abscess can occur within appendix.

Types of Appendicular Abscess

- Retrocecal
- Subcecal
- Preileal
- Postileal
- Pelvic

Pelvic abscess: present with Diarrhoea due to irritation of the sigmoid colon.

Treatment

Drainage of the abscess with delayed appendicectomy.

Retrocecal appendicitis:

Extraperitoneal Approach

Procedure

- Incision: 5-6 cm made at RIF
- All muscles divided. Do not open the peritoneum. Access the retroperitoneum and if found pus, swept the peritoneum medially.
- And suction pus and insert drain retroperitoneally
- Then, Close Abdomen layer by layer

For Appendicular Abscess with Pelvic Abscess:

Procedure

- Laparotomy
- Insertion of Urinary Catheter
- Incision: Lower Midline Incision
  - » Incise the skin with 15 blades up to the sheath (Linear alba)
  - » Then, incise the linea alba and peritoneum
  - » Access the peritoneum cavity, push the intestine to the medium with six six
  - » Access the abscess cavity and drain the pus
  - » If appendix cannot be identified, drain the pus with the insertion of malecot catheter in the abscess cavity
  - » If the appendix can be identified well, do appendicectomy.

Post-op Treatment

- Continue IV antibiotics for 3-5 days, Nothing by mouth and IV line
- Interval Appendicectomy 1-2 months later

List of Equipment and Medicine

No.	Equipment
1.	Blade - No.10
2.	The drainage tube (Foley catheter) and urine bag
3.	Prolene 0 with a round body
4.	Urinary catheter and Urine Bag
5.	2/0 vicryl or 2/0 chromic with round body needle
6.	2/0 prolene or 2/0 Nylon with round body needle
7.	2/0 silk and 2/0 nylon with cutting needle

No.	Medicine
1.	IV fluid
2.	IV ceftriaxone
3.	IV metronidazole
4.	Injection analgesics (of available)
5.	Oral Cefixime Tab
6.	Oral Metronidazole 200 mg Tab

5.1.1. Appendicectomy

A → Access

Traditional Gridiron incision

- 5–8 cm long, in line with the external oblique fibers if you anticipate the need to extend the exposure. The incision crosses McBurney's point at right-angles to the spino-umbilical line, one-third lateral, two-thirds medial. If necessary, the external oblique muscle and aponeurosis can be split in both directions and the internal oblique and transversus muscles can be cut to convert the incision into a right- sided Rutherford Morrison incision.

B → Opening the abdomen

- Incise the skin cleanly with the belly of the knife.
- Divide the subcutaneous fat, Scarpa's fascia, and subjacent areolar tissue to expose the glistening fibers of the external oblique aponeurosis.
- In the gridiron approach, these fibers run parallel to the skin incision.
- Incise the external oblique aponeurosis in the line of its fibers. Start with a scalpel, then use the partly closed blades of Mayo's scissors while your assistant retracts the skin edges.
- Retract the external oblique aponeurosis to display the fibers of the internal oblique muscle, which run at right-angles. Split internal oblique and transversus abdominis muscles.
- Pick up a fold of peritoneum with artery forceps and after ensuring that bowel loops are not included in between the forceps, make a small incision through the peritoneum with a knife. Use scissors to enlarge the hole in the line of the skin incision.
- Find the caecum, identify a taenia and follow it distally to the base of the appendix Mobilize the appendix from base to tip.
- Divide the mesoappendix distal to the clampand ligate the vessel with 2/0 Vicryl or similar material.
- Crush the base of the appendix with a hemostat then replace the clamp 0.5 cm distal to the crushed segment. Ligate the crushed segment with 2/0 Vicryl and cut off the appendix just distal to the hemostat.
- If peritoneal soilage is present, need to do intraperitoneal drain at pelvic.

C → Closure

- Pick up the edges of the peritoneum around the entire incision with fine hemostats to allow easy and safe suturing of the opening with continuous 2/0 Vicryl or similar material.
- Insert interrupted stitches of the same material into the internal oblique muscle with just enough tension to oppose but not strangulate the muscle fibers. Now close the external oblique aponeurosis with a continuous Vicryl stitch.
- Apply the povidone-iodine solution to the wound once the peritoneum is closed. Appose the subcuticular tissues with fine sutures in an obese patient and close the skin with interrupted suture 2/0 silk or Nylon.

5.2. Cellulitis and Abscess

Definition

Cellulitis is a non-suppurative invasive infection of tissue.

Signs and Symptoms

Signs of inflammation:

5 cardinal signs (pain, temperature, redness, swelling, loss of function).

Treatment

Surgical intervention – not required. It can be treated with antibiotics.

- IV Flucloxacillin 500mg 8 hourly x (3-5) days or
- IV Amoxicillin/clavulanic acid 1.2 g 8 hourly x (3-5) days
- Followed by Oral Antibiotics

Most cases are subsided with antibiotics.

If there is any injured wound, the debridement of the wound must be done.

If cellulitis is not relieved and progress to necrotizing fasciitis, aggressive debridement with empirical IV antibiotics, and high flow oxygen must be done.

Then timely referral to a higher-level hospital should be done.

List of Equipment and Medicine

No.	Equipment
1.	Oxygen

No.	Medicine
1.	IV Flucloxacillin
2.	IV Amoxicillin/ clavulanic acid
3.	Oral Flucloxacillin
4.	Oral Amoxicillin/clavulanic acid

5.2.1. Incision and drainage of a superficial abscess

Diagnosis of a superficial abscess

5 cardinal signs:

Pain, Temperature, Swelling, Redness, Loss of function and fluctuation Sign (+) ve

Principles of Incision and drainage skin incision should be given at depended area, avoid major vessels and nerve, avoid joint line

- Creation of multilocular to unilocular
- Counter drain if necessary
- Deroofing if necessary
- Deep-seated and organ space abscess should be referred properly

Technique

- After aseptic condition and under appropriate anesthesia, a skin incision was given up to abscess cavity
- Loculi were breakdown by sinus forceps
- Pus was drained
- Eusol plug was inserted

List of Equipment and Medicine

No.	Equipment
1.	11 - blade
2.	2/0 silk or 2/0 nylon for skin
3.	Sinus forceps

No.	Medicine
1.	IV Flucloxacillin + Amoxicillin
2.	Oral Flucloxacillin + Amoxicillin
3.	Analgesic – IV/ Oral
4.	EUSOL solution

5.3. Wound Management

The simple and clean wound should be cleaned and sutured. If the wound is contaminated, proper debridement. Healed by secondary intension or delayed primary suture should be considered.

Antibiotic – route

depends on types of wound

Equipment:

Minor surgical set

Technique

- The wound should be cleaned with a solution I (chlorhexidine/soap and water), II and III under LA or GA
- Proper wound debridement was done.
- The wound was sutured layer by layer if the wound is clean.

List of Equipment and Medicine

No.	Equipment
1.	Sutures depend on site and depth of wounds e.g., 2/0 chromic catgut for muscle repair
2.	2/0 silk or 2/0 nylon for skin
3.	Minor surgical set

No.	Medicine
1.	Antibiotics types and route depends on the type of wound • e.g., amoxicillin + flucloxacillin TDS x 5 days
2.	Analgesic depends on wounds
3.	Solution I, II and III

CHAPTER-6

Clinical Management Guidelines for Essential Obstetrics Care

Basic Essential Obstetrics Services

- Antenatal Care
- Normal Labour
- Forcep Delivery
- Vacuum-Assisted Delivery
- Postnatal Care
- Antepartum Haemorrhage
- Postpartum Haemorrhage
- Severe Pre-eclampsia and Eclampsia
- Caesarean Section
- Bleeding in early pregnancy
- Ruptured ectopic pregnancy

6.1. Antenatal Care

Objective:

To conduct antenatal care for every pregnant woman

First Visit

- Book for ANC using a standardized AN record.
- Take a complete history – to identify who may need additional care as high-risk (refer if necessary)
- Calculate EDD from menstrual cycle and LMP to identify the maturity
- Measure body weight in kg and height in meter
- Perform a thorough physical examination to detect medical diseases.
- Obstetric examination – to confirm pregnancy, its maturity in accordance with LMP
- Identify fundal height, measure SFH in cm, number of the fetus, lie, presentation and detect FHS by Pinard fetal stethoscope
- Pretest counseling PMCT- if positive PMCT package (appropriate referral If PMCT package is not available)
- Arrange for antenatal investigations (if facility present)
  - » To screen for blood group, rhesus, Hb%(coulter), HBs antigen, HCV antibody, STS/VDRL, HIV
- Urine for protein either boiling or dipstick
- Health education
- Counseling and give information on diet and lifestyle consideration

Action

- Folic acid supplementation (400mcg / day up to 12 weeks)
- Immunization for tetanus after 24 weeks
- Prescribe iron when morning sickness is relieved
- Arrange next visit at 1 - 4 weeks depending upon gestational age

Second Visit

- Review, discuss and record results of all investigations
- Post-test counseling on VCCT results
- Measure BP and perform Obstetric examination

Identify abnormal finding

- E.g., Anemia
- Treatment should start promptly and referral to secondary care should be considered if there are significant symptoms and/or severe anemia (Hb<7 g/dl) or late gestation (>34 weeks) or if there is a failure to respond to a trial of oral iron
- Blood transfusion (preferably packed cell transfusion) if haemoglobin is < 7g/dl
- Blood transfusion should be reserved for those with the risk of further bleeding, imminent cardiac compromise, or symptoms requiring immediate attention.
- E.g., UTI
- UTI to be treated with Ampicillin 500mg qid for 5days/cephalosporin 500mg tds for 5 days if no contraindication.

Subsequent Visits

Provide routine antenatal care during follow up visits monthly till 28 weeks, every 2 weeks till 36 weeks, and weekly thereafter assess the mother and fetal condition at 36 weeks and refer to the specialist center if there is a risk.

6.2. Normal Labour

Diagnosis of Labour

- Contractions occur at regular interval
- Interval gradually shorten
- The intensity of pain gradually increase
- Progressive cervical effacement & dilatation

First Stage of Labour

Initial Assessment

- A detailed history, clinical examination, and basic investigations to Identify high- risk pregnancies.
- Appropriate referral if it is a high risk

General Examination

- The general condition of the woman, temperature, blood pressure, PR

Abdominal Examination

- Uterine contraction by palpation (every 30min)
- Fundal height, Symphisio fundal height, lie, presentation.
- The level of presenting part (fifths)
- Fetal heart rate (every 15min in first stage & every 5min in the second stage)

Vaginal Examination

- Any abnormal discharge from the vagina
- Colour and quantity of amniotic fluid
- Consistency, position, effacement, and dilatation of the cervix
- Station, caput, and molding of the head.

Investigations

- Urine for protein, ketone, and sugar
- Urgent Hb%, blood Grouping, and Rh

Active Management of Labour

- Monitoring with the partograph
- It has 3main components – the fetal record, maternal record, and progress of labour.
- The latent phase is from 0-3cm dilatation (Not last longer than 8hr)
- The active phase is 3-10cm dilatation (1cm/hr)

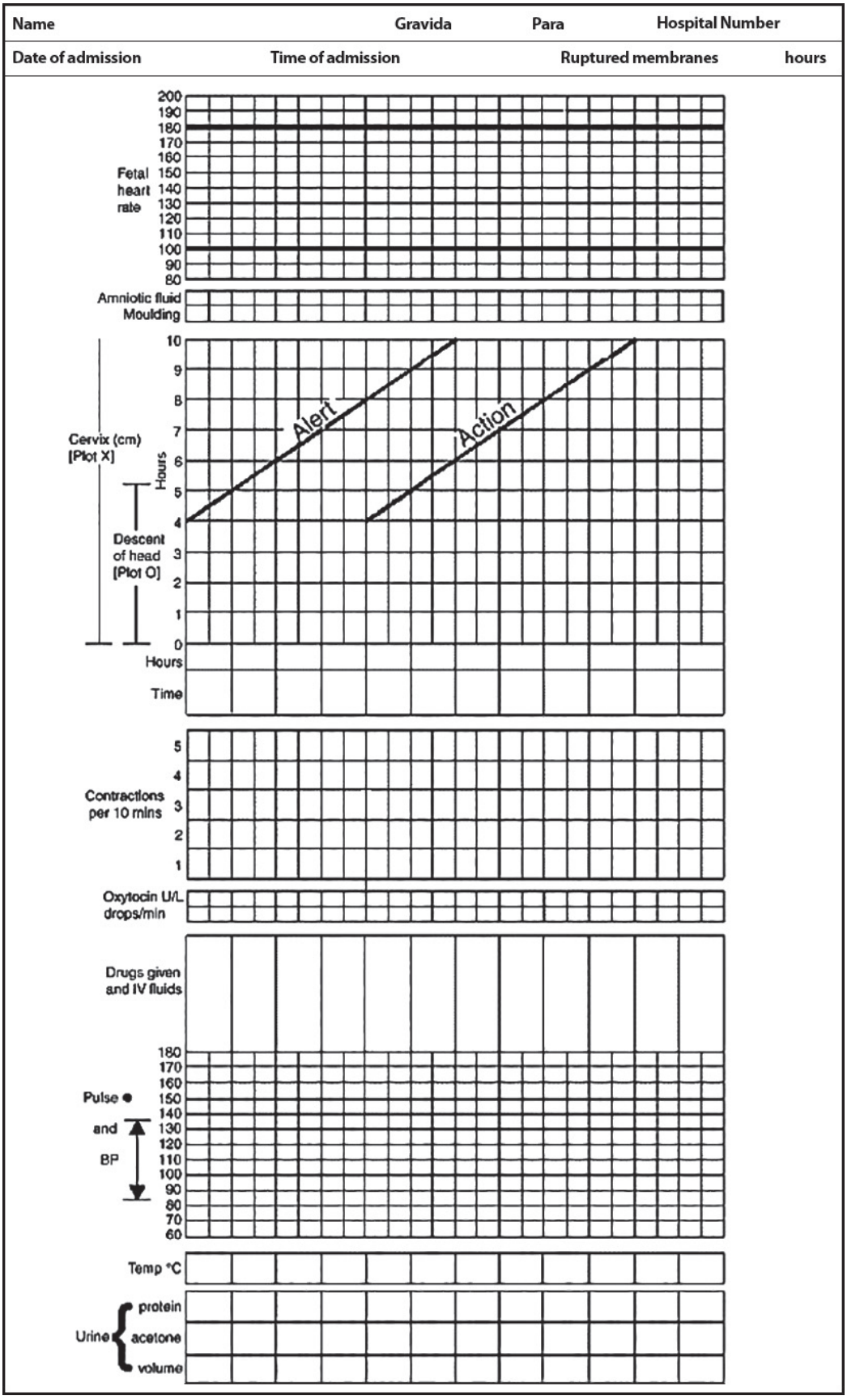


Figure 24: Monitoring in Labour

Fetal Monitoring

- Intermittent auscultation using a Pinard stethoscope (every 15min)
- Observation of the colour of the liquor (clear or meconium-stained), molding, caput

Maternal Monitoring

- BP, Pulse rate, temperature, urine protein, and ketone.
- Frequency, intensity, and duration of contraction.
- Assess progress of labour every 4 hours
- Note signs of maternal distress such as
- Tachycardia, tachypnoea, and dyspnea
- Pyrexia
- Dehydration with reduced urine output, ketone bodies in urine

Second Stage of Labour

- FHR: Monitored every 5 minutes
- Delivery should be completed within 1 hour (for multip) and within 2 hours (for primip) of 2nd stage
- Appropriate referral if there is prolonged 2nd stage

Delivery of the baby

- Ensure all delivery equipment and supplies
  - » Ensure the bladder is empty
  - » Comfortable position
  - » Emotional and physical support
  - » Allow pushing
  - » Wait until head visible and perineum distending
  - » Wash hands- and put-on gloves
  - » Universal precautions
- Ensure controlled delivery of the head
  - » Keep one hand on the head as it advances with contractions.
  - » Support perineum with the other hand and cover anus with a pad.
  - » Leave the perineum visible
  - » Ask the mother to breathe steadily and not to push during delivery of the head.
- Feel the cord around the neck
- Check the face is clear of mucous and membrane
- Await spontaneous rotation of shoulders and delivery

- Apply gently downward pressure to deliver the top shoulder
- Tilt baby up, towards the mother's abdomen to deliver lower shoulder.
- Place the baby on the mother's abdomen
- Note time of delivery
- Thoroughly dry the baby immediately, wipe eyes, and discard wet cloth.
- Assess baby's breathing while drying
- If the baby is not crying, observe breathing
- Exclude the second baby
- Palpate mother's abdomen
- Watch for vaginal bleeding
- Delay cord clamping
- Skin to skin contact
- Encourage the initiation of breastfeeding.

Third Stage of Labour

- Active management of the third stage should be recommended.
- 10U of oxytocin is given intramuscularly immediately after birth within 1minute after delivery.
- Late cord clamping and cutting of the cord (1-3 min after birth)
- Deliver the placenta by controlled cord traction
- If there is no prophylactic administration of uterotonic drugs during the third stage of labour, misoprostol can be used in a single dose.
- Check the placenta and membrane are complete
- Check the uterus is well contracted and there is no heavy bleeding
- Examine perineum, lower vagina, and vulva for tears and repaired if present

Fourth stage of labour

- Keep the mother and baby in the delivery room for a minimum of one hour after delivery of the placenta.

List of Equipment and Medicine

No.	Equipment
1.	Sterile gloves
2.	Amniohook or Kocher's forceps
3.	Sterile drapes
4.	Episiotomy scissors
5.	Small artery forceps
6.	Dissecting forceps, toothed
7.	Dissecting forceps, non-toothed
8.	Needle holder
9.	Sponge forceps
10.	Syringe (5cc)
11.	Sutures and ligature (Polyglycolic (2/0) (0)
12.	Gauze swabs
13.	Suction catheters
14.	Sterile pads
15.	Kidney dish
16.	Suction tube or ball
17.	Cord clamp
18.	Bag & mask

No.	Medicine
1.	Solution III
2.	Local anaesthetic agent (1 % lignocaine)
3.	Antiseptic solutions
4.	IV oxytocin

Instrumental Vaginal Delivery

6.2.1. Forceps delivery

Indications

- Most common – the prolonged second stage of labour.
- Fetal distress at 2nd stage
- Maternal distress or maternal exhaustion.
- To shorten the second stage especially in medical problems such as cardiac disease, cerebrovascular disease, pre-eclampsia, etc.

Contraindication

- Fetal malpresentation
- Cephalopelvic disproportion
- Fetal coagulopathy

Clinical criteria must be fulfilled

- Head is less than 1/5 palpable per abdomen
- Cervix is fully dilated
- Membranes ruptured
- The maternal bladder has been emptied recently
- Vertex presentation
- The exact position of the head should be determined
- Excessive caput or molding should not be present
- Appropriate analgesia – regional or pudendal block
- Informed maternal consent and cooperation
- Good uterine contraction

Conduct of a non-rotational forceps delivery

- Lithotomy position
- Cleaning & drapping, Empty the Bladder
- Assemble the blades
- Apply lubricant
- Atraumatic application of blades
  - » Warn patient
  - » Await uterine relaxation
  - » Gentle, wide sweep at the correct angle (in line with opposite inguinal ligament)
  - » Vaginal hand to guide and protect the vagina or baby.
  - » Easy locking of blades – remove and replace if resistance.
- Gentle traction beginning with the peak of each contraction.
- Local anesthesia 1% lignocaine 10 cc (Bilateral pudendal block and perineal infiltration

- Make an episiotomy when there is sufficient descent such that delivery is imminent.
- As the head crowns, change the angle of traction through 90 degree and control delivery of the head.
- Check the neck for cord – loosen and deliver shoulders with next contraction or maternal effort after restitution with external rotation and lateral flexion. Deliver the placenta (active third stage management).
- Careful vaginal or perineal or rectal examination and repair episiotomy or tear.
- Documentation
- Look for complication

List of Equipment and Medicine

No.	Equipment
1.	Sterile gloves
2.	Forceps
3.	Sterile drapes
4.	Episiotomy scissors
5.	Needle holder
6.	Syringe (5cc)
7.	Sutures and ligature (Polyglycolic (2/0) (0)
8.	Gauze swabs
9.	Suction catheters
10.	Sterile pads
11.	Kidney dish
12.	Suction tube or ball
13.	Cord clamp
14.	Bag & mask

No.	Medicine
1.	Local anaesthetic agent; 1% lignocaine
2.	Antiseptic solutions
3.	IV oxytocin

6.2.2. Vacuum-Assisted Delivery

Indications

- Prolonged 2nd stage
- Fetal distress at 2nd stage
- Fetal malposition (occipito-posterior, DTA)
- Maternal distress or maternal exhaustion.
- To shorten the second stage especially in medical problems such as cardiac disease, cerebrovascular disease, pre-eclampsia, etc.

Contraindications

- Face Presentation
- Gestation less than 34 weeks

Conduct of the vacuum assisted delivery

- Lithotomy, cleaning and draping
- Empty Bladder
- Testing the vacuum effect
- Prepare for vacuum delivery
  - » Apply lubricant to the outside of the cap
  - » Atraumatic vaginal insertion over the occiput
  - » The vacuum cup is (over the flexion point, 3cm anterior of posterior fontanelle).
  - » Take the negative pressure to 0.2kg/cm^2 and check that no vaginal tissue is caught under the cap, increase pressure gradually 0.2 kg/cm^2 within 2 mins
  - » Until the negative pressure up to 0.8kg/cm^2 i.e., within 8 min for the metal cup
  - » Directly increase the pressure up to 0.8kg/cm^2 for silastic cup
  - » Gentle traction beginning with the peak of each contraction or maternal effort.

» One hand should rest on the cap. (to prevent detachment and gauge descent (+/-) use fingers to promote head flexion) and the other hand applies traction.

- Episiotomy if necessary
  - » As the head crowns, change the angle of traction through 90 degree and control delivery of the head
  - » Check for cord – loosen and deliver shoulders with next contraction or maternal effort after restitution with external rotation and lateral flexion. Deliver the placenta (with active third stage management)
  - » Careful vaginal or perineal or rectal examination and repair episiotomy or tears.
  - » Documentation and review before discharge.

Failed Vacuum

- No evidence of progressive descent with each pull
- Delivery not imminent following three pulls or contraction
- More than 15minutes elapsed since the application of the instrument
- More than one cup de-attachment

List of Equipment and Medicine

No.	Equipment
1.	Sterile gloves
2.	Vacuum
3.	Sterile drapes
4.	Episiotomy scissors
5.	Needle holder
6.	Syringe (5cc)
7.	Sutures and ligature (Polyglycolic (2/0) (0)
8.	Gauze swabs
9.	Suction catheters
10.	Sterile pads
11.	Kidney dish
12.	Suction tube or ball
13.	Cord clamp
14.	Bag & mask

No.	Medicine
1.	Local anaesthetic agent; 1% lignocaine
2.	Antiseptic solutions
3.	IV Oxytocin

6.3. Postnatal Care

Definition

Postnatal care - Care during the first 6-8 weeks after childbirth

The immediate postnatal period - just after childbirth covering the first 24 hours which need close supervision by a skilled health attendant directly or indirectly

The early postnatal period
Day 2- 7 after childbirth

The late postnatal period
Day 8 to 42 after childbirth

Postnatal Care

- Keep the woman in the immediate postnatal room for at least 1 hour after delivery or until general condition and vital signs are stable
- Assess vital signs (pulse, blood pressure BP, temperature, respiration), amount of vaginal bleeding, presence of anemia, uterine contraction, and fundal height regularly (every 30 min) for one hour
- Transfer to the postnatal ward after 1 hour of a stable situation
- Encourage breastfeeding as soon as possible within half an hour
- Measure and document pulse and BP after 6 hours if the woman is stable
- Encourage to void urine within 6 hours and document the amount/volume; if she has not voided by 6 hours postpartum, feel the extent of bladder distension, check perineum for the presence of hematoma, give simple analgesic (paracetamol 500 mg) if there is no obvious cause of urinary retention and encourage/support her to void naturally
- Check for anemia and if present, give iron supplementation for 3 months
- Care of the perineum
- Assess the perineum if there is pain or swelling
- Evaluate signs and symptoms of wound infection, inadequate repair, and wound breakdown
- Observe the symptoms and signs of serious complications which need emergency action and appropriate referral
  - » Sudden profuse blood loss or hypovolaemic shock (tachycardia, hypotension, hypoperfusion, change in consciousness (Postpartum haemorrhage PPH)
  - » Diastolic DBP more than 90 mmHg and impending eclampsia (headache, visual disturbances, nausea, vomiting, increased jerk, clonus, change in conscious level) or DBP persistently more than 90 mmHg within 4 hours (Postpartum eclampsia)
  - » The temperature remains above 38°C on the second reading (4-6 hours after the first record of 38°C) in a woman who has the suspicion of infection (Puerperal pyrexia)
  - » Signs and symptoms of infection (fever, rigor, abdominal pain, foul-smelling vaginal discharge, sub-involution of the uterus) (Puerperal sepsis)
  - » Unilateral calf pain, redness, swelling (Deep Vein Thrombosis DVT)

  - » Shortness of breath, chest pain, tachypnoea, cyanosis, sudden onset of cough, basal crepitation, tachycardia (Pulmonary embolism)
- Support the woman ambulation instead of mobilization
- Discharge from the hospital and arrange for Late Postnatal visit at 6-8 weeks
  - » When both mother and baby are well (commonly day 3 in spontaneous uncomplicated vaginal delivery)
  - » When the stitches of episiotomy are removed (day 5) or it heals well
  - » When the abdominal wound stitches are removed (commonly at day 6-7) and it heals well
- Advise reporting immediately if there are any warning signs of neonatal complications

Postnatal follow-up Care in Postnatal Clinic

- Carried out at 6 weeks after delivery
- The examination includes an assessment of the woman's general well-being and common health problems; physical, emotional, and social health as well as the progress of the baby.
- Take the history and review the event during pregnancy and delivery
  - » Perform physical examination
  - » General condition – temperature, anemia, vital signs
  - » BP measurement especially if the woman has a history of hypertension during pregnancy or pre-eclampsia.
  - » Examination of breasts for any crack, ulcer, lump, and mastitis. Breastfeeding progress should be assessed at each postnatal contact.
  - » Systemic examination for CVS & Respiratory systems
  - » Abdominal examination --- tone of anterior abdominal muscles, any mass palpable
- Check the condition of the perineal wound (episiotomy/tear) if present
- Refer to have review and management of the medical disease by appropriate physicians
- Advice on general health, nutrition & feeding of the baby
- Contraceptive advice, counseling, and service
- Choice of a method according to the couple's wish using Decision Making Tool for birth spacing and Medical Eligibility criteria
- Need to discuss the pros and cons of various methods
- Explain in detail about the usage of the method chosen and when to come back for any problem
- For those who has completed her family, sterilization can be advised as an interval procedure

Postnatal Complications

Common postnatal complications are:

1. Postpartum haemorrhage - primary and secondary
2. Puerperal pyrexia and genital tract sepsis
3. Pre-eclampsia/eclampsia
4. Thromboembolism
5. Postpartum mental health problems
6. Perineal complications
7. Urinary complications
8. Postnatal orthopedic problems
9. Other complications

Management of Postnatal Complications

Early identification of postnatal complications by:

- relevant history taking
- clinical examination – general, systemic, perineal, and vaginal examination
- investigations if necessary, e.g., hemoglobin estimation if anemia is suspected, urine albumin checked if postnatal pre-eclampsia is suspected

Appropriate management

- Timely referral to the district hospital/tertiary center with first aid measures if necessary

6.4. Antepartum Haemorrhage

Definition

- Bleeding from the genital tract after 24 weeks of gestation.

Causes of APH

- Abruptio placenta (10-15%)
- Placenta praevia (15-26%)
- Local or cervical cause
- Indeterminate

1. Abruptio Placenta

It is the premature separation of a normally sited placenta from the uterus and occurs in about 1% of pregnancy.

Risk factors

- Idiopathic (Majority)
- Increasing age, Increasing parity
- Hypertension
- Smoking
- Trauma, External Cephalic Version
- Sudden uterine decompression following membrane rupture

Complications

- Disseminated Intravascular Coagulation
- Acute Renal Failure
- Post-partum Haemorrhage
- Fetomaternal Haemorrhage

2. Placenta Praevia

It occurs when the placenta is partially or wholly inserted into the lower uterine segment of the uterus.

Classification

(i) Minor placenta praevia – the placenta is situated in the lower uterine segment but does not cover the cervical os.

(ii) Major placenta praevia-the the placenta covers the cervical os.

Risk Factors

- Increasing age
- Previous CS
- Previous placenta praevia
- Smoking
- Multiple pregnancies
- Previous dilatation and curettage

List of Equipment and Medicine

No.	Equipment
1.	Equipment for Vaginal Delivery
2.	Equipment for LSCS

No.	Medicine
1.	Medicine used in Vaginal Delivery
2.	Medicine used in LSCS

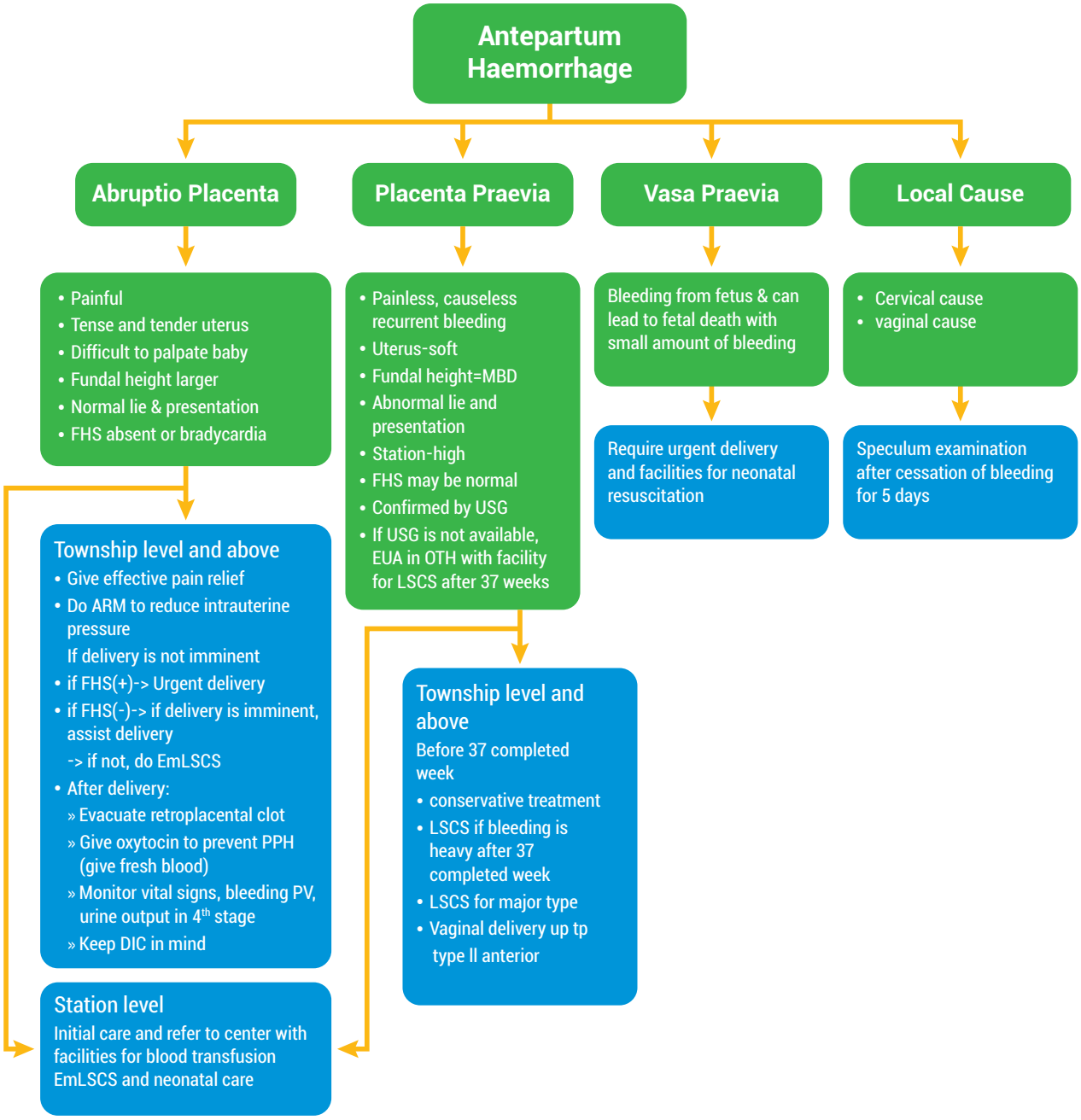


Figure 25: Management of Antepartum Haemorrhage

6.5. Postpartum Haemorrhage

Types

- Primary PPH
- Secondary PPH

Table 14: Risk factors of Postpartum haemorrhage

Maternal		Fetal
Pre-existing		• Multiple pregnancies
• Raised maternal age	• Previous cesarean	• Polyhydramnios
• Primiparity	• Bleeding disorders	• Big baby
• Grand multip	• Obesity	• Shoulder dystocia
• Uterine fibroid	• APH	
Intrapartum		
• Prolonged labour	• Pyrexia in labour	
• Cesarean section	• Episiotomy	
• Instrumental delivery		

Causes of four "T"

Sr.	
#Tone	Uterine atony (most common)
#Tissue	Retained placenta
#Trauma	Injury to vagina, perineum, uterine tear at CS
#Thrombin	Clotting disorders

Primary PPH:

Loss of more than 500ml of blood from the genital tract within 24 hours of delivery.

Secondary PPH

Abnormal bleeding per vagina between 24 hours and 12 weeks post-delivery.

Management of PPH

- Rapid assessment and evaluation of the general condition including vital signs.
- If shock is suspected, treat the shock immediately.
- Insert double-wide bore cannula and collect blood for grouping and matching.
- Reserve 4-6 units of blood and issue if needed.
- Massage the uterus to expel blood and blood clots. (blood clots trapped in the uterus will inhibit effective uterine contraction)
- Give oxytocin 10units IV slowly and oxytocin drip 40 u per bot

- PR prostaglandin (Cytotec) 800-1000 mcg or sublingual 600mcg
- IV ergometrine 0.5mg if there is no contraindication such as heart disease and hypertension
- Start IV crystalloid infusion and Indwelling catheterization
- Find out the possible cause of PPH (90% are due to uterine atony)
- Check the completeness of the placenta if it has been already expelled.
- Examine the cervix, vagina, and perineum for tears. If present, repaired accordingly.
- Bimanual compression and intrauterine balloon tamponade can be tried if pharmacological measures failed to control PPH or simultaneously with pharmacological measures
- Appropriate referral if all these first-line measures failed

Procedure

Bimanual compression

- Wear high-level disinfected gloves
- Insert a hand into the vagina and form a fist
- Place the fist into the anterior fornix and apply pressure against the anterior wall of the uterus
- With the other hand, press deeply into the abdomen behind the uterus, applying pressure against the posterior wall of the uterus
- Maintain compression until bleeding is controlled and the uterus contracts

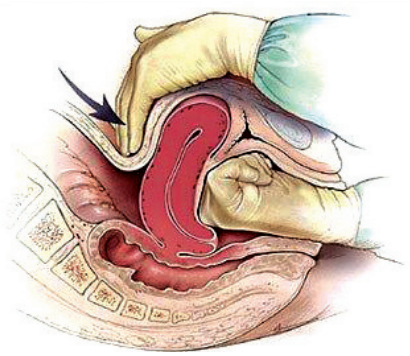


Figure 26: Technique of Bimanual Massage for Uterine Atony

Aortic compression

- Aortic pulsation can be felt easily through the anterior abdominal wall in the immediate postpartum period.
- Apply downward pressure with a closed fist over the abdominal aorta directly through the abdominal wall.
- The point of compression is just above the umbilicus and slightly to the left
- With the other hand, palpate the femoral pulsation to check the adequacy of compression
- If the femoral pulsation is not palpable, the pressure exerted is adequate
- Maintain compression until bleeding is controlled

Balloon tamponade or Condom tamponade

- Unroll the condom and insert the tip of the Foley catheter into the condom.
- Tightly tied the base of condom not to leak filled water
- Put Sim's speculum to retract the posterior vaginal wall and hold the anterior lip of the cervix with sponge holding forceps.

- Grasp the condom with another sponge forceps and put into the uterus
- Inflate catheter by connecting the open/outlet end of the catheter to giving set connected to infusion bag.
- Inflate condom with water or saline to about 300-500 mls (or required amount at which no further bleeding is observed.)
- Tie the end of the catheter after turning the end over when the desired volume is achieved, and bleeding is controlled
- Maintain in-situ for 6-12 hours if bleeding controlled and the patient is stable
- Give a broad-spectrum antibiotic cover.
- Continue to monitor the patient closely, resuscitate and/or treat shock necessary
- When a patient is stable (after 6hours) slowly deflate condoms by letting out 50ml per hour.
- Condom tamponade may be kept in place for up to 24hours.
- If bleeding is not controlled within 15 mins of initial insertion, abandon procedure, and seek surgical intervention immediately.

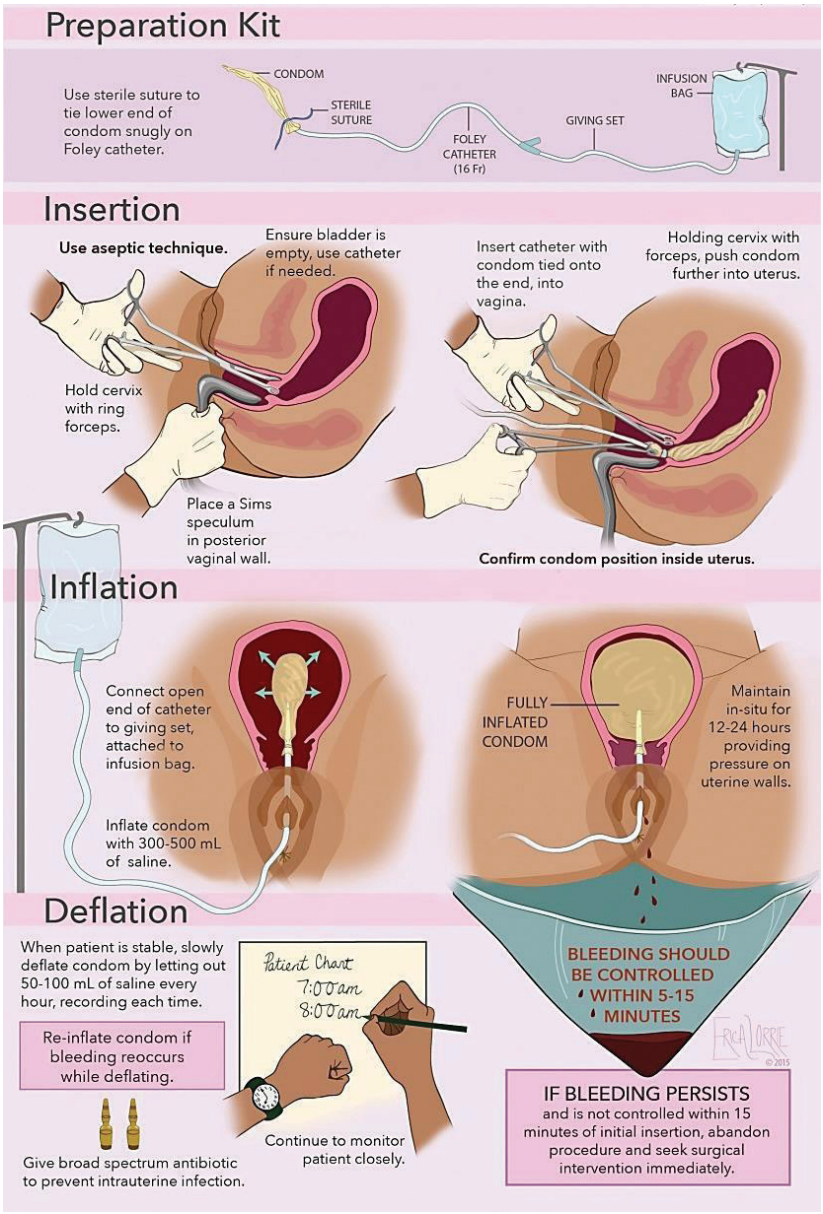


Figure 27: Condom Tamponade to Treat Postpartum Haemorrhage

Retained placenta

The placenta and membranes are undelivered until 30min (active management) after the vaginal delivery of the fetus.

Clinical Management

General Care

- IV-line access and start IV fluid replacement
- Send blood for grouping/matching and save
- Indwelling catheterization
- Ensure adequate analgesia and reassess
- Look for the sign of placenta separation and if it is present, apply controlled cord traction to remove the placenta.
- If the placenta is not delivered after 30 minutes of oxytocin stimulation and controlled cord traction, attempt manual removal of the placenta
- If bleeding continues, assess clotting status using a bedside clotting test.
- If there are signs of infection, give parenteral antibiotics (injection third-generation cephalosporin)

Manual Removal of Placenta

- Wearing high-level disinfected elbow-length gloves
- Hold the umbilical cord with a clamp. Pull the cord gently until it is parallel to the floor.
- Insert a hand into the vagina and up into the vagina and up into the uterus.
- Move the fingers of the hand laterally until the edge of the placenta is located.
- If the cord has been detached previously, insert a hand into the uterine cavity.
- Explore the entire cavity until a line of cleavage is identified between the placenta and the uterine wall.
- Detach the placenta from the implantation site by keeping the fingers tightly together and using the edge of the hand to gradually make a space between the placenta and the uterine wall.
- Proceed slowly all around the placental bed until the whole placenta is detached from the uterine wall.
- If the placenta does not separate from the uterine surface by gentle lateral movement of the fingertips at the line of cleavage, remove placental fragments. If the tissue is very adherent, suspect morbid adhesion of placenta.
- Hold the placenta and slowly withdraw the hand from the uterus, bringing the placenta with it.
- On the other hand, continue to provide counter-traction to the fundus by pushing it in the opposite direction of the hand that is being withdrawn.

- Check completeness of placenta and membrane
- The uterine cavity should be checked and confirmed as empty.
- Examine the woman carefully and repair any tears to the cervix or vagina or repair episiotomy.
- The oxytocin infusion should be continued.

List of Equipment and Medicine

No.	Equipment
1.	Evacuation & Curettage tray
2.	Sim's speculum
3.	Vulsellum forceps
4.	Uterine sound
5.	Uterine curette
6.	Sponge forceps
7.	Indwelling catheter
8.	Gauze swabs
9.	Condom
10.	Sterile elbow-length gloves
11.	Dilatation & Curettage Tray
12.	Uterine dilators
13.	Folley catheter

No.	Medicine
1.	Injection antibiotics - cephalosporin
2.	IV Fluid – N/S, R/L
3.	PR prostaglandin (Cytotec)
4.	IV Oxytocin
5.	IV Ergometrine
6.	Distilled water
7.	IV crystalloid
8.	Analgesics : Paracetamol suppository, diclofenac suppository, injection tramadol

6.6. Severe Pre-eclampsia and Eclampsia

It is important to refer the patient to an appropriate center with specialist care after acute management

Diagnosis

Criteria for severe Pre-eclampsia (one or more)

- Blood pressure: SBP >160mmHg, DBP ≥ 110mmHg on at least two occasions at least 4 hours apart with the patient at rest.
- Proteinuria >5gm in 24 hours, over 3+ urine dipstick test

Symptoms

- Oliguria: < 400ml in 24hours
- Epigastric Pain
- CNS: visual changes, headache, scotomata, mental status change

Signs

- Vomiting and generalized headache
- Increase jerks and clonus
- Pulmonary Oedema
- Impaired Liver Function tests
- Thrombocytopenia
- Intrauterine Growth Restriction: with or without abnormal Dropler assessment
- Oligohydramnios

Definition of Eclampsia:
The occurrence of tonic-clonic seizures superimposed on Pre-eclampsia

Acute management

- Turn onto her side with lateral position
- Ensure the airway is protected
- Give oxygen
- Never leave the women alone
- Observe vital signs, reflexes, fetal heart rate hourly
- Indwelling catheter to monitor urine output and proteinuria
- Close monitoring of fluid intake and urine output
- Monitor for the development of pulmonary oedema
- Auscultate the lung bases hourly for crepitation indicating pulmonary oedema. If rales are heard, withhold fluids, and give frusemide 40 mg IV once.

Treatment and prophylaxis of convulsion

- Drug of choice – Magnesium Sulphate ($MgSO_4$)

For Station Medical Officer

- Loading dose: Deep IM $MgSO_4$ 10G (50% solution) with 1ml of 2% Lignocaine, 5G in each buttock and refer to the hospital immediately.
- Maintenance dose: Deep IM $MgSO_4$ 5G (50% solution) with 1ml of 2% Lignocaine every 4hours in alternative buttocks if it takes time to arrive at the hospital. Or
- Loading dose: IV $MgSO_4$ 4G (20ml/ampoule of 20% solution) over 5-10minutes
- Maintenance dose: N/S 500ml + 8G of $MgSO_4$ with 15dpm = 1G/hr at least 24hours from last fit.

For recurrent fits

- A further bolus dose of 2G(IV) or increase in the infusion rate to 1.5G or 2G/hr
- Exclude other causes of fits (epilepsy, encephalitis, cerebral malaria)
  - » Treatment for acute/severe hypertension (SBP ≥160mmHg and/or DBP ≥110mmHg)
- Labetalol – Drug of choice
- If BP is still uncontrolled, give IV labetalol 10mg.
- If the response is inadequate, give IV labetalol 20mg (10 min later)
- Increase dose to 40 mg and then 80 mg if a satisfactory response is not obtained after 10 mins of each dose.
- A cumulative dose of up to 300mg can be given.

(or)

Hydralazine – second-line drug

- Bolus dose 10mg IV slowly after dilution with 10 cc Sodium chloride 0.9%.
- Repeat doses 5mg IV at 20 minutes intervals may be given if necessary.
- The goal is to decrease DBP to 90 to 100mmHg
- Monitor BP every 5minutes
- If no lasting effect with boluses (assess over 20mins), consider an infusion at 2.0mg/hour increasing by 0.5mg/hour as required (2-20mg/hour usually required)

Nifedipine – third choice

- Nifedipine 5 to 10mg oral
- Fluid therapy
- Close monitoring of fluid intake and urine output is mandatory
- Fluid therapy should be limited to maintenance crystalloid (85 ml/hr or urine output in preceding hour + 30 ml)
- Corticosteroid to improve fetal lung maturity
- Injection Dexamethasone 6mg IM four doses 12hrs apart if the gestation is less than 34 weeks
- Injection Betamethasone 12mg two doses 24 hours apart

Investigations and monitoring:
Monitoring of hemoglobin, platelet count, transaminases, urea, creatinine, uric acid.

Delivery

- The definite treatment of eclampsia is "Delivery"
- Delivery should take place as soon as the woman's condition has stabilized. (once seizures are controlled, severe hypertension treated, and hypoxia corrected)
- Vaginal delivery should be considered
- But the caesarean section is likely to be required in primigravidae, remote from the term with an unfavorable cervix.

Postpartum care

- Close monitoring
- Anticonvulsant therapy should be maintained for 24hrs after delivery or the last convulsion
- Continue antihypertensive therapy as long as the diastolic pressure is 100mmHg or more
- Continue to monitor urine output

Pregnant woman with Eclampsia fits or severe PE

- SBP ≥ 160mmHg, DBP ≥ 110mmHg, Proteinuria ≥3+ (or) >5G in 24 hours, Symptomatic (Headache, Blurred vision, Epigastric pain), Hyperreflexia, Oliguria (<400ml in 24 hours), Pulmonary oedema,

> **HELLP syndrome:**
> (Haemolysis, Elevated Liver Enzyme, Low Platelet Count) Refer to tertiary center after giving initial treatment and resuscitation.

List of Equipment and Medicine

No.	Equipment
1.	Oxygen
2.	Drip set
3.	Syringes
4.	Mouth gag

No.	Medicine
1.	IV/IM Magnesium Sulphate ($MgSO_4$)
2.	Inj: 2% Lignocaine
3.	IV Frusemide
4.	IV N/S
5.	IV labetalol
6.	IV hydralazine
7.	Oral Nifedipine
8.	Injection Dexamethasone
9.	Injection Betamethaxone

6.7. Caesarean Section

Indications

No.	Major indication
1.	Previous Caesarean Section
2.	Cervical Dystocia
3.	Acute fetal compromise
4.	Major placenta previa

Pre-operative

- Review for indications
- Informed consent
- Check for fetal heart rate
- Give prophylactic antibiotics (Injection cephalosporin after test dose 1 hour before Operation
- Blood for G&M, reserve two units

Intra-operative Procedure

- Use spinal or regional anesthesia
- IV line with blood set (NS or RL) for preload
- Supine position with a lateral tilt to minimize inferior vena cava compression by the gravid uterus, avoiding both maternal hypotension and subsequent reduced placental perfusion and fetal hypoxia.
- The bladder should be emptied with an indwelling catheter
- The abdomen should be cleaned and draped in a sterile manner
- Abdominal Entry
- Transverse, approximately 15cm, symmetrical lower abdominal incision (Pfannenstiel or Jo Cohen) approximately 2cm above the symphysis pubis.
- Incise centrally through the subcutaneous tissue and rectus sheath followed by sharp or blunt extension of the incision.
- Parietal peritoneum identified between rectus muscles, the peritoneum incised, and opened in the transverse plane.
- Uterine rotation corrected manually, insert Doyen retractor, and expose the lower part of the uterus.
- Elevate utero-vesical peritoneum, incise transversely, using scissors and push the lower edge of peritoneum and attached bladder inferiorly.

Uterine entry and delivery

- Curved 3cm incision into the exposed lower uterine segment, careful entry into the uterine cavity using sharp or blunt dissection, membrane incised, and fingers used bluntly to extend the incision laterally.
- Insert hand inferiorly into the uterine cavity below the presenting part gently until the presenting part appears within the uterine incision.
- Fundal pressure applied by assistant and baby delivered.
- Intravenous oxytocin administered by anesthetist, placenta or membrane delivered with controlled cord traction and uterine cavity swabbed to remove any products of conception.

Surgical Closure

- Closure of uterus in a double layer with continuous locking or non-locking absorbable sutures. e.g., polyglycolic acid 1
- Closure of rectus sheath with continuous absorbable or non-absorbable suture e.g., polydioxanone PDS. polyglycolic acid 1.(0)
- Skin closure with fine (e.g., 2/0) absorbable PG 2-0or non-absorbable e.g.:0 Proline or Nylon 0) subcutaneous suture.
- Peritoneal and fat layers do not require to close routinely.

Post-operative Care

- Note vital signs and aware of PPH
- Aware of PPH
- Observe bleeding per vagina and save pads
- If bleeding severe, treat according to the guideline for PPH
- Continuous oxytocin drip(20 iu per bottle for 24 hours)
- Continue parenteral antibiotics according to situation
- Careful documentation of the procedure and findings

Before Discharge

- Look for complications
- Explain the patient about the indication of Caesar in understandable language.
- Tell her birth spacing and follow up visit.
- To continue haematinics and nutritious diet during the breast-feeding period.
- Advice to book antenatal care and delivery in the specialist hospital with the next pregnancy.

List of Equipment and Medicine for Caesarean Section

No.	Equipment
1.	Green-Armytage forceps
2.	Low forceps
3.	Midstraight forceps
4.	Curved dissecting scissors
5.	Scalpel handle and blade
6.	Short dissecting scissors
7.	Long dissecting scissors
8.	Stitch scissors
9.	Small, curved artery forceps
10.	Small, straight artery forceps
11.	Large, curved artery forceps
12.	Large, straight artery forceps
13.	Needle holder (long)
14.	Needle holder (short)
15.	Retractors (Doyen)
16.	Self-retaining retractor
17.	Dissecting forceps (toothed)
18.	Long dissecting forceps (non-tooth)
19.	Tissue forceps (Alllis)
20.	Tissue forceps (Duval)
21.	Tissue forceps (Babcock)
22.	Sponge forceps
23.	Occlusion clamps (straight, curved)
24.	Crushint clamps (large, small)
25.	Syringe (5cc, 10cc)
26.	Suture (polyglycolic 0, 1, 2/0, nylon 0)
27.	Suction nozzle
28.	Diathermy electrode
29.	Flexible probe with round point
30.	Grooved director
31.	Nasogastric tube
32.	Towel clips
33.	Stainless steel bowls
34.	Kidney dish
35.	Gallipots(Steel Bowl)

No.	Equipment
36.	Linen tapes
37.	Gauze swabs
38.	Antiseptic solution
39.	Adhesive tape (Primapore or Silk plaster
40.	Drainage tube (if necessary)
41.	Sterile drapes (for infection case)
42.	Sterile gloves
43.	Cannula (18G)
44.	Blood set
45.	Drip set
46.	Foley Catheter
47.	Urine bag
48.	Cord clamp
49.	Caps and masks
50.	Aprons

No.	Medicine
1.	IV Oxytocin
2.	IV Fluid- Normal Saline
3.	Distilled water
4.	Injection cephalosporin
5.	Oral antibiotic (Flucloxacillin)
6.	Solutions(I,II,III)

6.8. Bleeding in early Pregnancy

Possible differential diagnosis:

1. Miscarriage
2. Ectopic pregnancy
3. Hydatidiform mole
4. Implantation bleeding

- Explore history particularly bleeding PV, pain, the passage of tissue/vesicles, detailed menstrual history including LMP to assess the severity and to differentiate the possible causes
- Physical examination:
- BP, PR, degree of pallor
- Abdomen: consistency (soft/guarding), uterine size, palpable mass, free fluid
- Pelvic examination: cervical os (open/close/tissue at os), excitation tenderness, uterine size, adnexa mass, adnexa tenderness, POD fullness/tenderness
- Urine hCG
- Perform surgical or medical evacuation if the clinical diagnosis is confirmed incomplete miscarriage (os open, tissue at os)
- Appropriate referral to have an ultrasound scan for diagnosis
- If the patient already had USS and which revealed RPOC/missed miscarriage, she may be offered expectant management or medical or surgical evacuation
- Appropriate referral for suspected cases of ectopic pregnancy and molar pregnancy
- In case of miscarriage with sepsis (septic abortion), referral to a center with specialist care should be done for further management

Table 15: Diagnosis and Treatment Options of Bleeding in Early Pregnancy

Diagnosis	Treatment options
Threatened miscarriage	• Reassurance • Expectant management • If continued bleeding, further clinical assessment
Incomplete miscarriage	• Depending on the clinical condition and the women's preference, she may be offered expectant, surgical (vacuum aspiration), or medical management. • Antibiotics if indicated • Pain control
Missed miscarriage	• Depending on the clinical condition and the women's preference, she may be offered expectant, surgical (MVA or D&C) or medical management.
Complete miscarriage	• Conservative management • Pain control

Table 16: Surgical and medical management of abortion by gestational size

Diagnosis	Treatment options
Medical management	**Incomplete miscarriage/ abortion** Misoprostol 600mcg sublingually every 3 hours for a maximum of 3 doses or 800mcg vaginally in a single dose. **Missed miscarriage/ abortion** Misoprostol 600 mcg sublingually every 3 hours for a maximum of 3 doses or 800 mcg vaginally in a single dose.
Surgical management	• Vacuum aspiration using a manual or electric aspirator. • Where vacuum aspiration is not available, dilatation and curettage (D&C) or evacuation and curettage (E&C) has to be used with care. It should be replaced with vacuum aspiration, to improve safety. • MVA is the first choice if available

For uterine size greater than 12 weeks gestation

Diagnosis	Treatment options
Medical Management	Treatment for, incomplete or missed abortion in the second trimester, may use the same medication regimens as follows • Incomplete miscarriage: Misoprostol 200mcg vaginally 6 hourly for maximum 4 doses • Missed miscarriage: Misoprostol 100mcg vaginally 3 hourly for 2 doses or 600mcg sublingually 3 hourly for 2 doses

List of Equipment and Medicine

No.	Equipment
1.	Manual Vacuum Aspirator
2.	Dilatation and curettage (D&C) Set
3.	Sterile gloves
4.	Sterile drapes
5.	Urine hCG

No.	Medicine
1.	Oral antibiotics: Metronidazole, Doxycycline and Azithromycin
2.	Antiseptic solutions
3.	SL Misoprostol
4.	PV Misoprostol

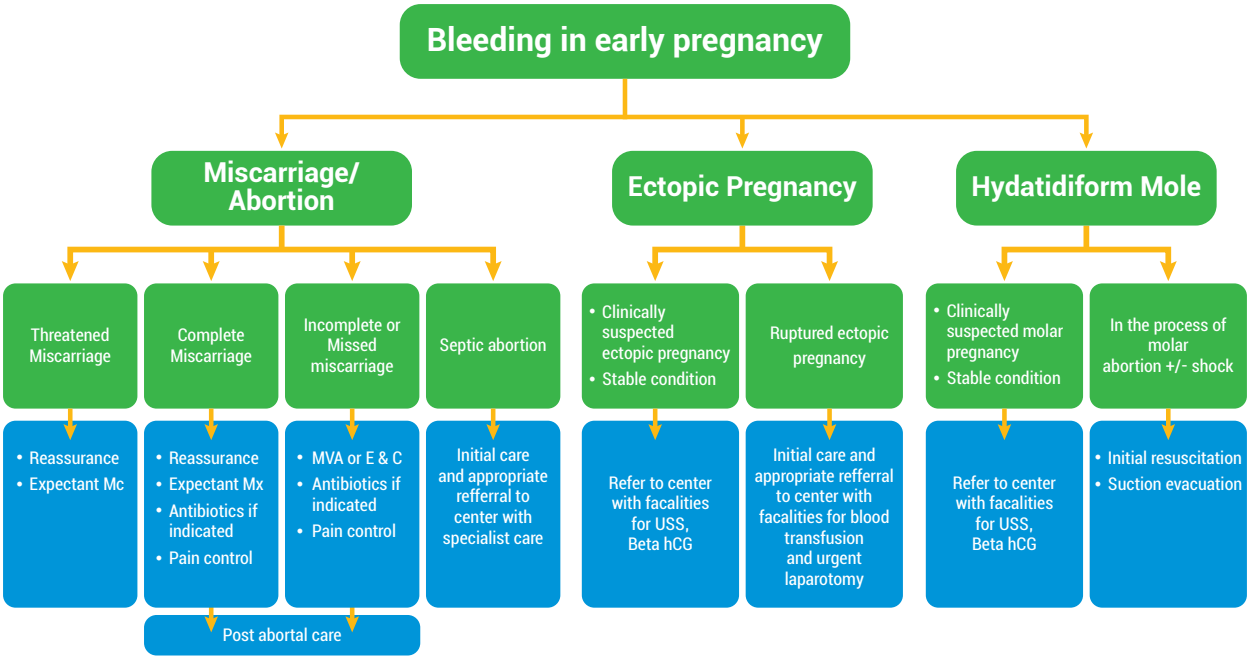


Figure 28: Algorithm of Management of bleeding in early Pregnancy

6.9. Ruptured Ectopic Pregnancy

Diagnosis

Women with reproductive age regardless of marital status present abnormal uterine bleeding with abdominal pain, ruptured high index of ectopic pregnancy is suspected, urine hCG should be done with consent.

Sign and symptom

- A short period of amenorrhoea
- Lower abdominal pain
- Slight bleeding PV
- Fainting attack or collapse
- Shoulder tip pain or pain during defecation/ micturition
- Pallor, tachycardia
- Hypotension(ruptured ectopic)

Abdominal Exam

- Tenderness present in one iliac fossa
- Free fluid (Haemoperitoneum)

Vaginal Exam

- Slightly enlarge uterus
- Cervical excitation pain
- Tenderness in pool

Investigation

- Urine UCG
- USG if available

Management of ruptured (acute) ectopic pregnancy

- Resuscitation if a patient is presenting with shock
- BT if necessary
- Mini laparotomy if ectopic is suspected.
- At laparotomy
  - » Assess the amount of haemoperitoneum
  - » Inspect the contralateral tube and ovary
  - » Salpingectomy is indicated in
    - Rupture tubal pregnancy
    - Recurrent ectopic pregnancy in a tube already treated conservatively
    - Previous sterilization and reversal of sterilization
    - Previous tubal surgery for infertility
    - Pre-existing tubal damage.
      - » Secure hemostasis
      - » ± peritoneal toilet ± drain
- Explain operative findings and post-op diagnosis to patient and relatives
- Advise to seek early medical check and USG for localization of pregnancy in subsequent pregnancy since there is a risk of recurrence
- Post-operative management as a standard guideline.

At station level:
Initial care followed by immediate referral to center with facilities for blood transfusion and urgent laparotomy.

List of Equipment and Medicine for Ruptured Ectopic Pregnancy

No.	Equipment
1.	Laparotomy set
2.	Sterile gloves
3.	Sterile drapes
4.	Foley's catheter
5.	Gauze swabs
6.	Sponge forceps
7.	Sterile gloves

No.	Medicine
1.	Injection antibiotics – 3rd generation cephalosporin
2.	IV Fluid – N/S
3.	Antiseptic solution

CHAPTER-7

Clinical Management Guidelines for Essential Pediatrics Care

Basic Essential Pediatrics Services

- Management of Sick Newborn
  - » Neonatal Resuscitation
  - » Shock
  - » Hypoglycemia
  - » Asphyxia
  - » Seizures
  - » Jaundice
  - » Neonatal sepsis
  - » Breathing difficulty
  - » Hypothermia
  - » Hyperthermia
- Management of Sick young infants and children
- Acute Respiratory Tract Infection/ Pneumonia
- Diarrhoea
- Dengue Haemorrhagic Fever
- Pediatrics Ear infection

7.1. Management of Sick Newborn

Neonatal Resuscitation

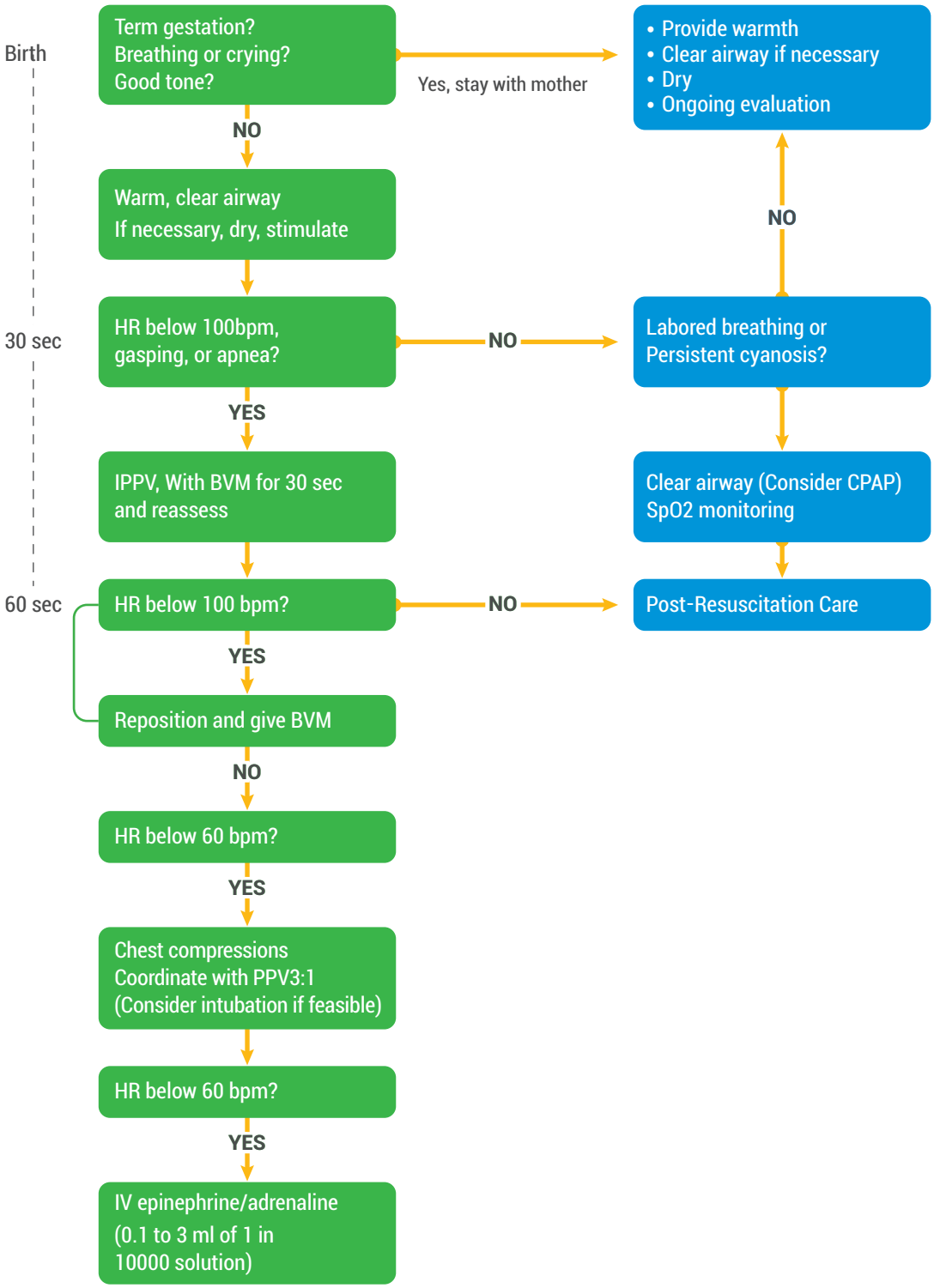


Figure 29: Neonatal Resuscitation

7.1.1. Immediate Newborn Care

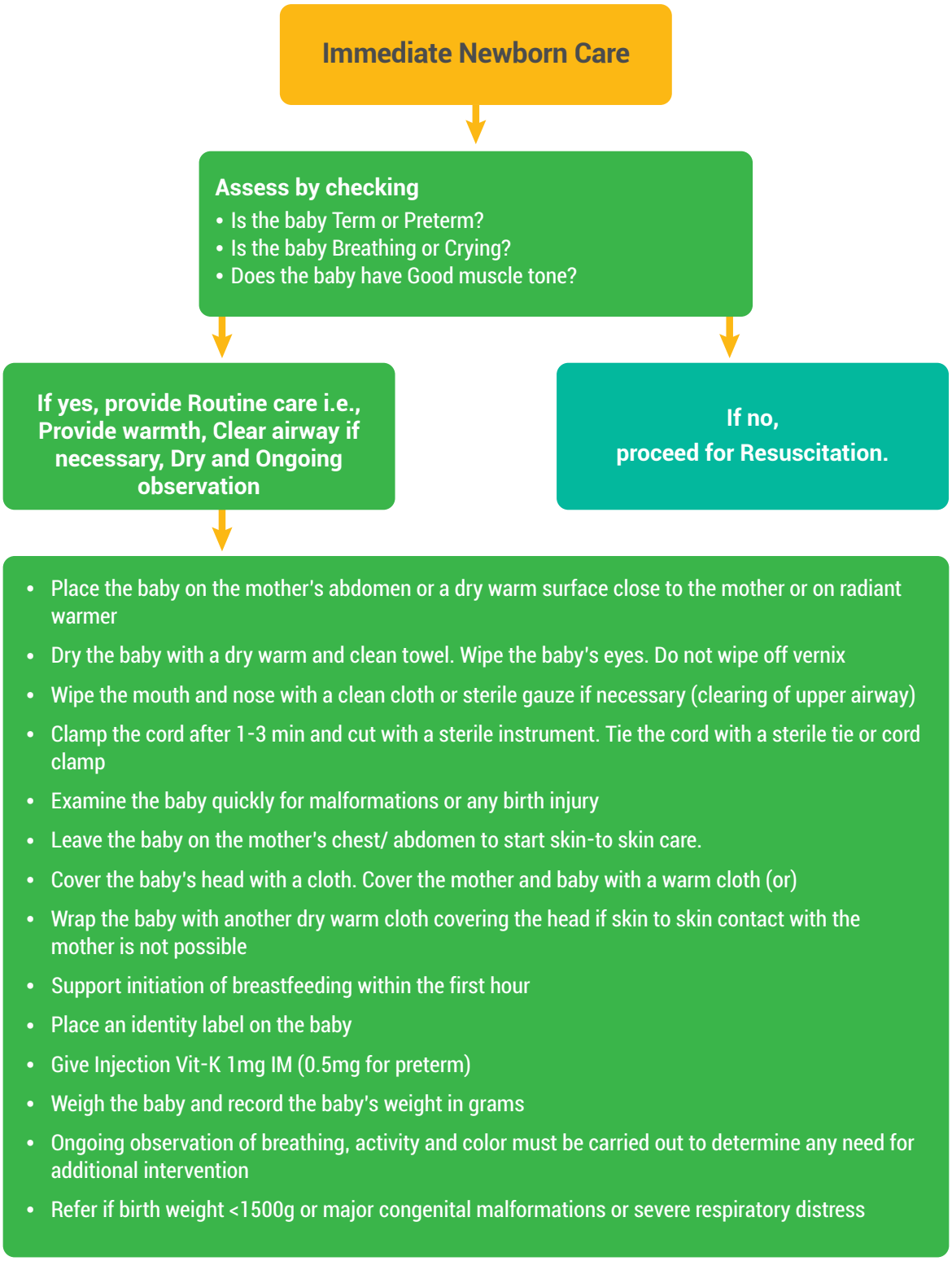


Figure 30: Immediate Newborn Care

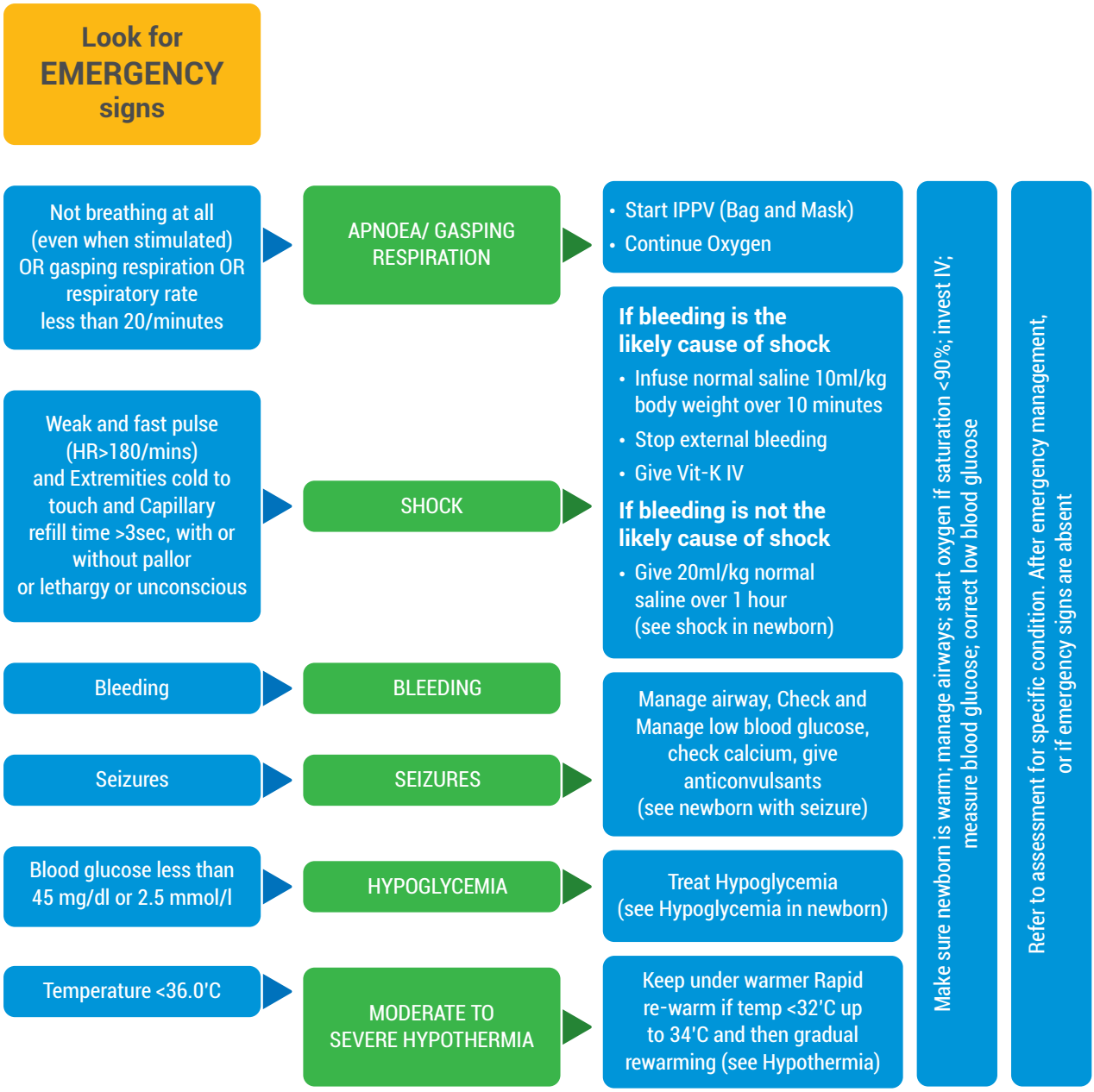


Figure 31: Rapid Assessment and Immediate Management of Emergencies in Newborn Infant

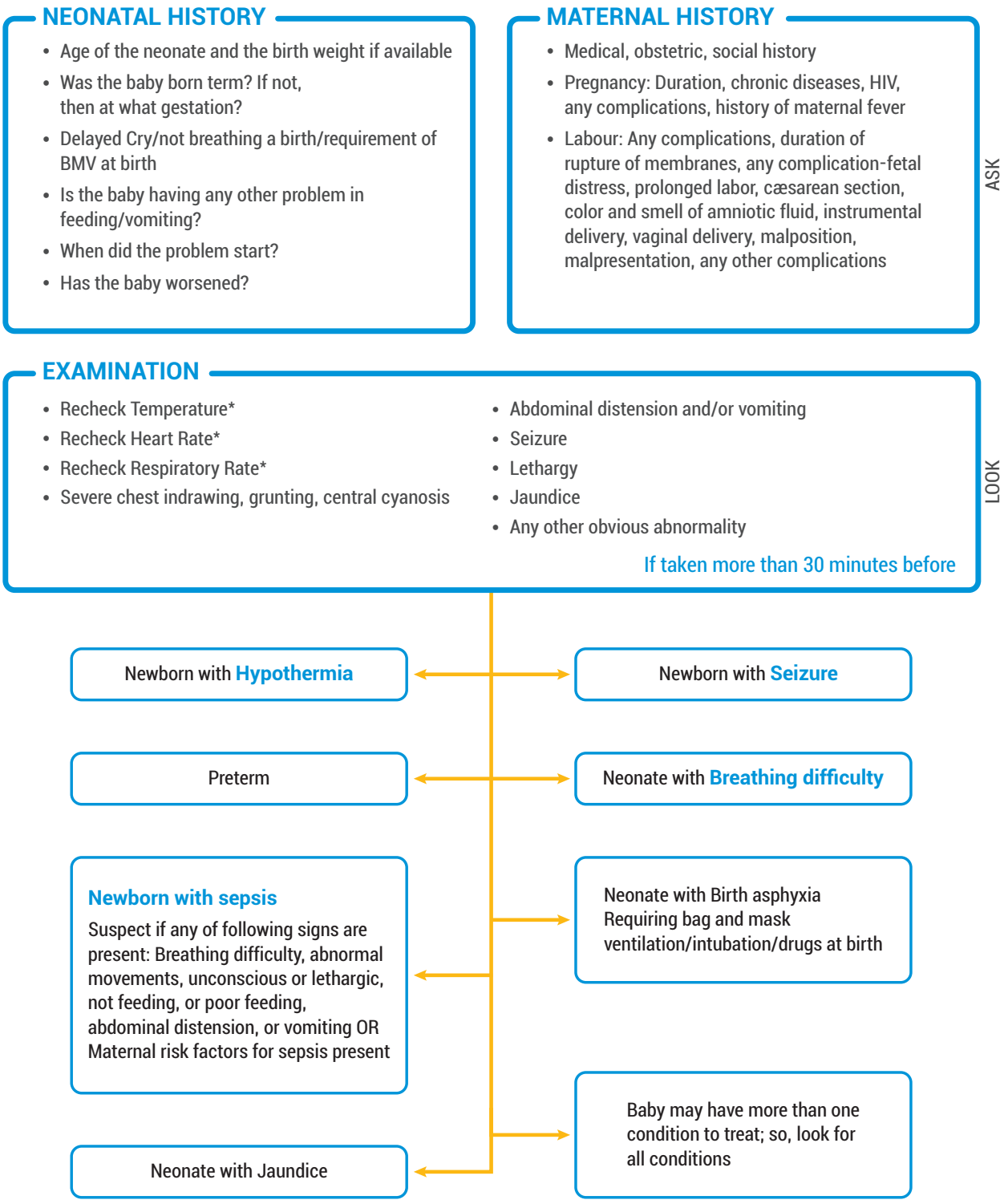


Figure 32: Assessment for Specific Conditions (After Emergency Management or If Emergency Signs are Absent)

7.1.2. Shock in Newborn

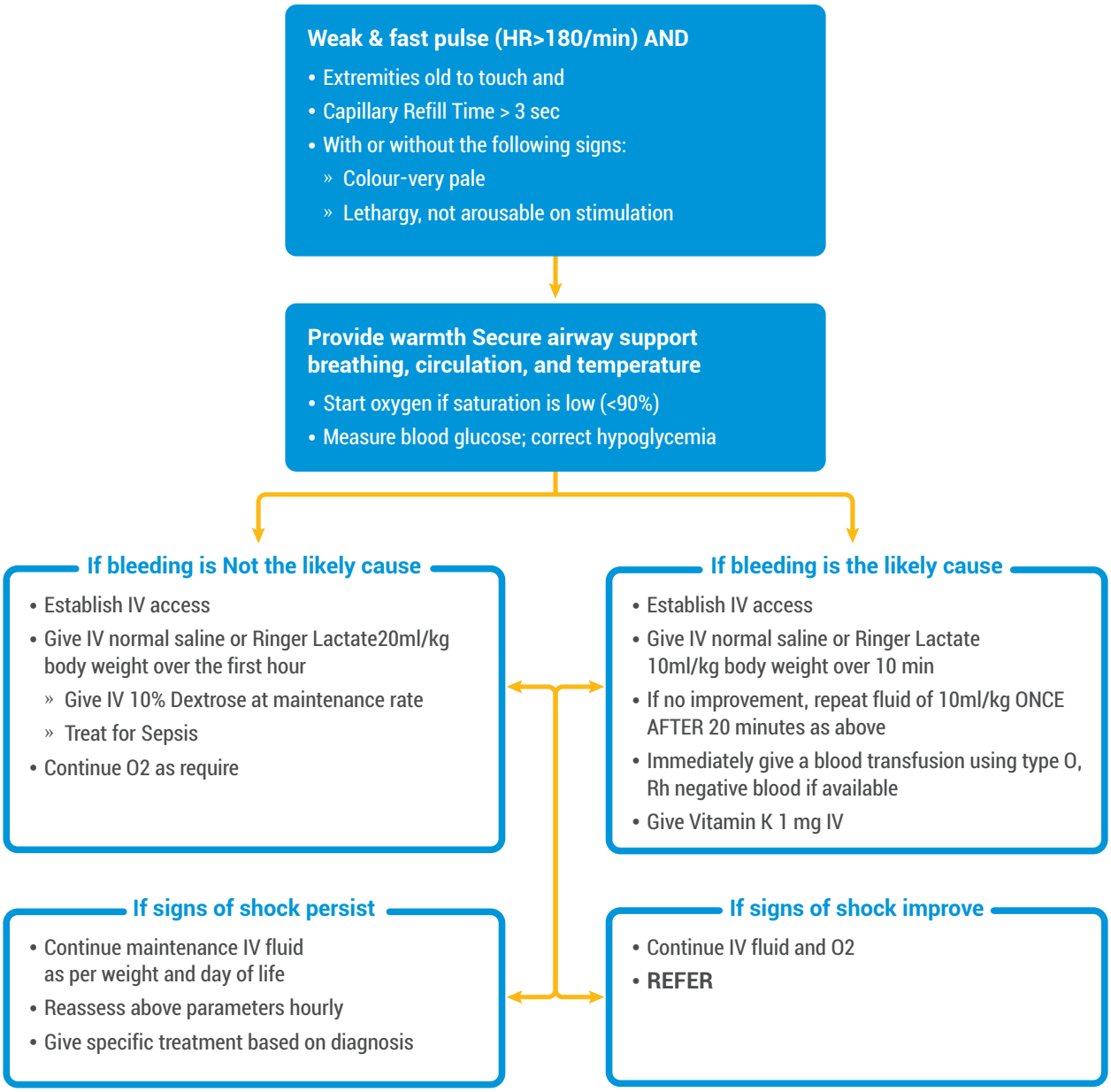


Figure 33: Shock in Newborn

Table 17: IV Maintenance fluid requirements in ml/kg/day

Day	Fluid	Preterm				Term
		<1 Kg	1-1.5 Kg	1.5-2.5 Kg	>2.5 Kg	
1.	10% Dextrose	100	80	60	60	60
2.	10% Dextrose	120	100	90	90	90
3.	10% dextrose Plus	150	130	120	110	120
4.	3mmol/kg/day Na*	180	150	150	130	150
5.	3mmol/kg/day Na*	180	180	170	150	150

*Equivalent to20 ml/kg/day of 0.9% saline (Na) & 1ml/kg/day of potassium (2 mmol in 1 ml of K+)

7.1.3. Hypoglycemia in Newborns

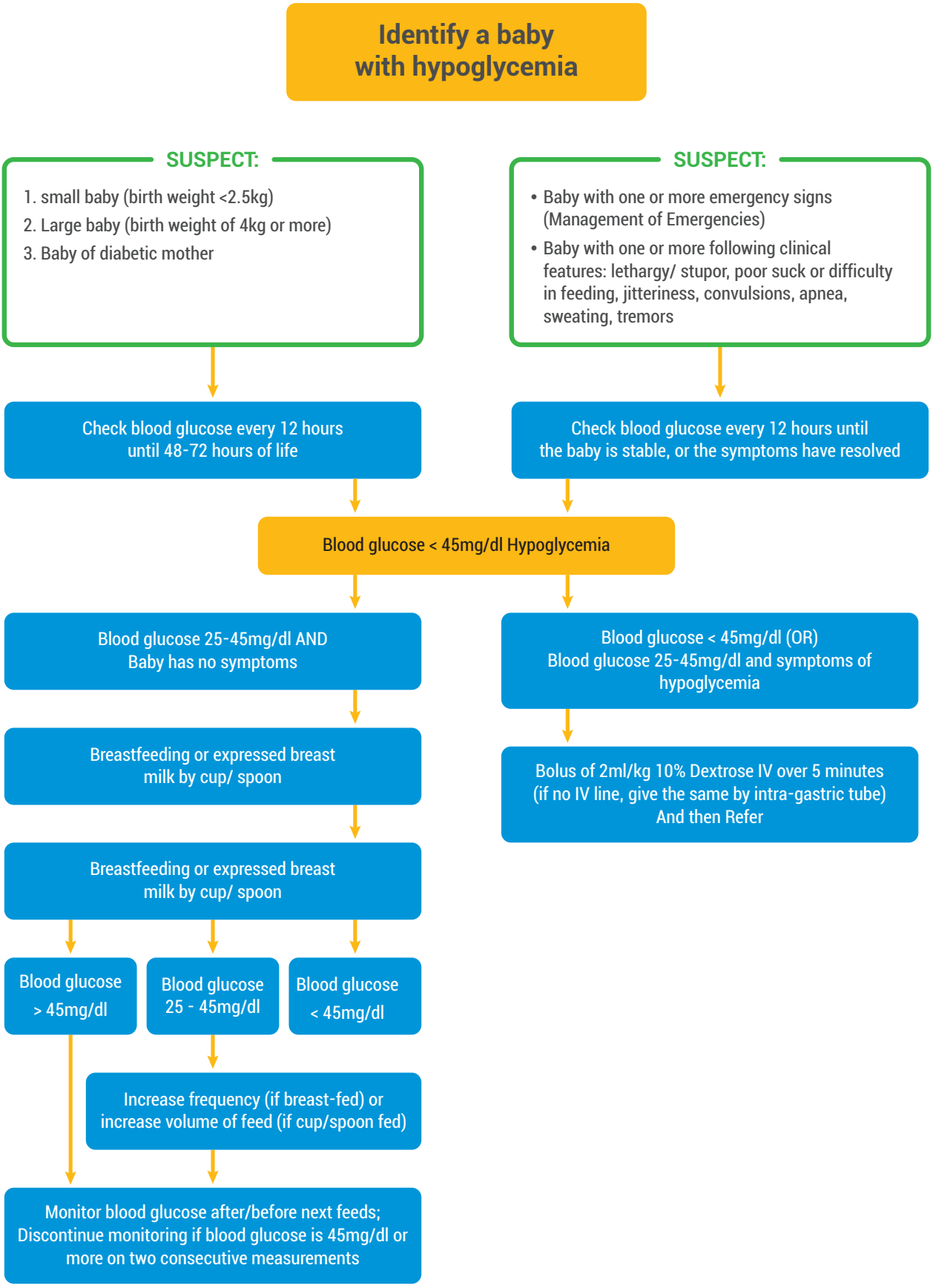


Figure 34: Management of Hypoglycemia in Newborns

7.1.4. Asphyxiated Newborns

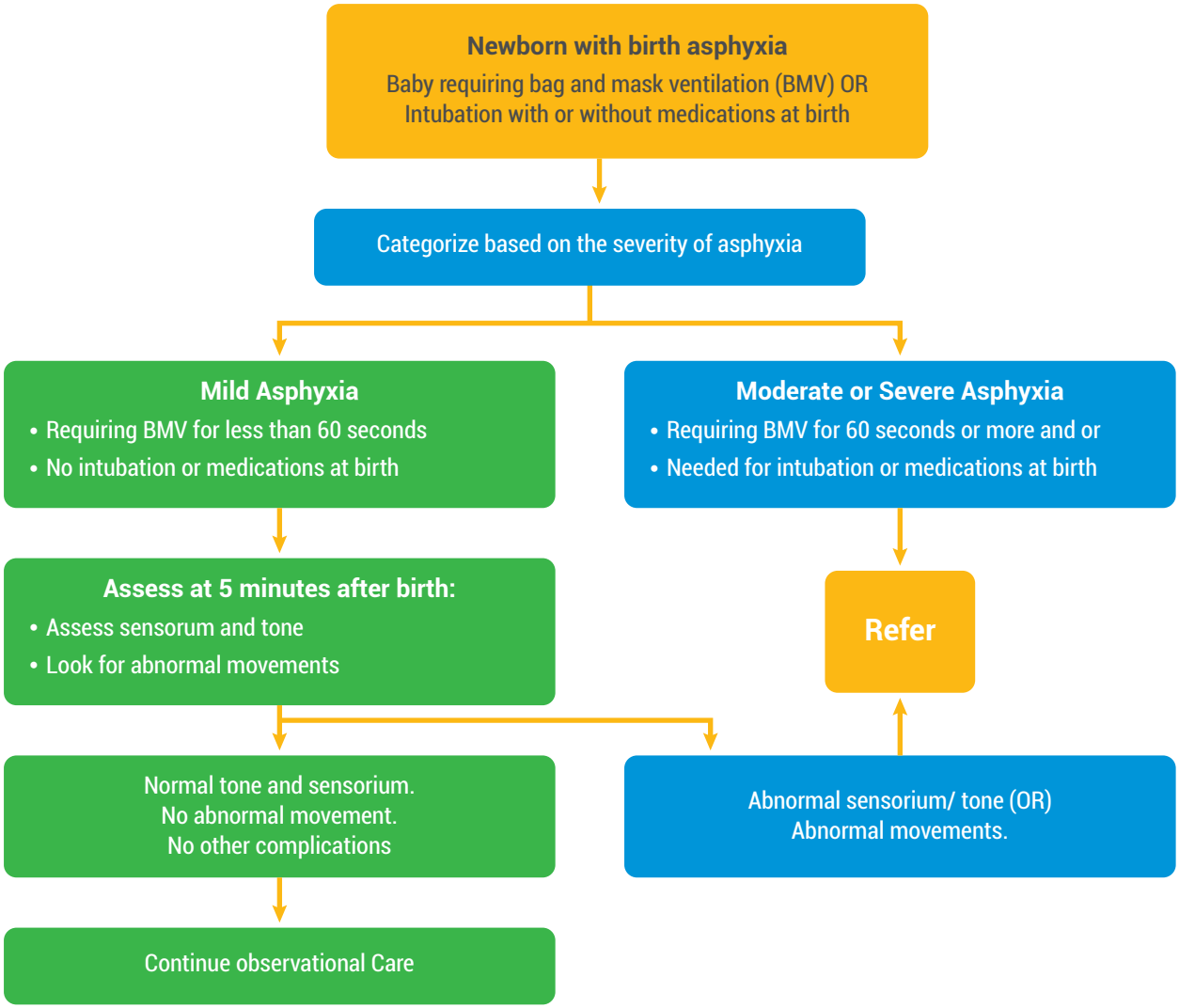


Figure 35: Management of an Asphyxiated Newborns

7.1.5. Seizures in Newborns

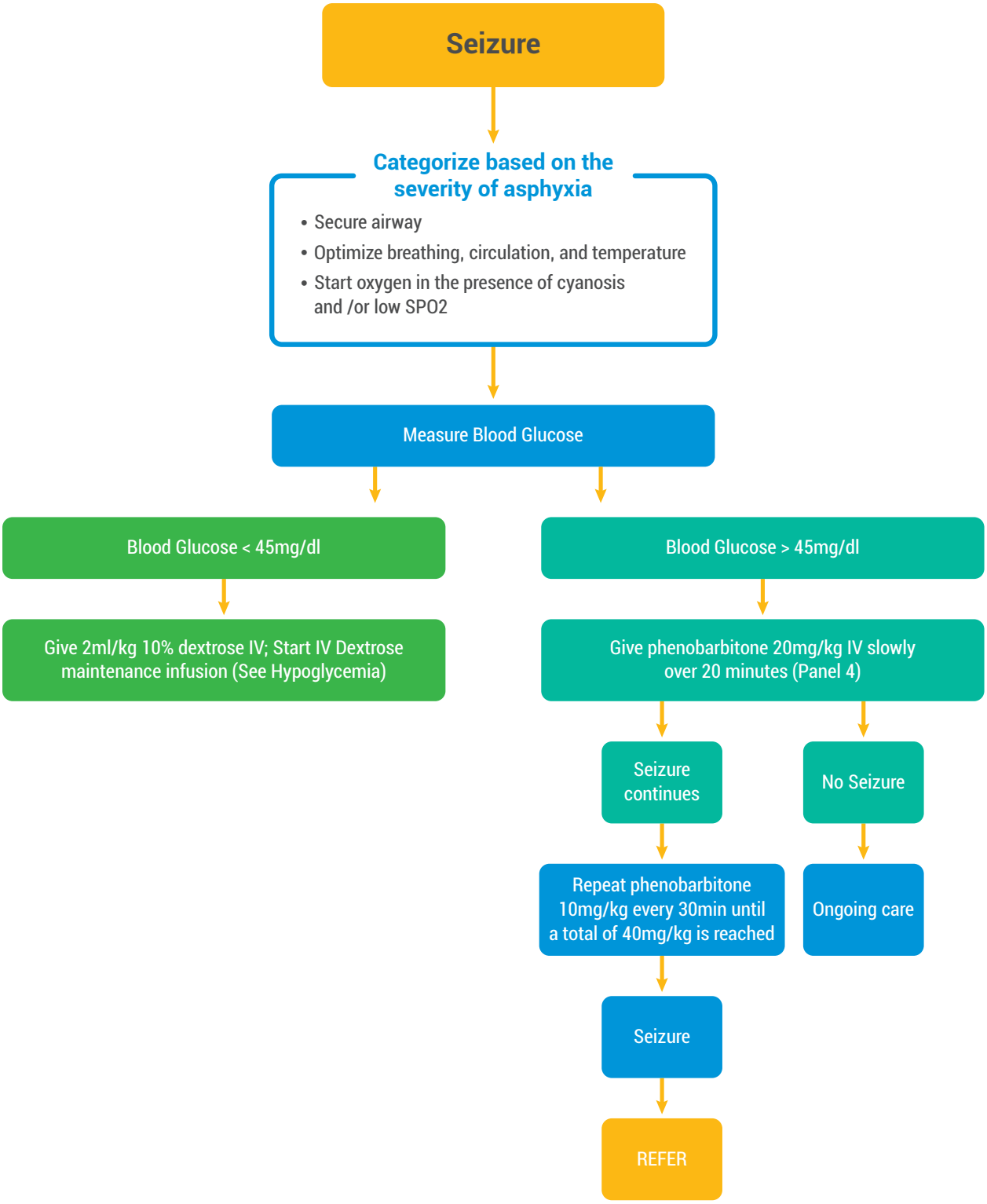


Figure 36: Initial Management of a Newborn with Seizures

Table 18: Convulsions vs. Jitteriness

Convulsion	Jitteriness
Have both fast and slow component, slow movement (1-3 jerks per second)	Fast movements (4-6 per second) tremors are of equal amplitude
Not provoked by stimulation	Provoked by stimulation
Does not stop with restraint	Stop with restraint
Neurological examination often abnormal	The neurological examination usually normal
Often associated with eye movements toxic deviation of fixed stare and for autonomic changes (changes in heart rate)	Not associated with eye movements or automatic changes

Table 19: Protocol for Administering Phenobarbitone

Presentation	Injection 200 mg/ml: 1 ml ampoules
Dosages	Loading dose: 20 mg/kg IV or IM Maintenance: 5mg/kg/day PO (once daily)
Route	IV and PO
Directions of use	Take 0.1 ml of solution and dilute with 0.9 ml of water for injection to make 1 ml Resultant concentration is 20 mg/ml. Give the required amount slowly under 15-20 minutes
Caution	May cause respiratory arrest

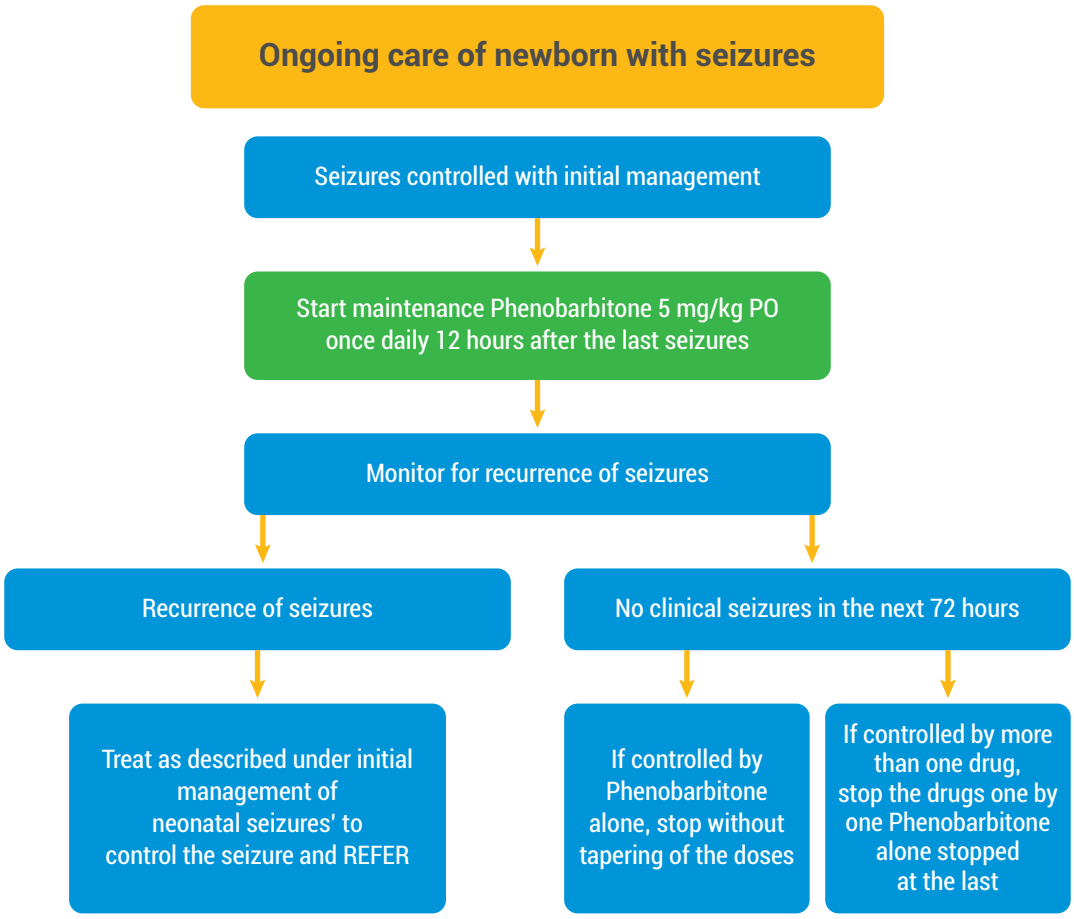


Figure 37: Ongoing Management of a Newborn with Seizures

7.1.6. Jaundice in Newborn

Management of jaundice in newborn

Assess risk factors which can cause severe hyperbilirubinemia

Refer if one of these criteria present.

- Birth asphyxia
- Temperature instability
- CNS signs (e.g., lethargy)
- Sepsis
- LBW: premature and SGA

Assessment of Severity of Jaundice

- Assess the level of jaundice clinically if measurement of TSB (Total serum bilirubin) is not available
  - » Neonatal jaundice first becomes visible in the face and forehead. Blanching reveals the underlying colour. Jaundice then gradually becomes visible on the trunk and extremities
  - » For visual staining of the skin and sclera (a level of at least 5mg/dl)
  - » A simple and useful method of assessing the degree of jaundice is Kramer's rule
  - » Assess rate of rise of serum bilirubin >0.5 mg/dl/hr (or) >8µmol/L/hr (or) >5mg/dl/day
  - » Assess features of impending bilirubin encephalopathy (poor sucking,lethargy and incomplete Moro's reflex)

Note:

Do not rely too much on the level of Jaundice on visual assessment alone. This is just a screening and before treating, always check for TSB

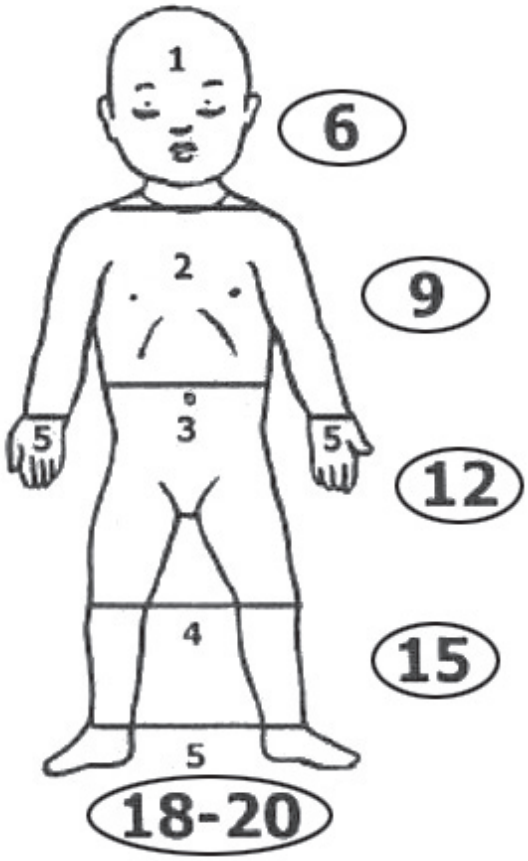


Figure 38: Assessment of Jaundice Clinically

Table 20: Assessment of Level of Jaundice

Area of body	Rate of bilirubin (mg/dl)	Average (mg/dl)
Face	4-8	6
Upper trunk	5-12	9
Lower trunk and thighs	8-16	12
Arms and lower legs	11-18	15
Palms and soles	>15	>15

Differentiate whether Physiological or Pathological jaundice

Physiological Jaundice

- Appears after 48 hours
- Maximum intensity by 4th and 5th day in term and 7th day in preterm
- Total serum bilirubin level (TSB) usually less than 15 mg/dl (255 umol/l)
- Clinically not detectable after 14 days
- Disappears without any treatment

Note:

Baby should, however, be watched for worsening jaundice

Pathological Jaundice

Characteristics

- Appears within 24-48 hours of age
- TSB level more than 15mg/dl
- Rate of rise of TSB >5mg/dl/day (or) >0.5mg/dl/hour or >8umol/L/hour
- Jaundice persisting after 14 days
- Direct bilirubin >2mg/dl
- Stool-clay coloured and urine – staining clothes yellow
- Refer if there is anyone of above criteria

Investigations

Total serum bilirubin level (TSB)

- Moderately jaundiced well baby on the 2nd or 3rd day of life
- Any unwell jaundice baby
- Jaundice presenting in the 1st 24-48 hours of life
- Prolonged jaundice

For prolonged neonatal jaundice:
➜ Refer

Treatment:
Treatment of the underlying cause

Treatment of jaundice

Phototherapy-according to (Adopted) Phototherapy Guideline (Myanmar Pediatric Society)

Special blue lights by 4-5 fluorescent tubes (wavelength 450-475 nm) placed about 18th away from the baby's area

- Phototherapy should be given continuously except feeding and toileting.
- Expose the whole body. Cover the eyes. Turn the baby every 2-3 hours.
- Blue tubes need to be changed after every 1500 hours or every 3-6 months of usage

LED lights

equally as effective as blue fluorescent lights in treating NNJ and are

recommended for providing intensive phototherapy.

- The lights are cold (may need to be used together with a warming device for sick and small babies.
- A very long-life span: survive up to 50,000 hours or 1 year in continuous use

Support successful BF:
Need to nurse the baby at least 8-12 times per day
(at least 6 wet nappies a day)

Prevention of dehydration:
Need to give extra fluid of about 20-30 ml/kg/day by means of more frequent BF or EBM by cup or spoon.

How do you use the chart?

- First plot the baby's total serum bilirubin against the baby's age in hours.
- Next decide whether the (i) baby is >38 weeks and well, (ii) baby is >38 weeks with risk factors or 35-37 weeks and well, or (iii) 35-37 weeks with risk factors and select the appropriate intervention line.
- If the plotted bilirubin value is above the selected intervention line, the baby requires to be started on phototherapy.

Table 21: Guidelines for phototherapy and Exchange transfusion in low-birth-weight infants

Birth Weight (GM)	Total Serum Bilirubin (mg/dl)	
	Phototherapy	Exchange Transfusion
500-750	5-8	12-15
750-1000	6-10	>15
1000-1250	8-10	15-18
1250-1500	10-12	17-20
1500-2500	15-18	20-25

Note

Lower bilirubin values in the range applies to lower birth weight values in the range
Refer from station hospital if the serum bilirubin level reaches the level for exchange transfusion

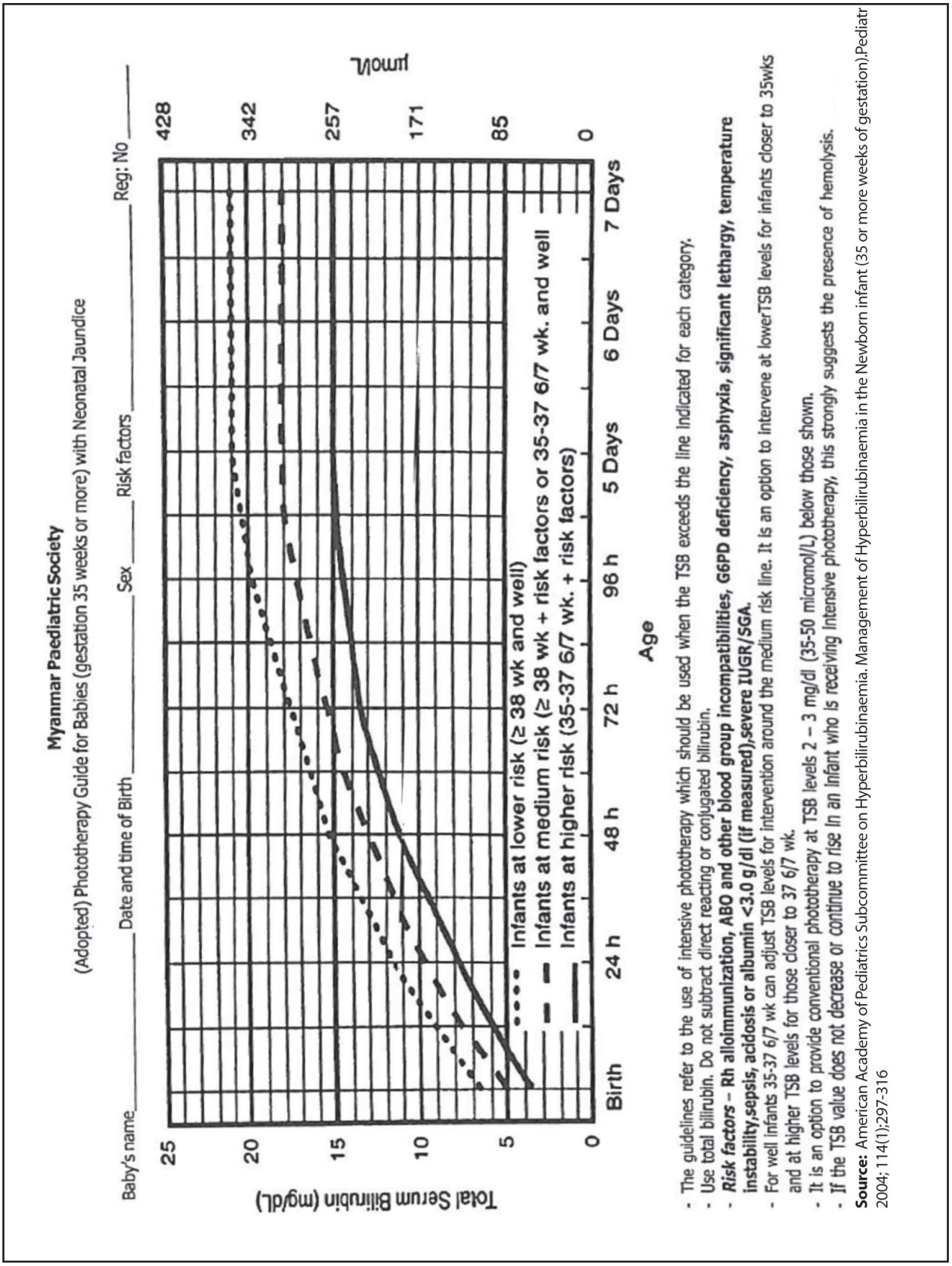


Figure 39: Guidelines for initiating Phototherapy

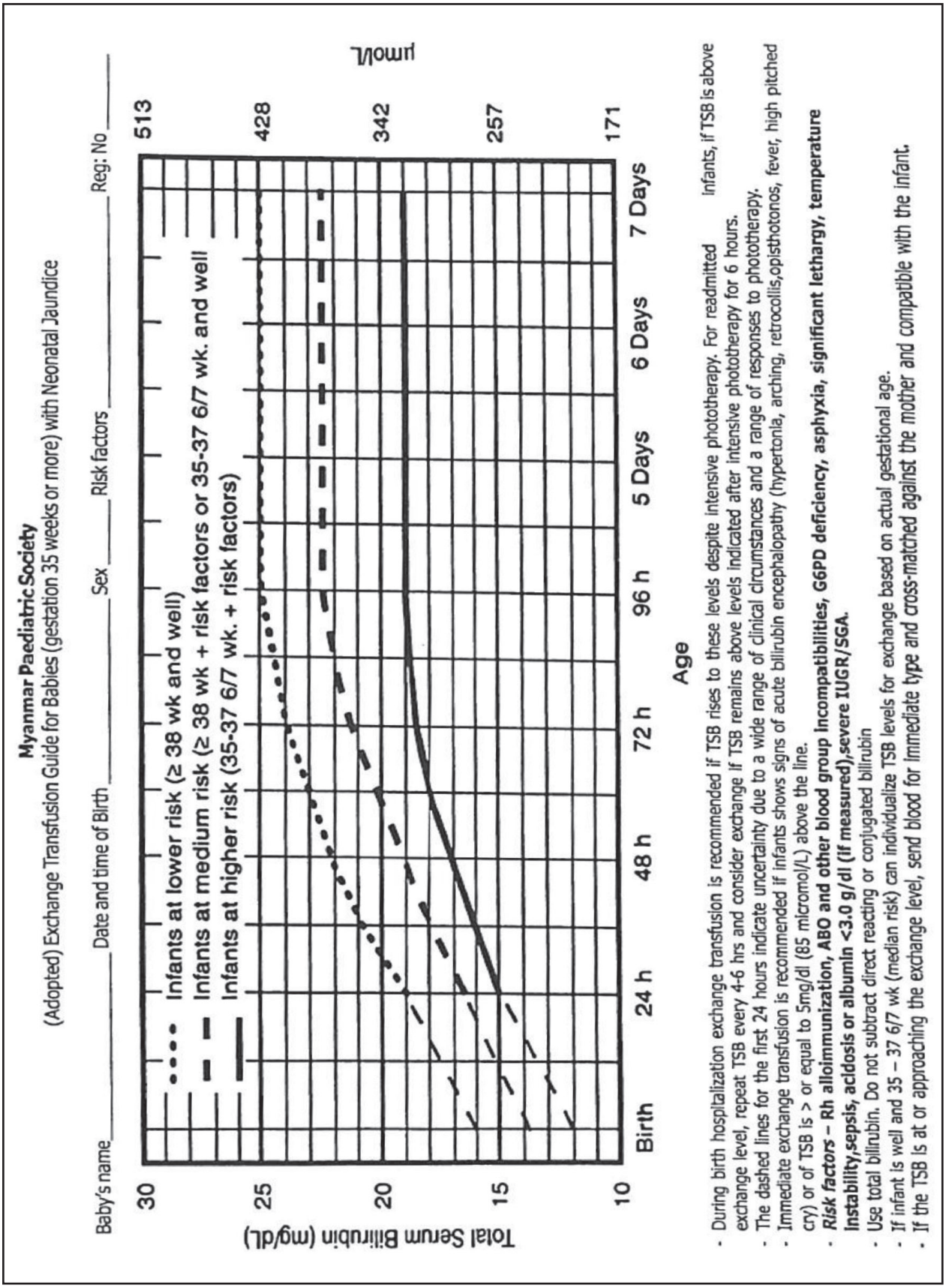


Figure 40: Guidelines for initiating Exchange Transfusion

7.1.7. Neonatal Sepsis

Common systemic bacterial infections in young infants include sepsis, pneumonia, and meningitis and all these may present alike.

> **Neonatal sepsis:**
> It is a clinical syndrome of systemic illness accompanied by bacteremia occurring in the first month of life.

Bacterial sepsis in a young infant is suspected by the presence of one or more of the following signs:

- Unable to feed
- Convulsions
- Fast breathing (60 breaths per minute or more)
- Severe chest indrawing
- Nasal flaring
- Grunting
- Bulging fontanelle
- Axillary temperature 37.5'C or above (or feels hot to touch)
  or temperature less than 36'C (or feels cold to touch)
- Lethargic or unconscious,
- Less than normal movements

Many of these symptoms may be present in other conditions e.g., Perinatal asphyxia, hypoglycemia, or hypothermia. In such situations, take the help of risk factors and sepsis screen.

More specific localizing signs of infection which indicate serious bacterial infection include

- Painful joints, joint swelling, reduced movement, and irritability if these parts are handled
- Many skin pustules/big boil (abscess)
- Umbilical redness extending to the periumbilical skin or umbilicus draining pus

Treatment of Neonatal sepsis

- Admit to hospital
- Provide supportive care and monitoring for the sick neonate
- Start antibiotics, give injection ampicillin, and gentamicin.
- Give cloxacillin (if available) instead of ampicillin if extensive skin pustules or abscess as these might be signs of Staphylococcus infection.
- Most bacterial infections in neonates should be treated with antibiotics for at least 7-10 days except meningitis, arthritis, deep abscesses, and staphylococcal infections which would require 2-3 weeks of therapy.
- If not improving in 2-3 days or deteriorate ➜ refer

Supportive care of a septic neonate

- Provide warmth, ensure consistently normal temperature
- Provide bag and mask ventilation with oxygen if breathing is inadequate
- Start oxygen by hood or mask, if cyanosed or grunting.
- Start IV line.
- Infuse glucose (10 percent) 2ml/kg stat.
- If perfusion is poor as evidenced by capillary refill time (CRT) of more than 3 seconds, manage shock
- Inject vitamin K 1mg Intramuscularly.
- Consider the use of dopamine if perfusion is persistently poor.
- Avoid central feed if very sick, give maintenance fluids intravenously

Table 22: Antibiotic therapy of sepsis

Antibiotic	Each dose (mg/kg/dose)	Frequency		Route	Duration (Days)
		<7 days age	>7days age		
Injection Ampicillin (or)	50	12 hourly	8 hourly	IV, IM	7-10
Injection Cloxacillin	50	12 hourly	8 hourly	IV	7-10
AND					
Injection Gentamicin (or)	5	24 hrly	24 hrly	IV, IM	7-10
Injection Amikacin	15	24 hrly	24 hrly	IV, IM	7-10

7.1.8. Breathing difficulty in the Newborns

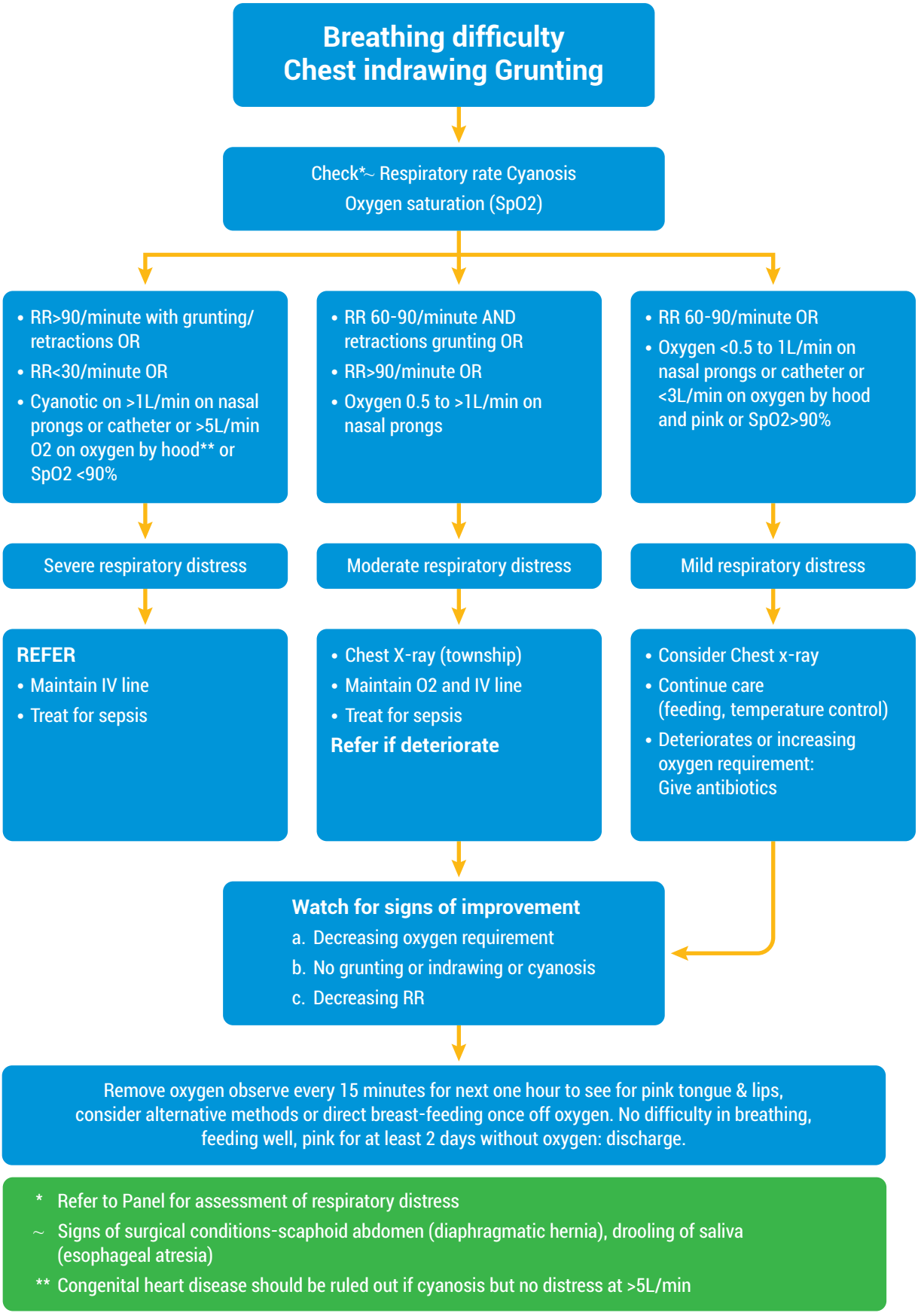


Figure 41: Breathing difficulty in the Newborns

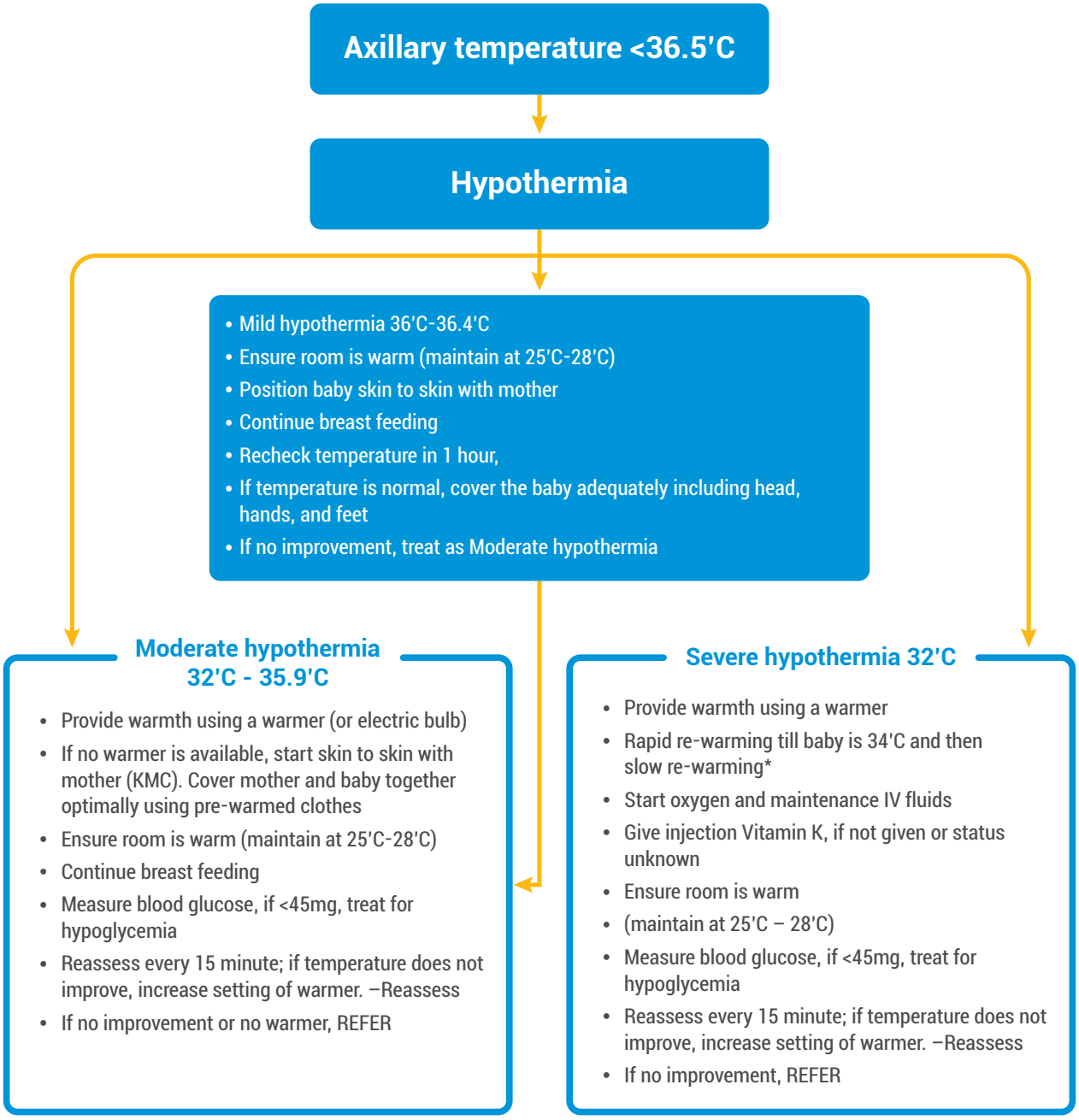


Figure 42: Hypothermia

Hypothermia can be a sign of infection

*Initially use high setting of the warmer and if the baby's temperature has been increasing at least 0.5'C per hour over the last 3 hours, rewarming is successful, shift to lower setting of warmer and continue measuring the baby's temperature every 2 hours.

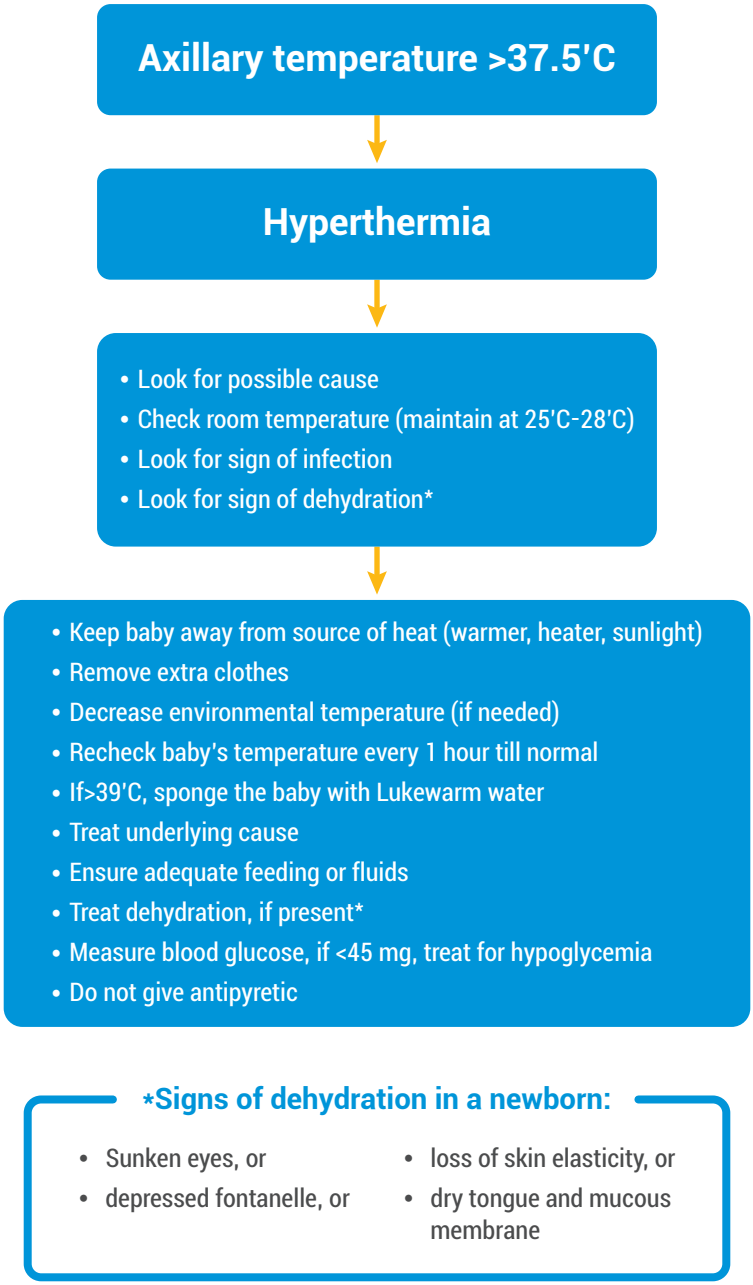


Figure 43: Hyperthermia

Hyperthermia can be a sign of infection

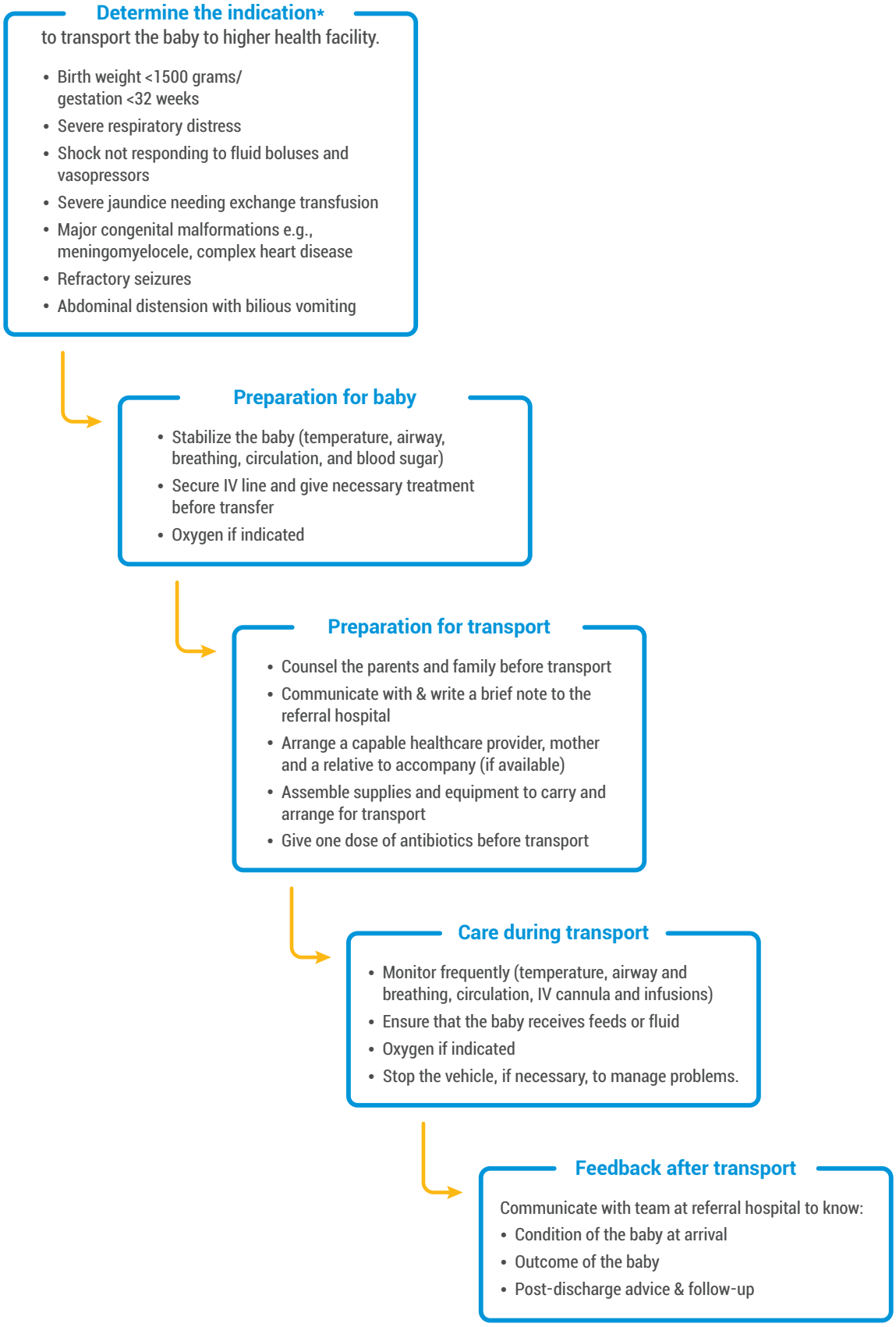


Figure 44: Transport of a Sick Baby

*Indications have to be individualized for each facility depending upon capabilities and infrastructure of referring and referral facilities

List of Equipment and Medicine

No.	Equipment
1.	Bag-Valve-Mask
2.	Pulse Oximeter
3.	Cord clamp
4.	Oxygen
5.	Baby warmer
6.	Glucometer
7.	Weighing machine
8.	Thermometer
9.	Chest X-Ray
10.	LED Photo

No.	Medicine
1.	IV Fluid – N/S, R/L
2.	Inj: Vitamin K1
3.	IV Dopamine
4.	IV 10 % Dextrose
5.	IV Phenobarbitone
6.	Oral Phenobarbitone
7.	Distilled water
8.	Injection antibiotics: Cefotaxime, Ampicillin, Cloxacillin, Gentamicin, Amikacin

7.2. Management of Sick Infants and Child

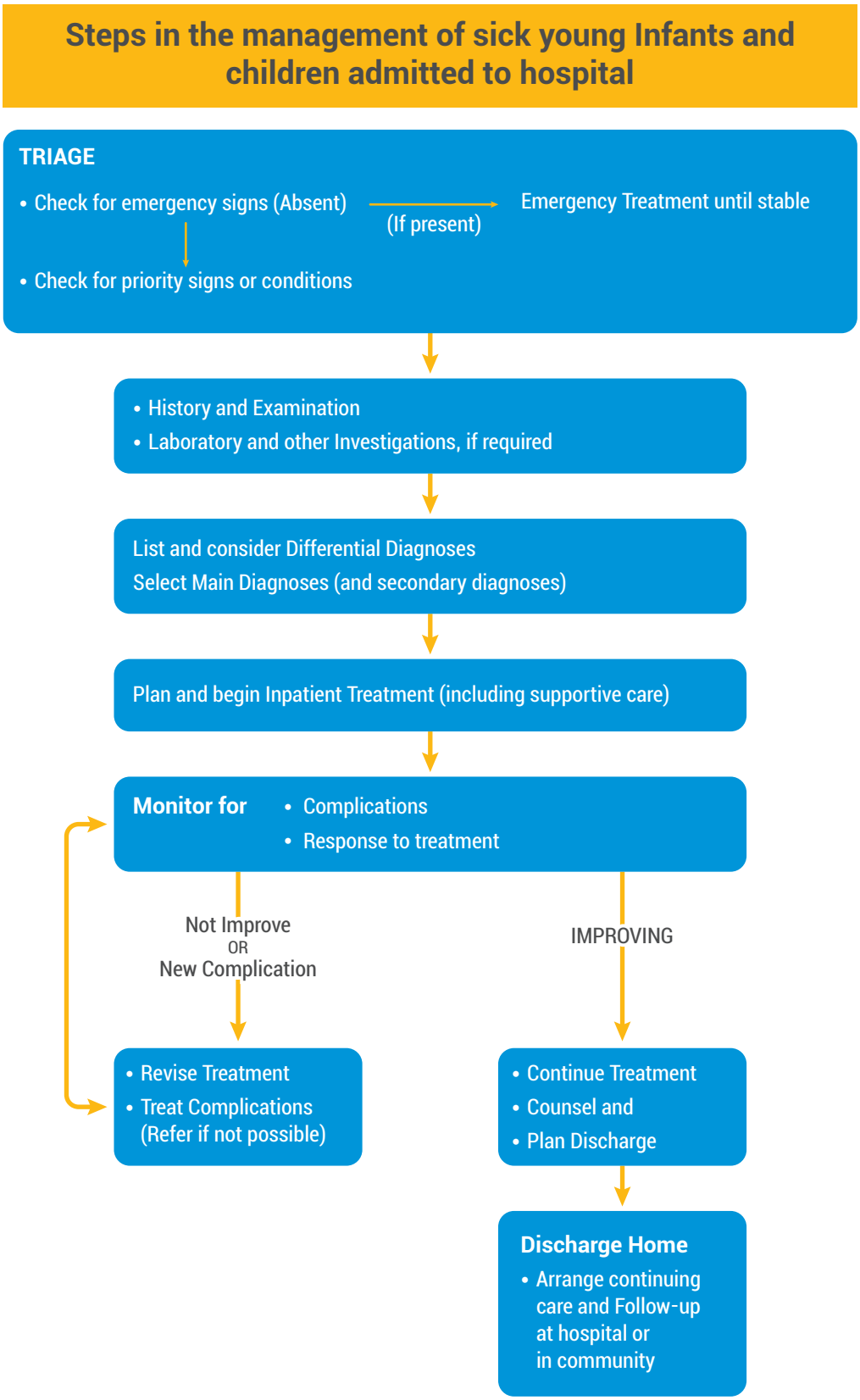


Figure 45: Steps in the Management of Sick Young Infants and Children Admitted to Hospitals

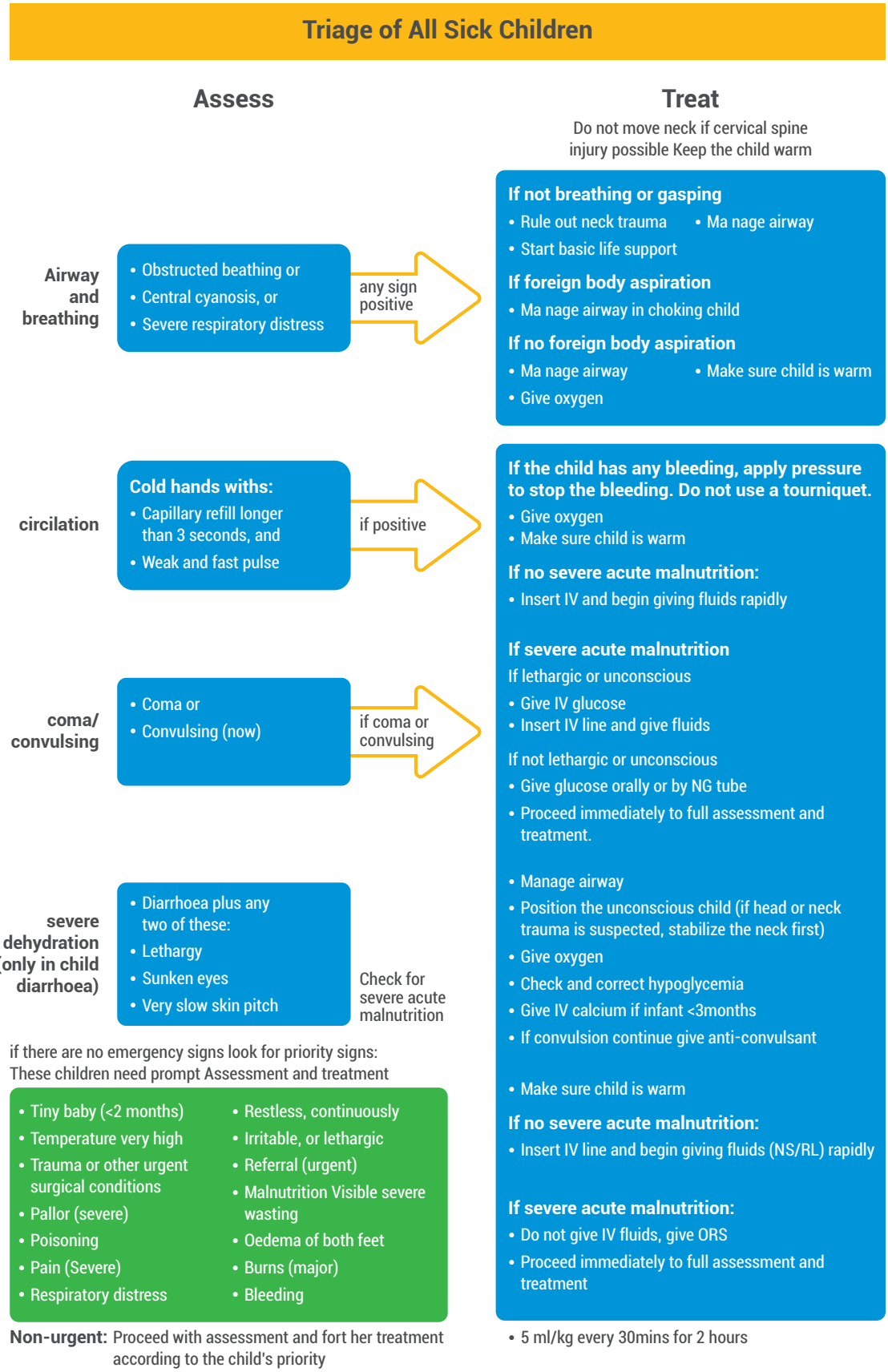


Figure 46: Triage of All Sick Children

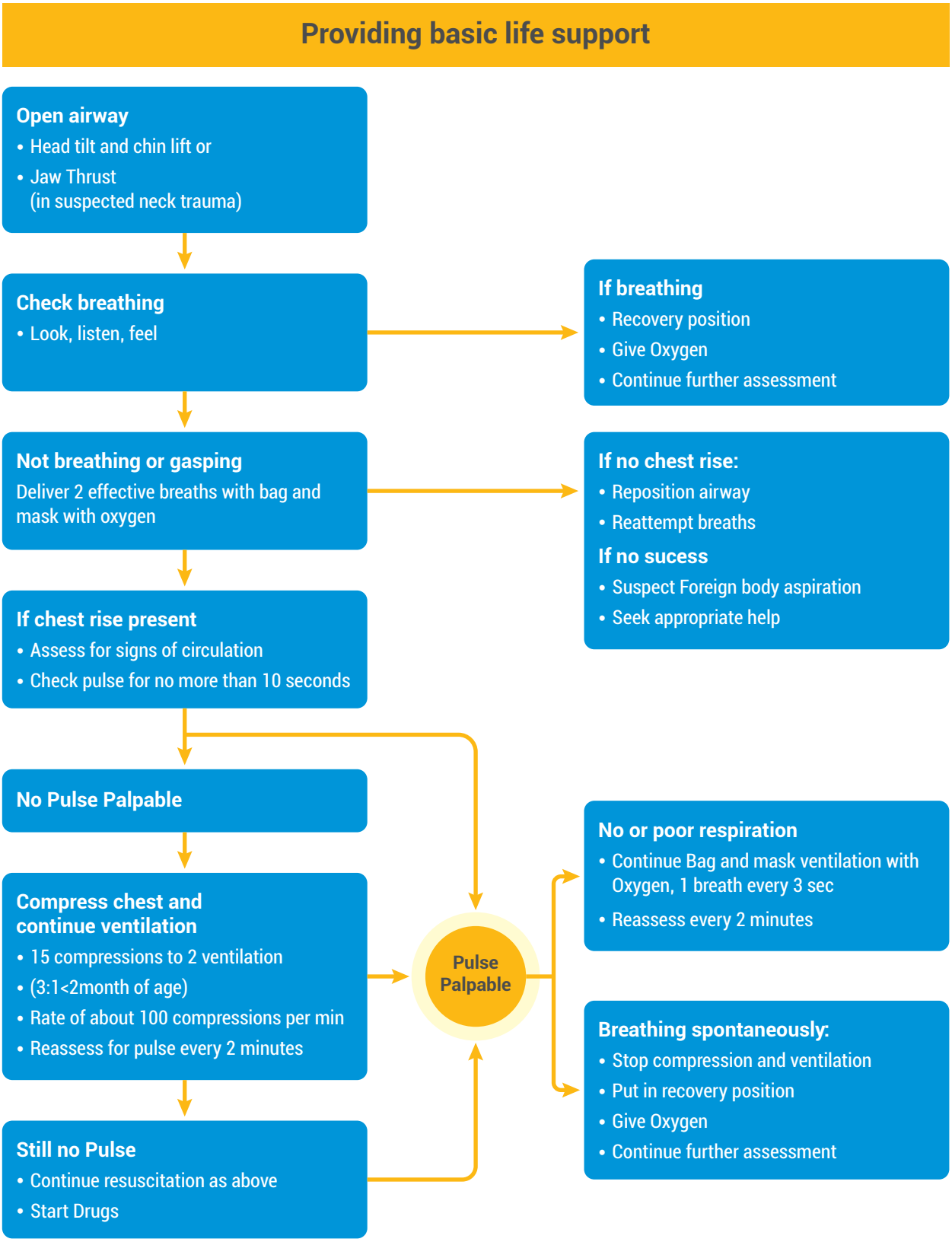


Figure 47: Providing Basic Life Support

List of Equipment and Medicine for infants and children

No.	Equipment
1.	Oxygen
2.	Bag-Valve-Mask
3.	Pulse Oximeter
4.	Glucometer
5.	Thermometer

No.	Medicine
1.	IV Fluid – N/S, R/L
2.	IV 10 % Dextrose
3.	IV calcium gluconate
4.	IV Phenobarbitone
5.	Oral Phenobarbitone
6.	ORS
7.	Injection antibiotics; Cefotaxime/ Ceftriaxone, Ampicillin, Cloxacillin, Gentamicin, Amikacin

7.2.1. Acute Respiratory Infection in Children

Diagnostic Features

- Cough
- Fever
- Dyspnoea and tachypnea
- Danger signs such as convulsion, drowsiness, cyanosis, and stridor in a calm child
- Use of accessory muscle of respiration, chest indrawing, and intercostal indrawing
- Coarse crepitation, and rhonchi in some patients
- Bronchial breath sounds are associated with lobar consolidation

Assessment of Severity of ARI

For all age groups in between 2-59 months

No Pneumonia

- Cough and cold

Pneumonia

- Fast breathing and/or chest indrawing
  - » < 2 months age : > 60/min
  - » 2-12 months age : > 50/min
  - » 12 months – 5 years age : > 40/min

Severe pneumonia or Very severe disease

- Presence of general danger signs
  - » Not able to drink
  - » Persistent vomiting
  - » Convulsions
  - » Lethargic or unconscious
  - » Stridor in a calm child
  - » Severe malnutrition

Investigation

Chest radiograph

CXR is indicated in:

- Clinical findings are ambiguous
- A complication such as a pleural effusion is suspected
- Pneumonia is prolonged and unresponsive to antimicrobials

Referral Indications

- Hemodynamic Instability
- Recurrent apnoea or slow irregular breathing
- Rising respiratory rate and pulse rate with clinical evidence of respiratory distress and exhaustion and failure to maintain SpO_2 >92 % with 8 L of Oxygen

Monitoring

- Temperature, heart rate, respiratory rate, SpO_2 and respiratory distress including chest indrawing and use of accessory muscles of respiration should be monitored 4 hourly

Antibiotic therapy:
To be given under only pneumonia, severe pneumonia, or very severe diseases.

Antibiotic therapy in an outpatient setting

Children under 5 years of age

- First choice: Amoxicillin
  (Child 1 month – 1 year 62.5 mg 3 times daily
  Child 1-5 years 125 mg 3 times daily
  Child 5-18 years 250 mg 3 times daily) for 7 to 10 days
- Second choice : Amoxicillin / Clavulanic acid(30 mg of Amoxycillin/kg/dose 8 hourly) OR Azithromycin Child over 6 months 10 mg/kg (max 500 mg once daily) for 5 days
- Macrolides (Azithromycin) if Mycoplasma pnuemoniae or Chlamydia pneumoniae is suspected
- Flucloxacillin if Staph aureus is suspected
  (Neonate under 7 days 25 mg/kg/dose twice daily
  - » IV Benzylpenicillin 0.5 L units/kg/dose 6 hourly OR
  - » IV Ampicillin
    (25 mg/kg/dose 6 hourly)
- Second choice

  Considered when :
  - » No signs of recovery after 48-72 hours of 1st line antibiotics
  - » Toxic and ill with spiking temperature for 48-72 hours

Drugs

» Amoxicillin / Clavulanic acid (30 mg of Amoxycillin/kg/dose 8 hourly) or

» Cefotaxime (50 mg/kg/dose every 8-12 hours; increase to every 6 hours in very severe infections)

Antibiotic therapy in an inpatient setting

- Total duration 7-10 day
- Start with IV and change oral once the clinical response is good and the child can take orally

Supportive treatment

Fluids

- Patients who are vomiting or who are severely ill may require IV fluids
- It should be given at 80 % of maintenance level and serum electrolytes should be monitored

Oxygen

- It is important to maintain the SpO_2 > 92 %
- For children who are restless, tachypnoeic with severe chest indrawing, cyanosed or not tolerating feeds
- It can be given either via nasal cannulae, face mask or headbox

Temperature control

- Paracetamol 15 mg/kg/dose every 4-6 hours to reduce discomfort

List of Equipment and Medicine for young infants and children

No.	Equipment
1.	Oxygen
2.	Chest X-ray
3.	Pulse Oximeter
4.	Thermometer

No.	Medicine
1.	Oral antibiotics; Amoxicillin, Amoxicillin/ Clavulanic acid, Azithromycin, Flucloxacillin
2.	IV antibiotics; Benzylpenicillin, Ampicillin, Amoxicillin/ Clavulanic acid, Cefotaxime
3.	IV Fluid; NS, DS, DW
4.	Oral Paracetamol

7.2.2. Diarrhoea in Children

If the stools have changed from the usual pattern and are many and watery (more water than fecal matter). The normally frequent or loose stools of a breastfed baby are not diarrhoea.

Acute diarrhoea:
Most diarrhoeas that cause dehydration are loose or watery. If an episode of diarrhoea lasts less than 14 days, it is acute diarrhoea.

Assessment of a child with diarrhoea

History

Ask the mother or other caretaker about:

- Presence of blood in the stool
- Duration of diarrhoea
- Number of watery stools per day
- Number of episodes of vomiting
- Presence of fever, cough, or other important problems
- (e.g., convulsions, recent measles)
- Pre-illness feeding practices
- Type and amount of fluids (including breastmilk)
  and food is taken during the illness
- Drugs or other remedies are taken
- Immunization history

Table 23: Assessment and classification of dehydration

Classification	Signs or symptoms	Treatment
Severe dehydration	Two or more of the following signs : • Lethargy/unconsciousness • Sunken eyes • Unable to drink or drinks poorly Skin pinch goes back very slowly (> 2 seconds)	• Give fluids for some dehydration (Plan C)
Some dehydration	Two or more of the following signs : • Restlessness, Irritability • Sunken eyes • Drinks eagerly, thirsty Skin pinch goes back very slowly(> 2 seconds)	• Give fluids for some dehydration (Plan B) • After dehydration, advise another on home care • Follow up in 5 days if not improving
Not dehydration	Not enough signs to classify as some or severe dehydration	• Give fluids, zinc supplements, and food and advise to continue ORS at home (Plan A) • Advise mother when to return immediately • Follow up in 5 days if not improving

Indications for hospitalization:

1. Children with severe dehydration
2. Children with severe acute malnutrition
3. Children with associated co-morbid conditions

Management of Diarrhoea with no Dehydration

Treatment Plan (A):
Home therapy to prevent dehydration and malnutrition

Rule-1: Give the child more fluid than usual, to prevent dehydration

Rule-2: Give Supplemental Zinc (10-20 mg) to the child, every day for 10 to 14 days

Rule-3: Continue to feed the child, to prevent malnutrition

Rule-4: Take the child to a health worker if there are signs of dehydration or other problems

Check for immunized status and to immunize if there is a missed dose.

Management of Diarrhoea with some Dehydration

Diarrhoea Treatment Plan (B):
Treat Some Dehydration with ORS Give recommended amount of ORS in clinic over 4 hours period Determine the amount of ORS to give during the first 4 hours

Age*	Up to 4 months	4 months up to 12 months	12 months up to 2 years	2 years up to 5 years
Weight In ml	< 6 kg 200-400	6 - < 10 kg 400-700	10 - < 12 kg 700-900	12-19 kg 900-1400

* Use the child's age only when you do not know the weight. The approximate amount of ORS required (in ml) can also be calculated by multiplying the child's weight (in Kg) by 75.

If the child wants more ORS than shown, give more.

Show the mother give how to give ORS solution :

- Give frequent small sips from a cup.
- If the child vomits, wait 10 minutes. Then continue, but more slowly.
- Continue breastfeeding but stop other feedings.

After 4 hours :

- Reassess the child and classify the child for dehydration.
- Select the appropriate plan to continue treatment.
- Begin feeding the child in the clinic.

If the mother must leave before completing treatment :

» Show her how to prepare ORS solution at home.

» Show her how much ORS to give to finish 4-hour treatment.

» Give her enough ORS packets to complete rehydration. Also, give 2 packets as recommended in Plan (A).

Explain the 4 Rules of Home Treatment :

Plan (A)

1. Give extra fluid
2. Give zinc supplements
3. Continue feeding
4. When to return

Management of Diarrhoea with severe Dehydration

Children with severe dehydration require rapid IV rehydration with close monitoring, which is followed by oral rehydration once the child starts to improve sufficiently.

Note

Ringer's lactate solution is the preferred IV solution. If it is not available, normal saline can be used. 5 % dextrose solution is not effective and should not be used. In addition, all patients should start to receive ORS solution at the rate of 5 ml/kg/hr when they can drink. This provides some base and potassium which may not be adequately supplied by IV fluid.

Start IV fluid immediately. If the child can drink, give ORS (5ml/kg/hr) by mouth while the drip is set up. Give 100 ml/kg

Ringer's lactate solution (or if not available, normal saline), divided as follows:

AGE	First, give 30 ml/kg in	Then, give 70ml/kg in
Infants (under 12 months)	1 hour*	5 hours
Children (12 months up to 5 years)	30 minutes*	1 ½ hour

First, give 30ml/kg in the first same hour. Then give 70ml/kg in 5 hours.

- Repeat once if the radial pulse is still very weak or not detectable.
  - » Reassess the child every 15-30 minutes. If hydration status is not improving, give the IV drip more rapidly.
    - » Also, give ORS (about 5 ml/kg/hr) as soon as the child can drink: usually after 3-4 hrs (infants) or 1-2 hrs (children).
    - » If IV treatment not possible, give ORS 20ml/kg/hr for 6 hrs (120ml/kg) by NG tube.
    - » Assess an infant after 6 hr and a child after 3 hrs. Classify dehydration again. Then choose the appropriate plan (A, B, or C) to continue treatment.
    - » Give oral antibiotics for cholera if child 2 years or older.
    - » If possible, observe the child for at least 6 hrs after rehydration to be sure that the mother can maintain hydration by giving the child an ORS solution by mouth.

List of Equipment and Medicine for Diarrhoea in children

No.	Equipment
1.	Weighing machine
2.	IV cannula

No.	Medicine
1.	ORS
2.	Oral Zinc tab
3.	IV Fluid; RL, NS
4.	Oral antibiotics for cholera; Azithromycin, Cotrimoxazole
5.	Oral Paracetamol

7.2.3. Dengue Haemorrhagic Fever in Children

Table 24: WHO Classification of DHF

DF/DHF	Grade	Signs and symptoms	Laboratory
DHF	I	Fever and the haemorrhagic manifestation • Hess test + (> 90%) • Evidence of plasma leakage	• Thrombocytopenia <100,000 cells/ mm2; Hct rise ≥ 20 % majority of cases <50,000 cells/mm3 • Hct rise ≥ 20 % from baseline (due to plasma leakage)
DHF	II	As in Grade I plus spontaneous bleeding	• Thrombocytopenia <100,000 cells,mm2 • Hct rise ≥ 20 %
DSS (Compensated Shock)	III	As in Grade I or II plus circulatory failure (weak pulse, narrow pulse pressure (≤ 20 mmHg), hypotension, restlessness)	• Thrombocytopenia <100,000 cells,mm2 • Hct rise ≥ 20 %
DSS (Hypotensive Shock)	IV	As in Grade I or II plus circulatory failure (weak pulse, narrow pulse pressure (≤ 20 mmHg), hypotension, restlessness)	• Thrombocytopenia <100,000 cells,mm2 • Hct rise ≥ 20 %
Expanded Dengue Syndrome		• Complications of severe profound shock or associated with underlying host conditions/ diseases or co-infections • Central nervous system (CNS) manifestations including convulsions, spasticity, changes in consciousness and transient paresis have been observed	

Investigations

Complete blood count (CBC) and hematocrit (Hct) –

- Recommendations for CBC :
  - » All patients with warning signs
  - » Patients with fever >3days
  - » Patients with shock (these patients should undergo a glucose check)
  - » If CBC is not available in township level, check Hb then multiply by 3 to estimate Hct

Warning Signs

- Clinical Warning Signs (Required Strict observation and medical intervention) (if it is in station hospital, refer to a township or higher level)
  - » Significant abdominal pain
  - » Persistent vomiting
  - » Lethargy
  - » Restlessness
  - » Mucosal bleeding
  - » Fluid accumulation

Management Decisions

Group (A):

Patients who may be treated at home

- Can tolerate adequate volumes of oral fluids
- Pass urine at least once every six hours
- Do not have any of the warning signs
- Do not have any of co-existing conditions

Those with stable hematocrit can be sent home after being advised to return to the hospital immediately if they develop any of the warning signs and to adhere to the following action plan

- Fluids: Encourage oral intake of oral rehydration solution (ORS), fruit juice and other fluids containing electrolytes and sugar to replace losses from fever and vomiting
- Antipyretics: paracetamol for high fever if the patient is uncomfortable. The interval of paracetamol dosing should not be less than six hours

Instruct the caregivers that the patient should be brought to hospital immediately if any of the following occur

- No clinical improvement
- Deterioration around the time of defervescence
- Severe abdominal pain
- Persistent vomiting
- Cold and clammy extremities
- Lethargy or irritability/ restlessness
- Bleeding (e.g., black stools or coffee-ground vomiting)
- Not passing urine for more than 4-6 hours

Group (B):

Patients who require in-hospital management

- Patients with warning signs (if it is in station hospital, refer to the township or higher level)
- Those with co-existing conditions that may make dengue or its management more complicated (infancy, obesity, diabetes mellitus, renal failure, chronic hemolytic diseases)
- Those living far from a health facility without a reliable means of transport

Action plan for dengue patients with warning signs (In Township level)

(During the critical phase, Non-Shock Patient)

- Obtain a reference hematocrit before fluid therapy
- **IV Fluids:**
  - » Type: Isotonic solutions such as 0.9 % Saline, Ringer's lactate
    - » Infusion rate: Start with the appropriate rate (maybe 5-7 ml/kg/hr)
  - » Duration depends on the response to the initial rate with stable vital signs, urine output, and Hct
- **Monitoring**
  - » Vital signs and peripheral perfusion (1-4 hourly until the patient is out of the critical phase)
  - » Urine output (4-6 hourly) (to monitor every 4-6 hour and should be 0.5-1 ml/kg/hr)
    - » Haematocrit (before and after fluid replacement, then 6-12 hourly)
- After the first hour of initial fluid replacement, adjust the rate according to the clinical condition
- If clinical condition stable, urine output 0.5-1 ml/kg/hr for 4 hours and stable or minimally rise Hct ➜ same fluid rate (Note: Not changed after every hour)
- If clinically deteriorate, urine output <0.5 ml/kg/hr for 4 hours and stable Hct ➜ step down fluid rate
- If a patient goes into shock ➜ algorithm for shock
- IV fluid rate should be adjusted to maintain good perfusion and urine output of at least 0.5 ml/kg/hr

Group (C):

Patients who Require Emergency Treatment for Severe Dengue

- Fluid resuscitation will depend on whether the patient is having
  - » Compensated shock (or)
  - » Hypotensive shock
- The differences between the two clinical conditions are shown in Figure 50 and 51.

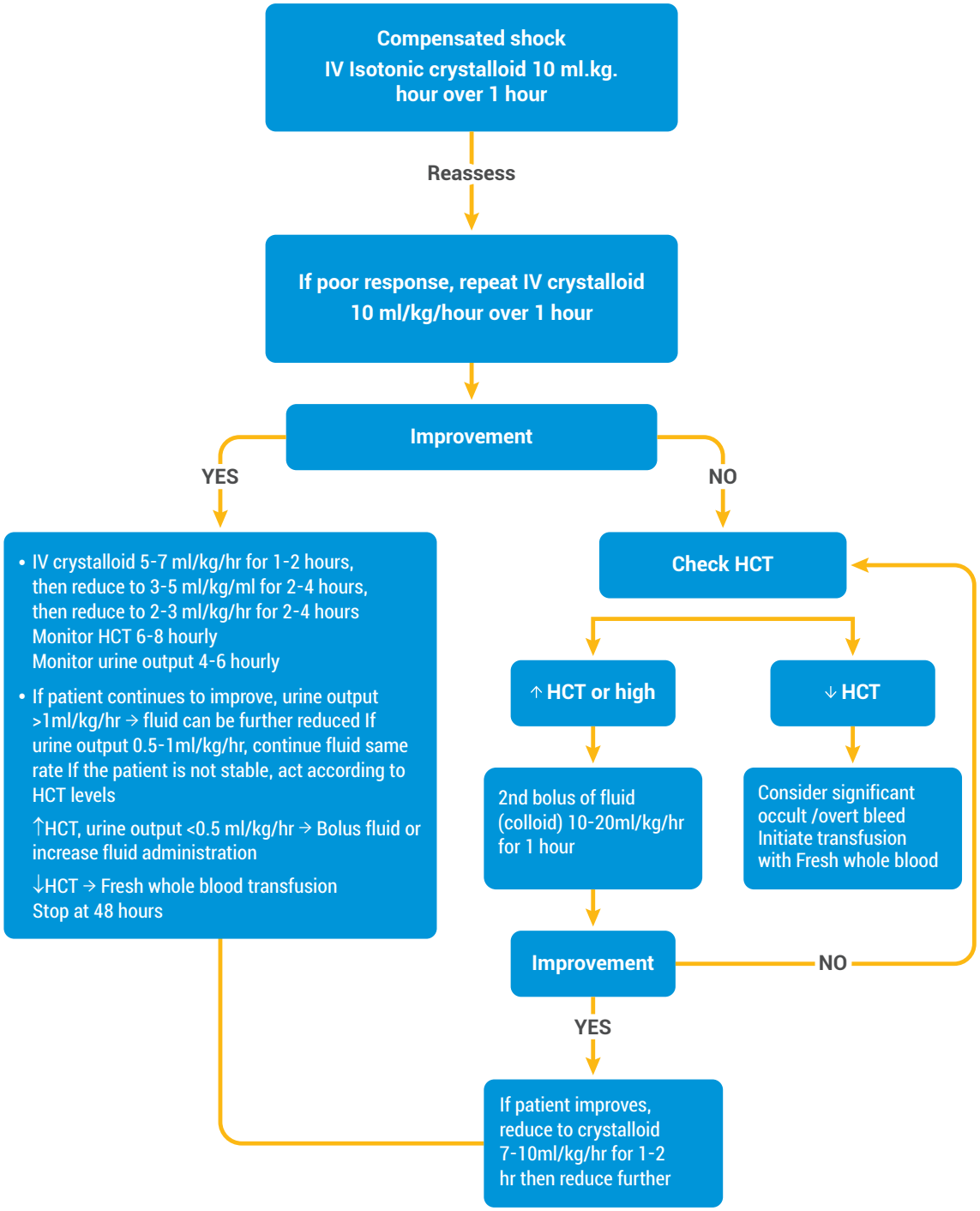


Figure 48: Algorithm for Fluid Management in Compensated Shock (DSS grade III)

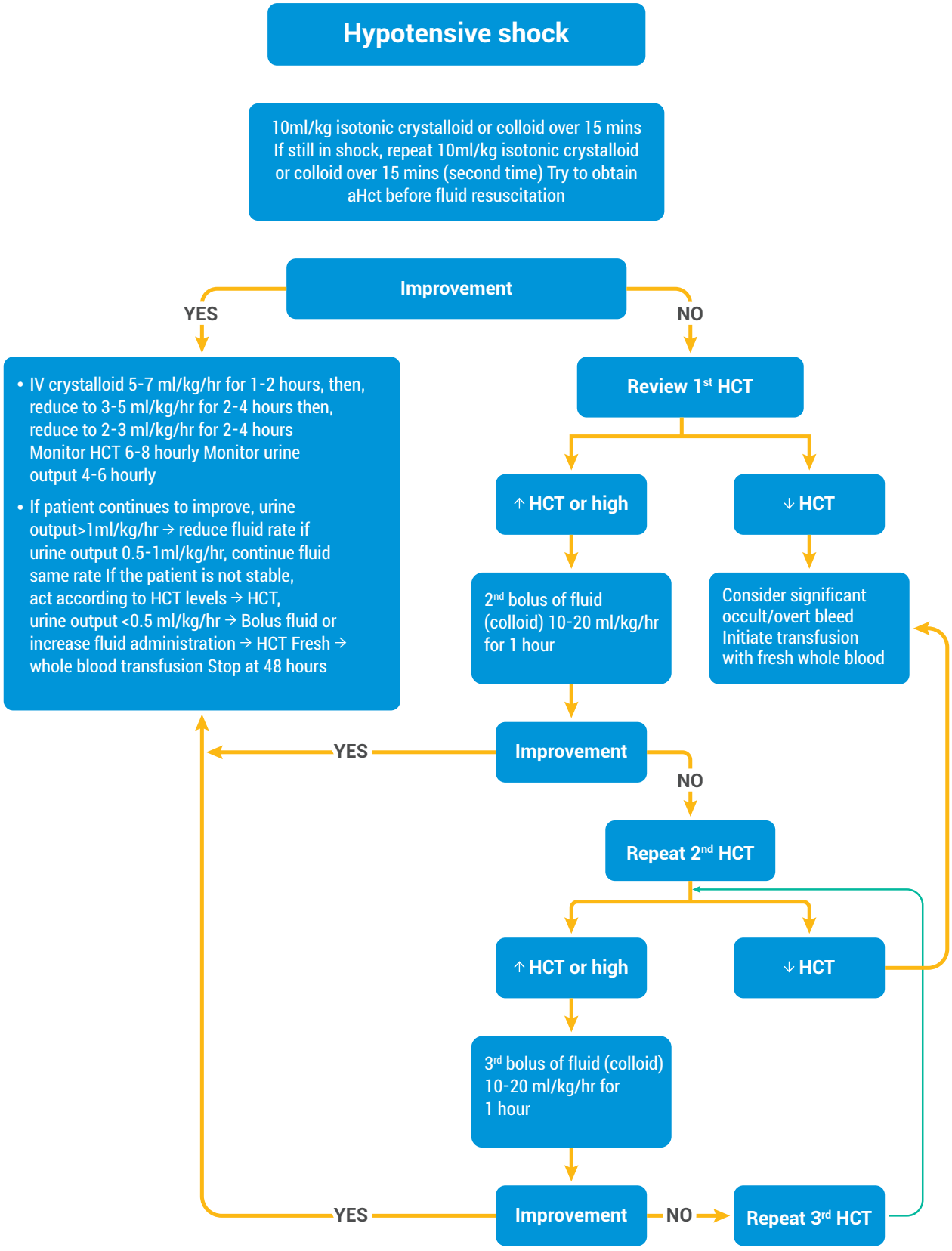


Figure (49) – Algorithm for Fluid Management in Hypotensive Shock (DSS Grade IV)

Referral and Transportation:

More severe/ complicated cases should be managed in hospitals where laboratory investigations, equipment, medicines, and blood bank facilities are available.

Criteria for referral to a higher level are

- Infants < 1 year
- Obese patients
- Prolonged/ profound shock
- Significant bleeding, hemolysis (hemoglobinuria)
- Repeated shock 1-2 times during treatment
- Patients who seem not a response to conventional treatment
- Patients who continue to have rising Hct and no colloid is available
- Patients with co-morbidity condition
- Patients with early signs and symptoms of fluid overload
- Patients with organ(s) involvement
- Patient with neurological manifestations such as change of consciousness, semi- coma, coma, convulsion

Referral procedures

- Discussion and counseling with families
- Prior contact with the referral hospital, communicating with the doctors and nurses responsible.
- Stabilizing patients before transfer
- Ensure that the referral letter must contain important information; clinical conditions with progression, time of shock, series of Hct, platelet count, vital signs, type, and amount of IV fluid, urine output and other important laboratories
- Recommend IV fluid at a slower rate of 5ml/kg/hr to prevent fluid overload during transportation
- At least a nurse who knows the clinical course, laboratory and treatment of patients should be accompanied
- Specialist or more experience doctors should be noticed before the transfer

List of Equipment and Medicine for Dengue Haemorrhagic Fever in Children

No.	Equipment
1.	Microcentrifuge for Hematocrit
2.	IV cannula
3.	BP cuff

No.	Medicine
1.	ORS
2.	Oral antipyretics: paracetamol
3.	IV fluid (crystalloid); NS, RL,
4.	IV fluid (colloid)

7.2.4. Pediatric Ear Infections

Mastoiditis:
Mastoiditis is a bacterial infection of the mastoid bone behind the ear.

Without treatment, it can lead to meningitis and brain abscess.

Diagnosis

Key diagnostic features are:

- High fever
- Tender swelling behind the ear

Figure 50:
Tender swelling
behind the ear

Treatment

- Give IV or IM cloxacillin or flucloxacillin at 50 mg/kg every 6h or ceftriaxone until the child improves, for a total course of 10 days.
- If there is no response to treatment within 48 h or the child's condition deteriorates, refer the child to a surgical specialist to consider incision and drainage of mastoid abscesses or mastoidectomy.
- If there are signs of meningitis or brain abscess, give antibiotic treatment and, if possible, refer to a specialist hospital immediately.

Supportive care

- If the child has a high fever (≥ 39° C or ≥ 102.2° F) that is causing distress or discomfort, give paracetamol.

Monitoring

- The child should be checked by a nurse at least every 6 h and by a doctor at least once a day. If the child responds poorly to treatment, such as decreasing level of consciousness, seizure, or localizing neurological signs, consider the possibility of meningitis or brain abscess.

Diagnosis

- This is based on a history of ear pain or pus draining from the ear (for < 2 weeks). On examination, confirm acute otitis media by otoscopy. The eardrum will be red, inflamed, bulging and opaque, or perforated with discharge.

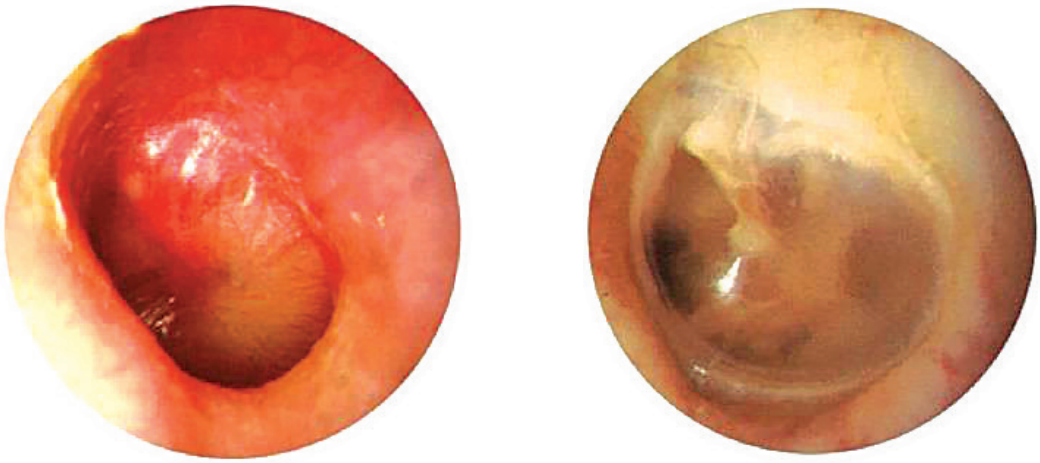


Figure 51: Acute Otitis media: bulging,
red eardrum (right), and normal eardrum (left)

Treatment

Treat the child as an outpatient

- Give oral antibiotics in one of the following regimens : -
  - » First choice: oral amoxicillin at 40 mg/kg twice a day for at least 5 days
  - » Alternately, when the pathogens causing acute otitis media are known to be sensitive to co-trimoxazole, give co-trimoxazole (trimethoprim 4 mg/kg and sulfamethoxazole 20 mg/kg) twice a day for at least 5 days.
- If pus is draining from the ear, show the mother how to dry the ear three times daily by wicking. Advise the mother to wick the ear three times daily until there is no more pus.
- Tell the mother not to place anything in the ear between wicking treatments. Do not allow the child to go swimming or get water in the ear.
- If the child has ear pain or high fever (≥ 39˚C or ≥ 102.2˚F) that is causing distress, give paracetamol.

Follow-up

- Ask the mother to return after 5 days.
  - » If ear pain or discharge persists, treat for 5 more days with the same antibiotic and continue wicking the ear. Follow up in 5 days.

List of Equipment and Medicine for Pediatrics Ear Infections

No.	Equipment
1.	Otoscopy

No.	Medicine
1.	IV or IM cloxacillin, flucloxacillin, ceftriaxone
2.	Oral paracetamol
3.	Oral antibiotics; amoxicillin, co-trimoxazole

CHAPTER-8

Clinical Management Guidelines for Essential Orthopedic Care

Basic Essential Orthopedic Services

- Acute Fracture
  - Common Closed fractures – Upper limb
    - Clavicle,
    - Proximal Humerus fracture
    - Humerus shaft
    - Elbow
    - Forearm
    - Distal Radius
    - Hand
  - Common Closed fractures – Lower limb
    - Femoural shaft
    - Knee
    - Both Bone
    - Ankle and foot
  - Major Closed fractures
    - Spine,
    - Pelvic and acetabular
    - Bilateral femur
  - Open fractures

- Acute Joint Dislocation
  - Shoulder
  - Elbow
  - Hip
  - Knee
  - Ankle
  - Small joints

- Acute Musculoskeletal and Joint Infection
  - Necrotizing Soft Tissue Infection
  - Acute hand infection
  - Acute Osteomyelitis
  - Acute Septic Arthritis

- Soft Tissue injuries
  - Fingertip
  - Tendon
  - Peripheral nerves
  - Vascular injuries of limbs
  - Open joint injuries

8.1. Acute Fracture

Definition

A fracture is defined as a break in the structural continuity of the bone.

Age	**Children**	➜	e.g., greenstick fracture, buckle, epiphyseal injury
	Adult	➜	high energy injury
	Elderly	➜	osteoporotic hip, vertebra, and distal radius fractures

Mechanism of Injury

Important to evaluate the fracture

- Low energy injury(simple fall) – elderly osteoporotic fractures/ pathological fractures
- High energy injury (RTA, FFH, falling object, assault) – multiple/ major/ complex fractures, associated injuries

Cardinal Signs of Fractures

A fracture is clinically diagnostic if 2 out of 5 are present.

1. Deformity
2. Local bone tenderness
3. Crepitus
4. Abnormal movement
5. Loss of function

Assessment

Multiple fractures, associated injuries, distal NV injuries

Radiological Confirmation

- X-rays are almost always needed to confirm diagnosis and plan for treatment.
- The pattern of fracture – transverse, oblique, spiral, comminuted
- The pattern of displacement – angulation, translation, rotation, shortening (overlapping)

Treatment Principles

- Start ABCDE in multiple injured patients
- Treatment depends on age, site of the fracture, fracture pattern, soft tissue injury, and associated injuries
- Non-operative treatment for undisplaced or minimally displaced fractures
- Operative treatment for displaced fractures

Initial Treatment

- Pain control – oral paracetamol, IM diclofenac injection
- Splintage – Sling, POP, Wood bar, sandbags, Clothing Binder
- Referral for X-ray or further treatment

Definitive Treatment

- X-ray confirmation
- Sling/ POP slab or cast for some undisplaced or minimally displaced fractures

8.1.1. Common Closed Fractures - Upper Limb

1. Clavicle Fracture

- Fall on the hand, fall form bicycle
- Pain, swelling, and deformity of clavicle; assess brachial plexus injury
- Treatment is, currently, the surgery in adults
- Initial Care: pain control, simple sling, and referral to higher center (Figure-52)
- Definitive Care: simple sling for 1-2 wks in children.

2. Proximal Humerus Fractures

- Simple fall on the hand in elderly/ high energy injury in adult
- Pain, swelling and loss of function in the shoulder; care of epiphyseal injury of the proximal humerus in children; assess brachial plexus injury
- Treatment is surgery in displaced fractures
- Initial Care: pain control, simple sling, and referral to higher center (Figure-52)
- Definitive Care: simple sling for 3 wks in elderly impacted #, adult undisplaced #

Figure 52: (A) Simple Sling, (B) Sling and Collar and Cuff for clavicle and proximal humerus fractures

3. Humeral Shaft Fractures

- Initial Care: pain control, splintage, and referral to higher center (Figure-52)

4. Elbow Fractures

- Include supracondylar (SC), intercondylar, epicondylar, lateral condylar humerus #s, olecranon #, radial head, and neck #s and elbow fracture-dislocation
- Fall on the hand, sports injury, high energy injury
- Pain, swollen elbow, restricted elbow movement, assess distal NV status
- Treatment is usually surgery
- Initial Care: pain control, splintage, and referral to higher center
- Definitive Care: posterior POP slab for 1-2 wks in undisplaced SC # of children (Figure-53)

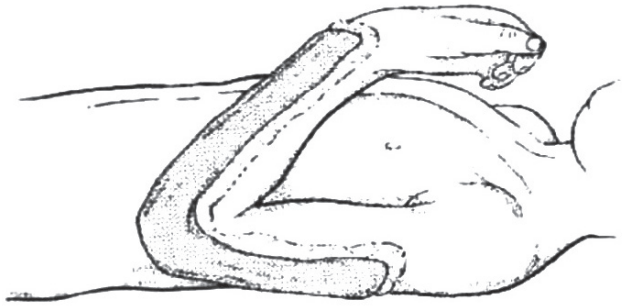
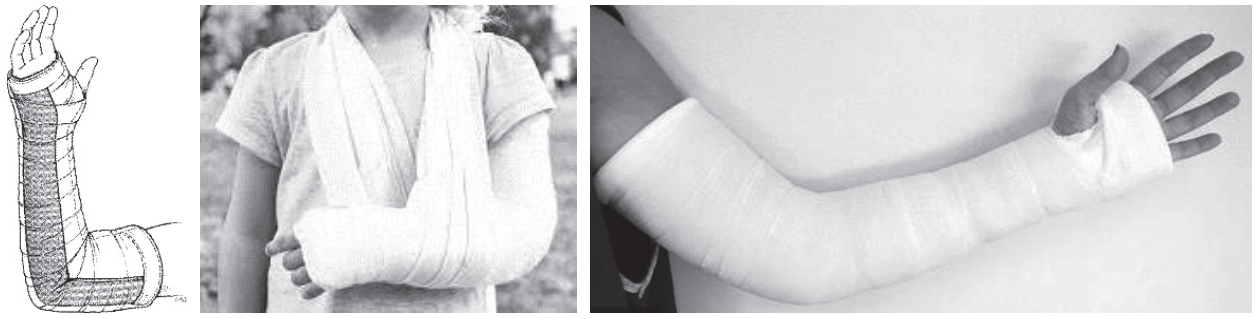


Figure 53:
POP Long Posterior Slab for
Elbow Fractures and Forearm Fractures

5. Forearm Fractures

- Include Monteggia, Galeazzi and both bone (BB) radius and ulnar shaft fractures
- Fall on the hand to high energy trauma
- Pain, swelling, deformity and restricted forearm movements, assess distal NV status
- Treatment is surgery in adult and closed reduction and casting in children; knowledge and skill are required
- Initial Care:pain control, splintage, and referral to higher center
- Definitive Care: long arm POP cast for 3-4 wks in undisplaced BB#s of children (figure-54)



(A) (B) (C)

Figure 54: (A) Long Arm Posterior Slab, (B) Long arm POP cast,
(C) Splint and Sling, for elbow and forearm fractures

6. Distal Radius Fractures

- Fall on the hand, machinery injury, FFH, RTA
- Pain, swelling, dinner fork deformity, restricted wrist movement; to assess distal radius epiphyseal injury
- Treatment is surgery in adult and elderly displaced fractures; closed reduction and casting or pinning in children; knowledge and skill are required
- Initial Care: pain control, splintage, and referral to higher center
- Definitive Care: forearm POP cast or slab for 1-3 wks in undisplaced # of children (figure-55)

Figure 55:
Forearm POP cast

7. Hand Fracture

- Include scaphoid, carpal joints, metacarpal (MC) and phalange (PL) #s
- Fall on the hand, boxing injury, machinery injury, RTA
- Pain, swelling, restricted finger joints, distal NV status (colour, turgor, temperature, and capillary refill)
- Treatment is surgery in displaced #s; splintage for undisplaced #s; knowledge and skill are required
- Initial Care: pain control, splintage, and referral to higher center
- Definitive Care: appropriate splintage for 3-6 wk for undisplaced MC & PL #s (figure-56)

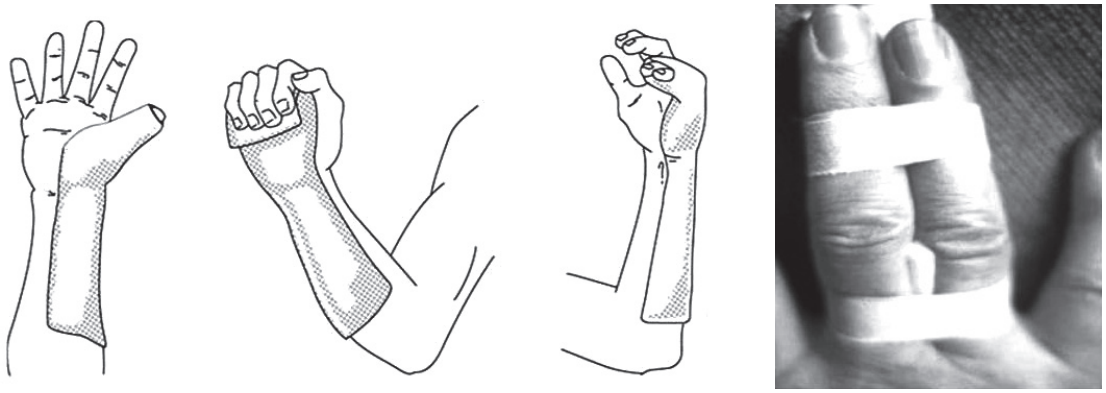


Figure 56: Thumb spica, Volar splint and Ulnar gutter splint and Buddy strapping for hand fractures

8.1.2. Common Closed Fractures - Lower Limb

1. Proximal Femoral Fractures

- Initial Care: pain control, rest, and referral to higher center

2. Femoral Shaft Fractures

- Initial Care: pain control, splintage, and referral to higher center

3. Knee Fractures

- Initial Care: Pain control, splintage, and referral to higher center

4. Both Bone Leg Fractures

- Usually, high energy injury, sometimes twisting injury
- Swollen and deformed limb, need distal NV assessment, beware compartment syndrome
- Treatment is usually surgery: Casting for undisplaced #s in children
- Initial Care: pain control, splintage, and referral to higher center
- Definitive Care: long leg cast for 3 to 4 wks in undisplaced #s of young children (figure-57)

5. Ankle Fractures and foot fractures

- Initial Care: pain control, splintage, and referral to higher center

Figure 57: POP short leg cast, POP cylinder cast and POP long leg cast

8.1.3. Major Fractures

- Apply on the multiple injured patients (polytrauma)
- A fracture that influences the mobility of patient leading to bedbound status
- Leading to infection, sepsis, pneumonia, ARDS, ARF, multiple organ failure and death
- Early referral to the higher center is essential for resuscitation, early surgical care and orthopedic stabilization, ICU facility

1. Spine Fracture

- Treatment depends on fracture severity, instability, and neurological injury; correct hypoxia and hypotension to prevent secondary spinal cord injury, X- rays only is not sufficient for diagnosis and management
- Initial Care: oxygen in spinal cord injury, pain control, fluid (NS) therapy in hypotension, spine immobilization, log roll method, and referral to higher center (figure-69).

2. Pelvic and Acetabular Fractures

- Assess hemodynamic instability; associated urological and neurological injuries
- Initial treatment is resuscitation, optimization, and temporary orthopedic fixation; definitive treatment is the orthopaedic fixation
- Initial Care: oxygen, fluid therapy (NS and/or Blood), pain control, pelvic binder, referral to higher center (figure-68).

3. Bilateral Femur Fractures

- Initial treatment is resuscitation, optimization, and temporary orthopedic fixation; definitive treatment is the orthopaedic fixation
- Initial Care: oxygen, fluid therapy (NS and/or Blood) if needed, pain control, splintage, referral to higher center (figure-65).

8.1.4. POP Application

POP:

POP is the Plaster of Paris that is commonly used as the traditional orthopaedic cast or splint. POP is calcined gypsum that hardens when it is combined with water (22° - 25° C). The setting time for POP is 10 min- 45 min ad the POP cast is fully dry after 72 hours.

Casts:

Circumferential immobilizers; provide superior and effective immobilization, less forgiving during the acute inflammatory stage; a higher risk of complications

Splints:

Non-circumferential Immobilizers- static or dynamic; faster and easier to apply; allow for the natural swelling; preferred tool for immobilization in the acute care setting

Purpose
1. To promote healing, 2. To maintain bone alignment, 3.To diminish pain,
4. To protect the injury, 5. To help compensate for surrounding muscular weakness

Indications
1. Non-operative fracture treatment, 2. ligament / tendon injuries, 3. additional temporary support following operation, 4. septic / aseptic inflammation

Guidelines for Proper Cast and Splint Application

1. Use appropriate amount and type of padding,
2. Properly pad bony prominences and high-pressure areas,
3. Properly position the extremity before, during, and after application of materials,
4. Avoid tension and wrinkles on padding and plaster,
5. Avoid excessive molding and indentations

POP slab:

Half by POP, half by bandage roll

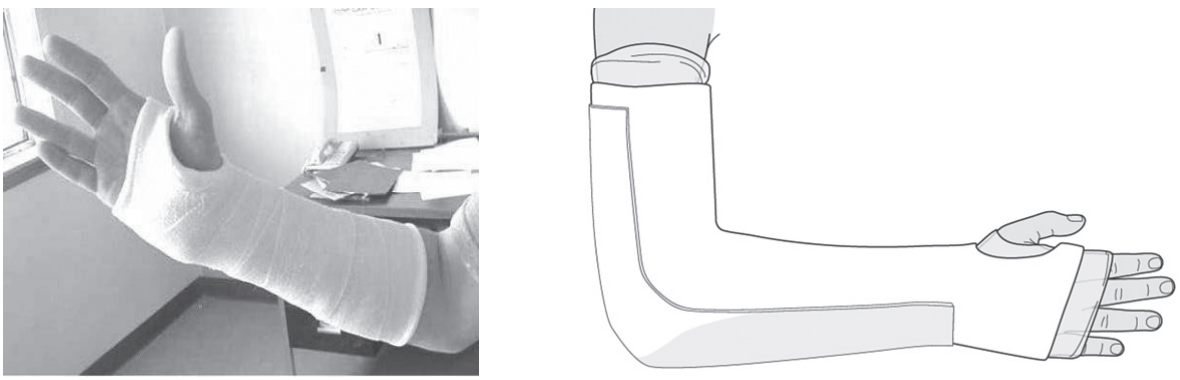
POP cast:

POP completely encircles the limb

Complications:

Compartment syndrome, Ischemia, Neurologic injury, Thermal injuries, Pressure sores, Skin infection and dermatitis, Joint stiffness

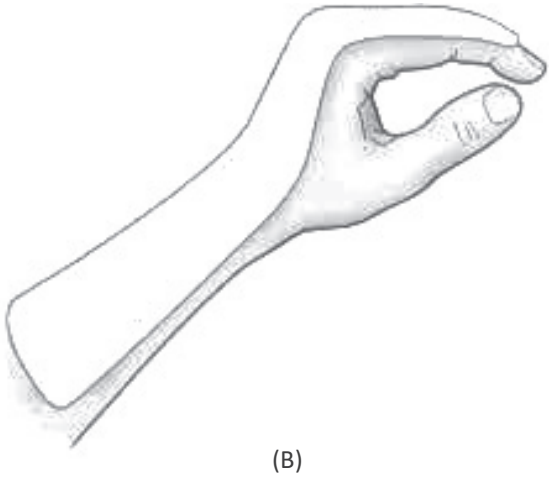
Common POP Casts and Splints



(A) (B)

Figure 58: (A) POP short arm cast, (B) POP long arm cast

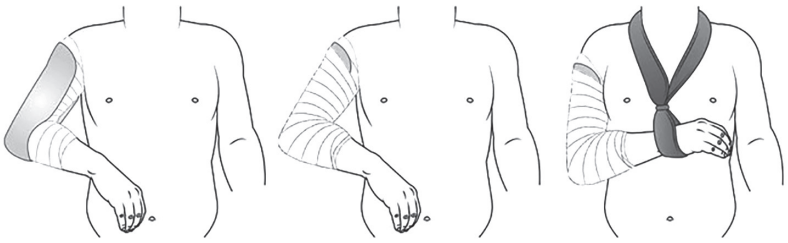
(A)



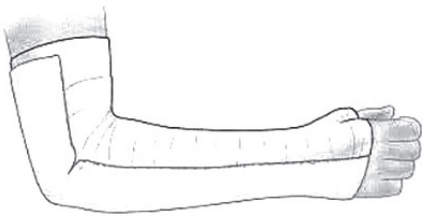
(B)

(C)

Figure 59: (A) POP volar slab, (B) POP dorsal slab, (C) POP ulnar gutter slab



(A)



(B)

Figure 60: (A) POP U-Slab, (B) POP long arm slab

(A)

(B)

Figure 61: (A) POP short leg slab, (B) POP long leg slab

8.1.5. Splintage guidelines for referral services of closed fracture

POP, wood sheet/bar, tree branch, cardboard paper, clothes, etc., can be used as temporary splintage materials for fractures and dislocations.

Fundamental Rules of Splinting

- 2 joint
- Functional position
- Well padding
- Comfortable and light

Casting

- Proper position of limb
- Good looking and good working together
- Adequate extent and strength
- Well padded, well molded
- Neither loose nor tight
- No pressure effects

Cast Padding

- Roll distal to proximal
- 50 % overlap
- 2 layers minimum
- Extra padding at fibular head, malleoli, patella, and olecranon

Figure 62:
Cast Padding

Upper Limb fracture

1. Clavicle fracture

- Arm sling/bag

2. Proximal humerus fracture

- Arm sling

3. Fracture shaft of humerus

- POP U Slab (Figure-60)

4. Fracture around the elbow

- POP long posterior slab (Figure-53)
- Extent of POP – just below the axilla to Metacarpal neck
- Elbow joint is in extended position

5. Forearm bone fracture

- POP long posterior slab (Figure-54)
- Extent of POP – just below the axilla to metacarpal neck
- Elbow joint is 90-degree flexion and forearm are in supination

6. Fracture around wrist joint

- POP dorsal slab (figure-63)
- Extent of POP is just below the elbow to metacarpal neck

Figure 63:
POP dorsal slab

7. Metacarpal and phalynx fracture

- Arm sling

Lower limb fracture

1. **Proximal femoral fracture (#neck of femur, trochanteric fracture, subtrochanteric fracture, # shaft of femur)**

- Immobilizing the injured limb (figure-64)

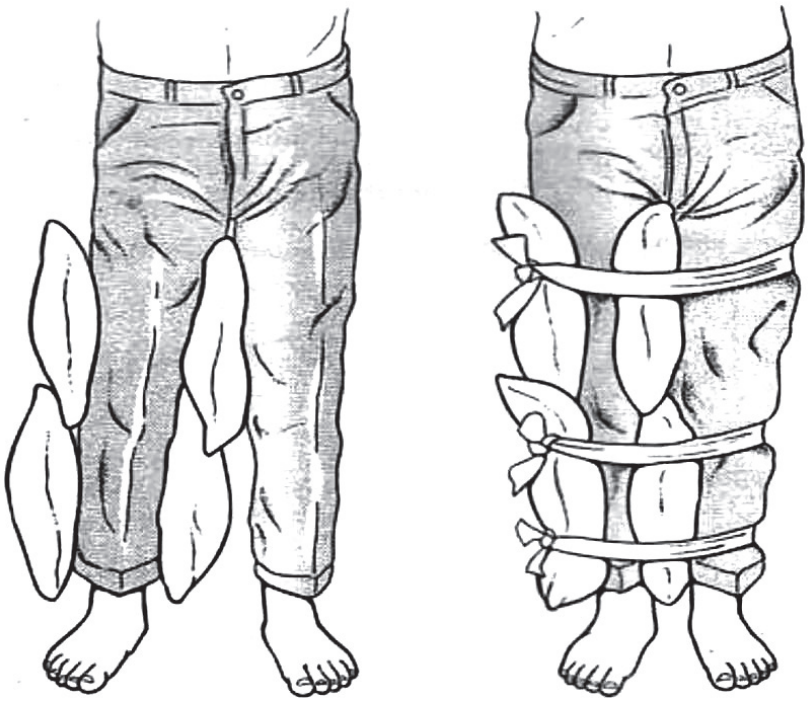


Figure 64: Immobilizing the injured limb by lying it to the normal limb over the pillow

2. **Bilateral cases of proximal femoral # and # shaft of femur**

- Thomas splint (figure-65)

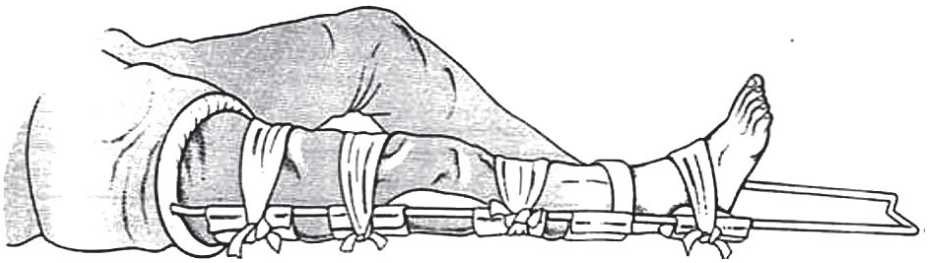


Figure 65: Thomas Splint

3. **Fracture around the knee joint and tibia and fibula fracture**

- POP Long posterior slab
- Extent POP is just below the root of thigh to tip of toes.

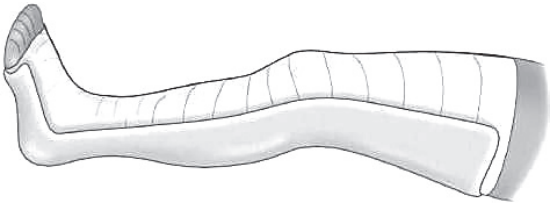


Figure 66: POP Long Posterior Slab

4. Fracture around the ankle joint and metatarsal fracture

- Below knee POP posterior slab
- Extent of POP is just below the knee joint to tip of toes.

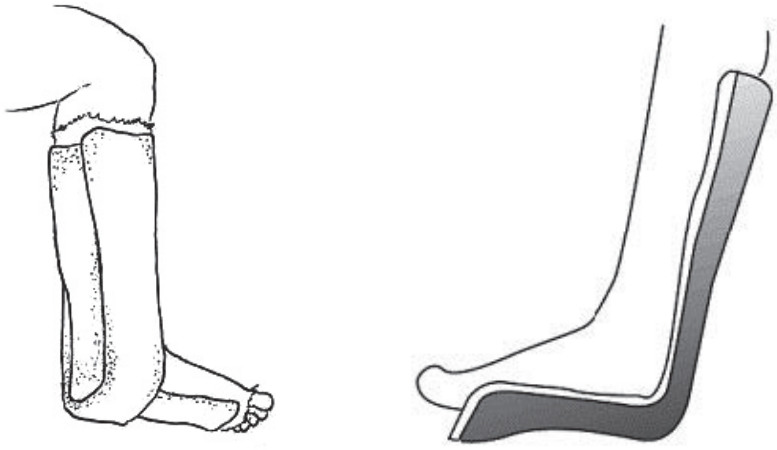


Figure 67: Posterior slab for ankle and foot fractures

5. Pelvic fracture

- Improvised pelvic binder

Figure 68: Improvised pelvic binder

6. Spine Injuries

- Rigid cervical collar
- Spine board

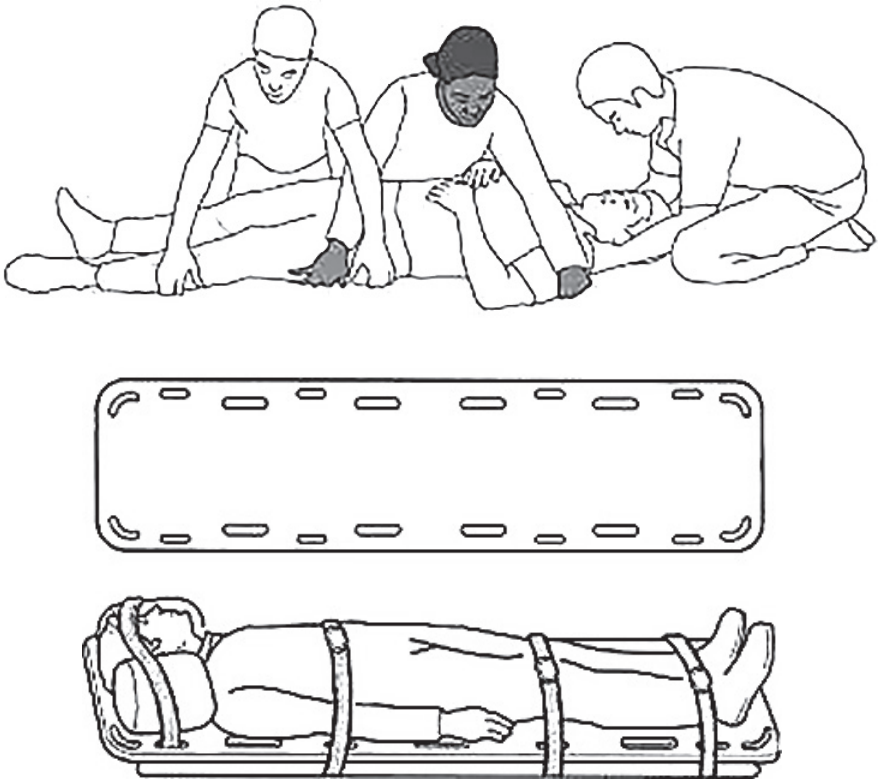


Figure 69: Log roll method, splintage and spine board for spine fracture

8.1.6. Splintage guidelines for referral services of acute dislocation of joints

1. Shoulder joint dislocation

- Arm sling

Figure 70:
Splintage for shoulder dislocation

2. Elbow joint dislocation

- Arm sling

Figure 71:
Splintage for elbow dislocation

3. Dislocation of wrist joint and small joints of hand

- Arm sling

4. Hip joint dislocation

- Refer the patient without any splintage

Figure 72:
Transport for hip dislocation

5. Knee joint dislocation

- POP long posterior slab
- Extent of POP is just below the root of thigh to tip of toe

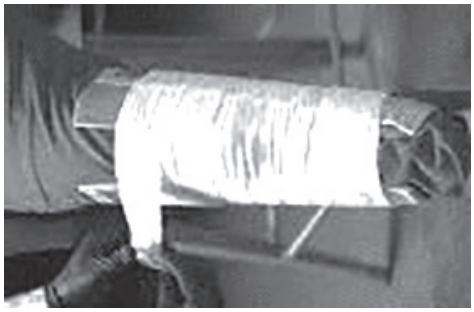


Figure 73: Splintage for knee dislocation

6. Dislocation of ankle joint and small joint of foot and toes

- POP below knee posterior slab
- Extent of POP is just below the knee to tip of toes

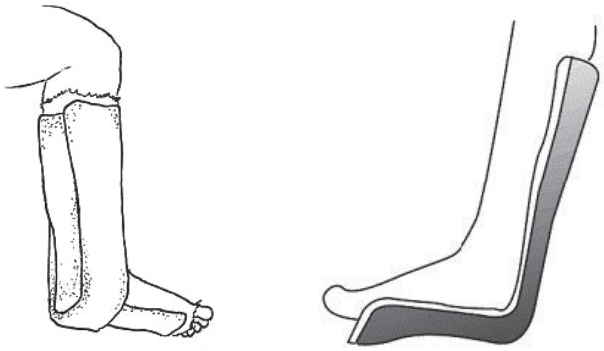


Figure 74: Splintage for ankle dislocation

8.1.7. Open Fracture

Definition:

A fracture in that fracture communicates with the outside environment through the wound.

MOI:

High energy injury (RTA, FFH, falling object, assault), low energy (simple fall, fall on the hand)

Assessment:

Associated organ injuries, open wound in variable sizes, wound contamination, signs of fractures, associated soft tissue injuries, distal NV status, other fractures

Risk:

Infection, neurovascular injury, compartment syndrome, limb loss in vascular injury/ severe crushed injury

Radiological Confirmation

- X-rays are almost always needed to confirm diagnosis and plan for treatment.

Treatment Principles

- Start ABCDE in multiple injured patients
- Treat associated organ injuries
- Early IV antibiotics (important to reduce the risk of infection)
- Early wound debridement and irrigation wound coverage; (adequacy of debridement is necessary to prevent infection and further orthopedic fixation and wound cover in that special skill and knowledge are required; generally, skin closure/suturing is not strongly recommended)

- A temporary or definitive orthopedic fixation
- Rehabilitation and follow-up

Initial Care

- Pain control (oral paracetamol, IM diclofenac injection)
- Wound cleaning wound coverage with a sterile dressing and/ or pressure bandaging; closure/ suturing of skin is strongly prohibited
- Splintage (for pain control, immobilization, and fracture bleeding control)
- IM – TT injection(tetanus prophylaxis)
- Early IV antibiotics, also in suspected cases (IV ceftriaxone 1 gm, add IV levofloxacin 500 mg in severe contamination or farm injury)
- Referral to a higher center for X-ray and/or further treatment

8.2. Acute Joint Dislocation

Definition:

Loss of congruency between two articulating surfaces of joint; basically, acute dislocation is < 3 weeks and old dislocation is > 3 weeks.

Mechanism of Injury:

Fall on the hand, direct blow, twisting injury, cyclist injury, RTA, FFH, other high energy injuries

Clinical Presentation:

Pain, swelling, typical joint deformity, restricted joint movement, ligament injury, neurovascular injury, associated organ injuries, associated fracture, open joint injury

Diagnosis:

MOI and Clinical sign is usually diagnostic. X-rays are necessary for confirmation of dislocation and assessment of fracture-dislocation

Risk:

Secondary OA, neurovascular injury, joint instability, permanent disability

Treatment principles:

Early reduction (within 24 hours); closed reduction, and/or open reduction; splintage; casting; orthopedic fixation

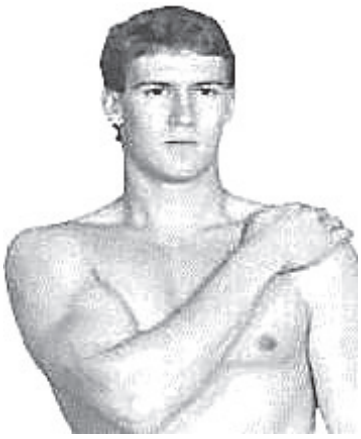
Initial Treatment:

Pain control, sling or splintage, X-ray, referral to higher center

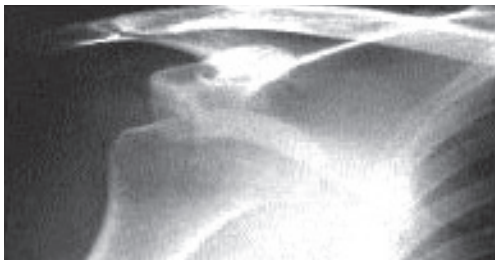
8.2.1. Shoulder Dislocation

- Pain, typical abduction deformity, squaring of the shoulder; assess axillary nerve
- Confirm with X-ray, assess associated fracture
- Treatment is usually closed reduction under sedation/ general anesthesia; rest in a sling for 1 to 3 weeks; fracture-dislocation usually needs surgery.
- Initial Care: pain control, sling, referral for X-ray and/or further treatment
- Definitive Care: closed reduction under sedation/general anesthesia & sling in simple case.
- Refer if unreduced in recheck X-ray, duration more than 1-week, open dislocation, # dislocation, there is other associated injury that needs specialist treatment.

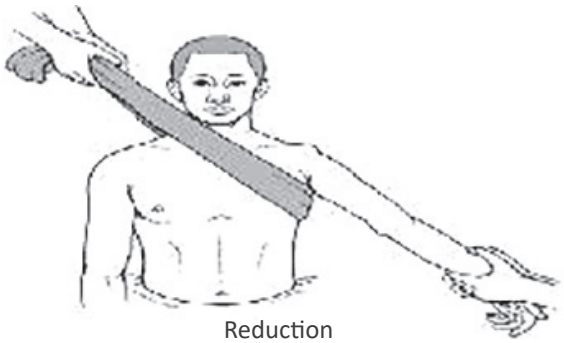
Shoulder dislocation
(Flattening of deltoid)



Dugas test (unable to reach the opposite shoulder)



Anterior dislocation of shoulder joint



Reduction

Figure 75: Clinical features, diagnosis, and reduction of Shoulder dislocation

8.2.2. Elbow Dislocation

- Initial Care: Pain control, splintage, referral for X-ray, and/or further treatment.

8.2.3. Hip Dislocation

- Treatment is the initially closed reduction, mostly followed by reconstruction of associated acetabular fractures, and fixation of other fractures
- Initial Care: Pain control, fluid therapy (if hypotension), referral for X-ray, and/or further treatment.

8.2.4. Knee Dislocation

- Treatment is an initial closed reduction, then a reassessment of vascular status and splintage; exploration, repair, fasciotomy for vascular injury; reconstruction of ligaments and fracture
- Initial Care: pain control, if open wound present – (wound cover with sterile gauze, IV antibiotics), splintage, fluid therapy (if hypotension), referral for X-ray, and/or further treatment.

8.2.5. Ankle Dislocation

- Treatment is reduction at an emergency unit to prevent skin compromise, IV antibiotics, wound debridement, temporary fixation, then bone and ligament reconstruction
- Initial Care: pain control, wound cover with sterile gauze, IV antibiotics, splintage, referral for X-ray, and/or further treatment.

8.2.6. Small Joint Dislocation

- Treatment is closed reduction and splintage; open reduction with or without pinning in failed closed reduction due to button-hole effect
- Initial Care: pain control, splintage, referral for X-ray and/or further treatment

8.3. Acute Musculoskeletal and Joint Infection

8.3.1. Necrotizing Soft Tissue Infection (NTSI)

- Characterized by 1. severe pain out of proportion to clinical sign, 2. nature of rapid spread (within 24 – 48 hours), 3. necrosis of fascia of muscle compartments leading to necrosis of perforators (arterioles) to the skin (skin necrosis, sometimes muscle necrosis)
- Often associated with diabetes mellitus; others- immunosuppression and PVD
- Locally – local pain, circumstantial swelling of the limb, redness, blisters, skin discolouration, signs of spreading infection, subcutaneous crepitus
- Systemically – fever, malaise, tachycardia, hypotension, and signs of organ failure
- Treatment – high index of suspicion, early IV antibiotics, early fluid therapy, nutrition, extensive and repeated wound debridement, serial advanced wound dressing, wound coverage

Initial Care:

Oxygen (tachycardia, hypotension), IV antibiotics (IV crystalline penicillin and IV metronidazole ± IV levofloxacillin / or IV ceftriaxone and IV levofloxacillin and IV metronidazole), wound dressing and bulky bandaging, early referral to higher center

8.3.2. Acute Hand Infection

- **Treatment principles** – antibiotics, rest, splintage and elevation, drainage (require skill and knowledge on the special incision; inappropriate lead to ugly and disable scar and neurovascular injury), rehabilitation.
- **Initial Care** – pain control, splintage, oral or IV antibiotics (oral flucloxacillin/ or oral amoxicillin and clavulanic acid / or IV ceftriaxone), referral for drainage of deep space infections

8.3.3. Acute Osteomyelitis

- Pain, redness, swelling, fever, restricted movement (pseudo paralysis)
- **Treatment –** high suspicion, pain control, splintage, IV antibiotics for 24 – 48 hours, X-ray is not helpful, drainage if no response (drainage – adequate exposure through a recommended incision, ± bone drilling – knowledge and skill required)
- **Initial Care –** High index of suspicion, Pain control, Splintage, IV antibiotics (IM/IV Cefotaxime), referral to higher center

8.3.4. Acute Septic Arthritis

- **Treatment –** high index of suspicion, pain control, splintage, early IV antibiotics, X-ray is not helpful, drainage if no response (drainage – aspiration, arthroscopy, and open methods – knowledge and skill required)
- **Initial Care –** High index of suspicion, Pain control, Splintage, IV antibiotics (IM/IV Cefotaxime), referral to higher center

8.4. Soft Tissue Injuries

8.4.1. Finger-Tip Injury

- **Treatment –** Reconstruction of the fingertip is required (graft, local, regional, and free flap)
- **Initial Care –** Pain control, cover with a sterile dressing, referral to higher center

8.4.2. Tendon Injury

- **Treatment –** Pain control, wound debridement, surgical repair of the tendon (need special knowledge and skill to regain free gliding movement of tendons); risk – infection, adhesion, loss of power
- **Initial Care –** Pain control, dressing, splintage, IV antibiotics (IV ceftriaxone), referral to higher center

8.4.3. Peripheral Nerve Injury

- **Common sites -** the digital nerve in finger; median and ulnar nerve in the volar wrist; superficial radial nerve in the radial wrist; median and radial nerve in cubital fossa; median and ulnar nerves in medial arm
- **Treatment** - pain control, wound debridement, surgical repair of the nerve (need special knowledge and skill to regain free gliding movement of tendons); risk – infection, adhesion, loss of power
- **Initial Care -** pain control, dressing, splintage, IV antibiotics (IV ceftriaxone), referral to higher center

8.4.4. Vascular Injury of Limb

- **Treatment –** pain control, wound debridement, surgical repair of torn artery and major veins; Risks – hypotension, anaemia, infection, limb ischaemia, late relative ischaemia, contractures
- **Initial Care –** pain control, pressure bandaging, a tourniquet (pressure cuff) may be used (cycle of 1 hr pressure and 5-10 min release), splintage, IV antibiotics, referral to higher center

8.4.5. Open Joint Injury

- **Treatment –** pain control, wound debridement, saline test for uncertain open joint, irrigation and debridement of joint, closure of joint
- **Initial Care –** pain control, splintage, IV antibiotics, referral to higher center

List of Equipment and Medicine for Orthopaedic Care

No.	Equipment
1.	POP 4 in Roll
2.	POP 6 in Roll
3.	Soft Ban/ Cotton Wool 4 in
4.	Soft ban/ Cotton Wool 6 in
5.	Bandage 4 in Roll
6.	Bandage 6 in Roll
7.	Gauze Roll/ Pad
8.	Basic Dressing Instrument Set
9.	Sterilizer/ Autoclave
10.	Basic or local made sandbag, tape, piece of cloth, wood stick, bamboo stick, stretcher, rigid cervical collar, spine board
11.	Arm sling
12.	Pillow
13.	Thomas splint (child size, adult size)
14.	OT bed sheet

No.	Medicine
1.	Oxygen
2.	Normal Saline 500 ml
3.	IM Tetanus Toxin (TT) injection amp
4.	IV Ceftriaxone injection vial IV Crystalline Penicillin injection vial, IV Cefotaxime
5.	IV Levofloxacillin
6.	IV Metronidazole
7.	Soap (Solution 1)
8.	Spirit sol
9.	Povidone Iodine sol

CHAPTER-9

Clinical Management Guidelines for Essential Safe Anesthesia

Basic Essential Anesthesia Services

- Spinal Anesthesia
- Ketamine Anesthesia (General Anesthesia)
- Local Anesthesia
- Obstetric Anesthesia

Principles of Anesthesia Care

- Staff who was trained in anesthesia
- Facilities and equipment for monitoring(*NIBP, PR, SpO_2%) and resuscitation(*O_2 supply, Anaesthetic machine, Ambu bag and mask)
- Equipment's and drugs required in anesthesia
- Training in Anesthesia and resuscitation*
- Pre-operative assessment
- Intra-operative monitoring and management
- Immediate post-operative care

9.1. Process of Anesthesia

Pre-Operative Assessment

History

- Current diseases conditions
- Coexisting medical illness (e.g., Recent upper respiratory tract infections, Asthma, Pulmonary TB, Coronary artery disease, Diabetes mellitus, Hypertension, CAD, DM, Hypertension, the likelihood of pregnancy) and associated complications, and medication compliance
- Medications (Currently taking drugs)
- Allergic and drug reaction
- Anesthetic history and any complications (e.g., High spinal or difficult airway management)
- Family history
- Social history (smoking, drugs, and alcohol)

Physical Examination

1. The vital sign (BP, PR, RR, SpO_2)

   Airway assessment for potential difficult airway/intubation

   - Size of mouth opening (Annex-5) (Mallampati grade II & III are potential for difficult endotracheal intubation)
   - A measure of thyro-mental distance (Figure 76)(should be more than 6.5cm)
   - Documents lose or chipped teeth
   - Note range of cervical motion(limitation in cervical spine movement can result in difficult intubation)
   - Document tracheal deviation
2. Precordium
3. Lungs
4. Abdomen
5. Extremities
6. Back

Height and weight of patient

- Height and weight measurement is a cornerstone in all surgical cases
- Dosage of drugs is calculated based on weight of the patient.
- Dose adjustment of Local anaesthetic agent for spinal anesthesia is based on height of the patient.
- BMI (Body Mass Index) should be calculated for potential difficult airway and questionnaires for Obstructive Sleep Apnea (OSA) should be done. BMI>30 is regarded as obesity and it has potential difficult airway management).

» OSA can be assessed in preoperative visit by asking "STOP" questionnaire.

S ➜ Snoring

T ➜ Tiredness (daytime sleepiness)

O ➜ Observed apnoea during sleep by partner

P ➜ Pressure high (high blood pressure)

Fasting

- To reduce the risk of gastric regurgitation and pulmonary aspiration by minimizing the volume of fluid and particulate matter in the stomach.
- Pulmonary aspiration is uncommon, but it can result in serious morbidity and rarely mortality (to see Fasting guideline in Annex).

Informed consent

- Explain the risks and benefits of choices of anesthesia (For more details, please refer to Annex-4)

Figure 76: Thyromental distance

9.1.1. Pre-Operative Preparation

The following pre-operative preparation must be done for all patients undergoing surgery:

1. Oxygen must be present (either cylinder or concentrator)
2. Functioning Ambu bag (mask, Ambu bag, reservoir bag, oxygen connector), airway (oropharyngeal airway- different sizes), and ET tube and laryngoscope if available.
3. Different sizes of the venous cannula.
4. Anesthetic drugs and resuscitation drugs (Adrenaline 1:10,000, 1;100,000 : Atropine 0.6mg – diluted in 0.2mg per cc: ephedrine 30 mg – diluted in 5-6mg per cc)
5. NIBP, Pulse oximeter, ECG for monitoring.
6. IV fluids – Crystalloid.
7. Suction

9.1.2. Intraoperative Management and Monitoring

- Conduct of Anesthesia (Local, General, Spinal Anesthesia)
- Intraoperative monitoring. Trained anesthesia personnel shall be present in the room throughout the conduct of all general anesthesia, spinal, and local anesthesia. During all types of anesthesia, the patients' oxygenations, ventilation, circulations shall be continuously evaluated
  - » Vital Signs every 5 minutes (Airway, Breathing and Circulation both clinically and using basic monitor (BP, PR, RR, ECG if available)
  - » Oxygen saturation (SPO_2) monitoring is essential. Kept above 96% & above.

9.1.3. Post-Anesthesia Care (PAC)

- Monitoring and resuscitation equipment should be available in PAC area.
- Resuscitative drugs and analgesics should be in place.
- All Patients should be kept in recovery areas for at least 30 min.
- For GA- the patient should be kept in a recovery position with oxygen 2L/min via nasal prong until the patient can obey the command.
- Post-operative pain relief by rapid-acting analgesics like IV Ketorolat or Paracetamol infusion 1 G, Fentanyl or Diclofenac, Tramadol 100mg Suppository
- For Spinal Anesthesia- Monitor BP. PR, Motor recovery and if there is hypotension or bradycardia, treat accordingly.
- All patients must be evaluated by trained anesthesia providers at recovery area or Post Anesthesia Care Unit (PACU) before discharge to the ward according to the following criteria.
  - » Easy arousability
  - » Full orientation
  - » The ability to maintain and protect the airway
  - » Stable vital signs for at least 15-30 min
  - » The ability to call for help, if necessary
  - » No obvious surgical complications (such as active bleeding)

9.2. Spinal Anesthesia

Pre-Operative preparation (as in 9.1.1)

Conduct for Spinal Anesthesia

1. Prepare the resuscitative measures (O_2, Drugs such as Ephedrine, Atropine, Dopamine, Adrenaline) Please see pre-operative assessment
2. Calculate the dosage of local anesthetic drugs according to Dose adjustment table (table 25)
3. Open IV line with an intravenous cannula, 18 or 20 G
4. Infuse the fluid with 25-30 drops per minute (Normal saline or Ringer lactate)
5. Measure and record baseline parameters such as BP, Pulse rate, SPO_2
   - » Conduct for Spinal Anesthesia
   - » The patient is positioned on the operating table in the lateral position.
   - » The patient's back should lie along the edge of the table and must be vertical.
   - » A line between iliac crests lies on the fourth lumbar spinous process; lumbar puncture should be performed either at the L2-3, L3-4 or L4-5 interspace. (Anatomy refer to Figure 77, 78)
   - » A full sterile technique (with a gown, gloves, and surgical drapes) is used.
   - » A selection of spinal needle (23-25 G) should be available.
   - » The spinal needle is inserted at the midline, midway between two spinous processes.
   - » In the well-positioned patient, the needle is directed at right angles to the skin.
   - » When the needle tip has entered the spinal canal, the stylet is withdrawn from the needle and the hub is observed for the flow of CSF, a needle with a transparent hub makes this easier. A gentle aspiration test should be performed if the free flow of CSF is not observed, or the needle carefully rotated through 90º.
   - » When CSF is obtained, the syringe containing the local anesthetic solution should be carefully attached firmly to the needle, taking care not to displace the needle.
   - » Gentle aspiration confirms the needle position, and the solution is injected at a rate of 1ml every 5-10s.
   - » A needle is withdrawn, and the patient placed supine (For unilateral block- Keeping lateral position for at least 5 min)
   - » Assessing the block – always assess the level of sensory block 3 min after spinal injection and every 5 min up to 20 min and at the end of operation.

Table 25: Dose (ml) adjustment for average Height (Average Height 5'-5'2")

Dermatomallevelto be reached	Surgical Procedure	0.5% Heavy Bupivacaine
T4 - T6	Appendectomy	3.4 ml
	Caesarean Section	2.0 - 2.2 ml
T6 - T8	Hernia	2.8 – 3 ml
T10	Bladder, vagina, and hip Surgery	2.4 - 2.6 ml
L1	Lower limb surgery	2.0 - 2.4 ml (Unilateral)
S1 - S2	Perineal and rectal surgery	1.0 - 1.6 ml

- 0.5% Heavy Bupivacaine equal to 5mg per/ml
- Dose(ml) should be reduced in old age and short structure (Above table reference from Manual of Primary Anesthesia)
- Increase dose (add 0.1 to 0.2 ml) for height taller than 5’2”

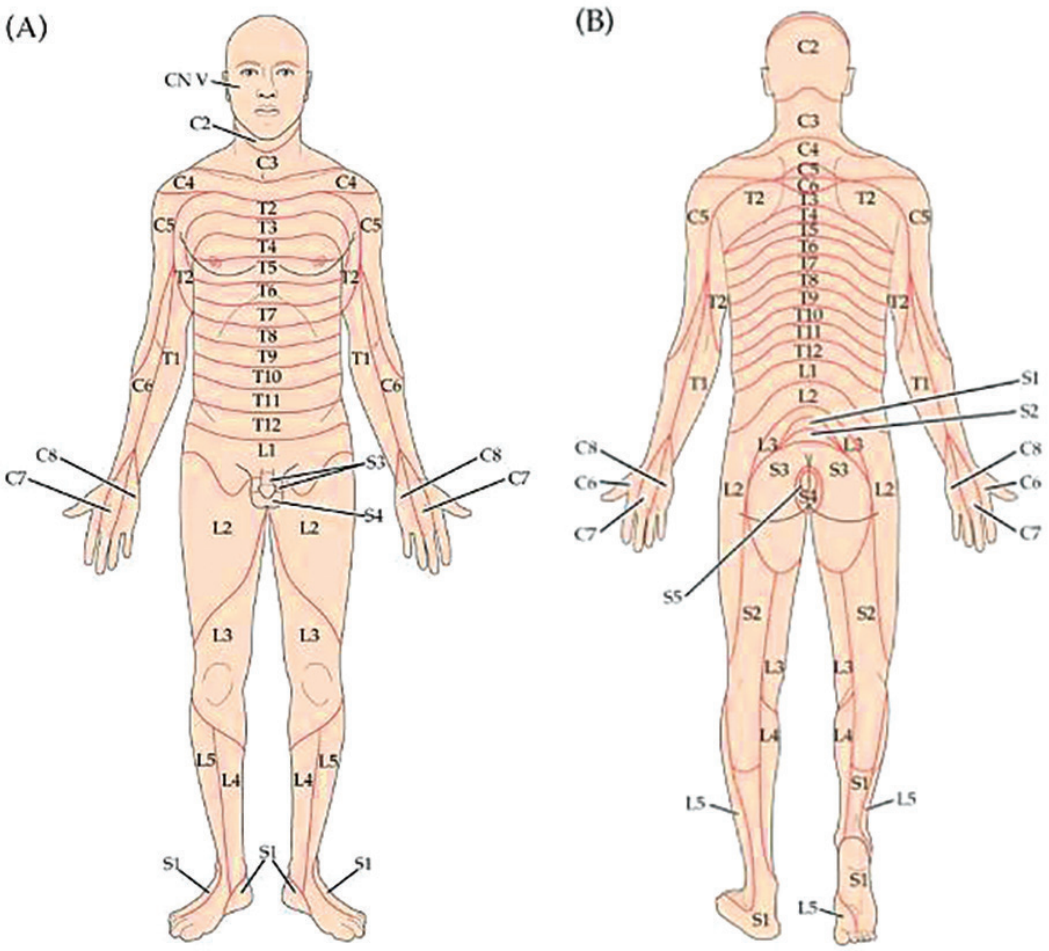


Figure 77: Dermatomal level

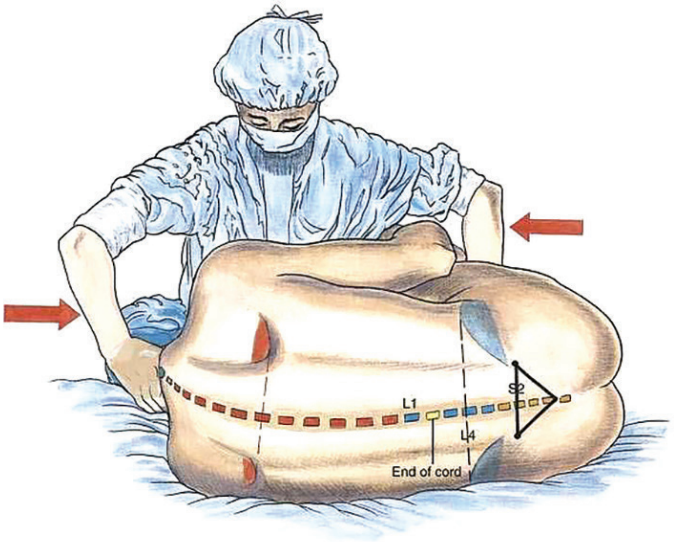


Figure 78: Position for Spinal Anesthesia and Interspace (between two spinous processes)

Spinal Anesthesia can be used at the Following Procedures

It is most suitable for surgery below the umbilicus. Types of surgery include -

- Acute appendicitis
- Appendicular abscess
- Irreducible inguinal hernia, (township hospital)
- Inguinal hernia (township hospital)
- Wound management including suturing (Below umbilicus)
- Incision and drainage (lower umbilicus)
- Removal of foreign body
- Cellulitis lower abdomen
- Suprapubic cystostomy
- Elective LSCS (without contraindications to spinal anesthesia)
- Emergency LSCS (without contraindications to spinal anesthesia)
- Retained placenta, (patient is not in shock)
- Uterine inversion, (patient is not in shock)
- Uterine rupture, (patient is not in shock)
- Miscarriage/Abortion (when surgical management is needed)
- Pelvic Abscess

Contraindication

1. Hypotension/Shock, Systolic Blood Pressure less than 90mmHg
2. Coagulopathy (low platelet, 70,000 and below)
3. Infection at the site of injection
4. Known cardiac disease

Complications and Management of Immediate Complications

Hypotension:

Hypotension is defined as a drop in blood pressure of more than 20% below the baseline blood pressure or systolic blood pressure less than 90 mmHg.

Management

- Increase inspiration Oxygen concentration. (increase flow rate or with face mask)
- Increase the rate of IV fluid (often bolus of 0.5-1 L will restore BP)
- Consider administration of Vasopressor (IV Ephedrine 3-6mg incremental dose)
- Heat rate < 60 beats per minute – IV Atropine 0.3-0.6 mg
- Check for other causes of hypotension. e.g., Blood loss, packs, retractor in abdominal surgery, etc.
- Ephedrine requirement more than 30mg starts dopamine infusion 200mg in 500ml Normal saline, 15 drops per minute for 1 hour

Total Spinal or Complete spinal block

The block extends above the T4 level causes severe CVS problems with bradycardia and hypotension. The block may extend higher and reaching the 4th ventricle result in respiratory arrest or profound hypotension.

Sign and symptom of Complete spinal block are –

- Cardio-respiratory- hypotension, bradycardia, respiratory compromise, apnea reduce oxygen saturation, dysphonia, difficulty in coughing, cardiac arrest.
- Neurological- nausea, vomiting, arm/hand dysaesthesia or paralysis, high sensory level block, cranial nerve involvement, loss of consciousness.

Symptom and sings usually occur within the minutes of Spinal Anesthesia, however, delay up to 30 minutes has been reported.

Management

- If a patient is respiratory compromised or reduction in oxygen situation level, bag and mask assisted ventilation with Ambu bag with oxygen attachment until the patient can breathe well
- Secure airway and intubation and ventilation if required.
- IV fluid therapy
- Treat Hypotension – vasopressor e.g., ephedrine 5-10mg, and if necessary, adrenaline 50-100 microgram (0.5-1 ml of1;10,000 solutions) will always be needed.

List of Equipment and Medicine for Spinal Anesthesia

No.	Equipment
1.	spinal needle (24-25G)
2.	3ml or 5ml syringe
3.	Sterile gauze, swab

No.	Medicine
1.	Local Anesthetic agent –Bupivacaine 0.5% hyperbaric (heavy)
2.	Emergency drugs – Adrenaline 1:10,000, 1;100,000: Atropine 0.6mg – diluted in 0.2mg per cc: ephedrine 30 mg – diluted in 5-6mg per cc
3.	antiseptic for cleaning the skin (Solution III and Solution II)

9.3. Ketamine Anesthesia

Ketamine Anesthesia:

It is a technique of general anesthesia by administering intravenous ketamine intermittently or infusion throughout the period of surgical procedure.

Pre-operative preparation

Simple Guide to Ketamine Anesthesia

1. **Premedication:**

- Atropine 10-20 µg/kg (not more than 600 g) IV prior to ketamine.
- Diazepam 0.1-0.2 mg/kg helps to reduce intraoperative movement and also limits postoperative delirium.

2. **Anesthesia:**

- give IV 1-2 mg/kg in small increments initially to avoid episodes of apnea. (For example – 30 mg boluses every 60 sec to a total of 100 mg in a 70 kg man.) Onset is rapid (1-2 min) with a duration of 10-15mins.
- Anesthesia can be maintained by either intermittent IV boluses or with infusion.
- Intermittent boluses of 0.5 mg/kg every 15-20 mins (OR) Infusion = 1-2 ml/min (1-2 mg/min)
- Infusion using syringe pump (50mg of ketamine is diluted up to 50ml of distilled water) (OR) Infusion with drip, (Add 500 mg of ketamine to 500 ml of a crystalloid solution) (1ml contains 1mg)
- Infusion = 1-2 ml/min (1-2 mg/min) 20 -40 DPM(drops per minute) with drip set
- The infusion is stopped roughly 30 mins before the end of surgery.
- This is judged according to the depth of anesthesia and the size of the patient; care being taken to avoid an overdose.
- Some patients may need as much as 4 mg/min.
- Return of full orientation may require may requires 60-90 mins

Steps for Ketamine Anesthesia

1. Check O_2 supply
2. Prepare resuscitative measures (drugs, Ambu bag, etc)
3. Kept suction machine ready.
4. Review preoperative assessment (Airway difficulty, drug allergy, fasting hours,etc.)
5. Check adequate fasting hours before operation apart from the life-saving procedure. Gastric emptying time is delayed inpatient with pain and in trauma.
6. Administer IV Ranitidine 50mg and Metochlorpramide 10mg 1 hr before an operation.

7. Measure BP, PR every 5min (if possible, use automatic measuring with monitor) & SpO_2% monitoring continuously and kept 96% & above
8. Give O_2 2-4 L/min (Nasal prongs/face mask with reservoir bag)
9. Make sure to open the IV line.
10. Administer GA according to guideline
11. Make sure an adequate depth of anesthesia before the incision is started.
12. Assess Airway patency & Breathing adequacy throughout the operation
13. If complications of GA occur manage appropriately.
14. Patient should be kept in recovery position (Annex) in quiet environment and continue to give O_2 2-4 L/min (Nasal prongs/face mask with reservoir bag) until he is fully awake.
15. If emergence delirium occurs, titrating dose of IV diazepam 3-10 mg or midazolan 2-5mg can be given(taking care of airway obstruction and monitoring until patient is fully awake)

Indications for Use

- Ketamine may be used as the sole anesthetic agent for a large number of superficial operations and procedures and sedation
- E.g., Minor to intermediate orthopedic surgery (especially distal arm or lower leg surgery including manipulation of fractures).
- Gynecological surgery (D&C, ruptured ectopic pregnancy) and other minor surgical procedures
- Drainage of abscesses
- Debridement of burns
- Change of wound dressing
- Cardiovascular stimulatory effects make ketamine a desirable drug for the induction of anesthesia in unstable cardiovascular patients, suffering from hypovolemia, hemorrhagic shock, or cardiovascular depression in sepsis.
- Children – nausea, vomiting, and hallucinations are less common in children.
- Status asthmaticus.
- Patients who have sustained trauma with extensive blood loss are typical candidates for rapid sequence anesthesia induction with ketamine

Patients unsuitable for ketamine

- Hypertension
- Ischemic heart disease
- Pre-eclampsia
- Acute alcoholic toxicity (fatal)
- Raised intracranial pressure.

Complication

- Aspiration
- Arrhythmia
- Hypoventilation
- Laryngospasm
- Delay Recovery
- Emergence of Delirium

Possible adverse effects of Ketamine

1. Hypoxemia (SpO_2<96%) during anesthesia may be due to

- **Airway management problems**

Airway obstruction may be partial or total due to the tongue falling back or secretions (presenting with noisy breathing or see-saw respiration)

Management:

Follow airway management guideline such as head tilt, chin lift, jaw thrust, putting oropharyngeal airway, gentle suction of secretion

- **Hypoventilation**
  - » Check shallow respiration or reduced respiratory rate due to sedations, GA, opioids, and bronchospasm, lung disease, aspiration
  - » May need to assist respiration with Ambu bag attached with O_2

- **Laryngospasm**
  - » Reflex closure of vocal cords
  - » Due to irritation of the airway (e.g., secretions blood, vomit) or in response to other*stimulation (e.g., peripheral pain, OPA) during light anesthesia
  - » Mild– incomplete closure—stridor
  - » Severe– complete closure- completely obstructed airway- no noise- abdominal
  - » If not treated– hypoxia, hypotension, bradycardia, ventricular arrhythmia- cardiac arrest

Prevention:

Should *ensure adequate depth of anesthesia before surgical stimuli, airway manipulations (intra- operatively and in recovery)

2. Aspiration

(a) Should be well fasted (Rules of fasting hours)

(b) Attempt to reduce the volume and acidity of the stomach in risky patients, GI prokinetics metoclopramide, H2 blocker ranitidine 1-2 hr before operation

(c) Consider best type of anesthesia

(d) E.g.,* LA or RA without sedation will maintain laryngeal reflexes and will protect against aspiration

With active vomiting ➜
avoid cricoid pressure, left lateral position, head down and suction

When airway clean and protected ➜
maintain SpO_2% with ventilation and O_2

Prevention of complication of Ketamine

- Always check O_2 supply
- Always use O_2 saturation monitor
- O_2 supplementation
- correct airway obstruction
- Manual ventilator support with bag and mask if necessary
- Consider lung problems. Aspiration, pulmonary oedema

Ketamine anesthesia

- **Advantages –**
  - » Can be used as sedatives, analgesics, and sole anesthetic agent
  - » Bronchodilatation, minimal respiratory depression, cardiovascular stimulation
  - » Can be given IM, IV
- **Disadvantages –**
  - » Cannot assess the level of anesthesia easily (light anesthesia with laryngospasm, a wrong sense of safety in recovery)
  - » Increased salivation
  - » Emergence of delirium
  - » Increased HR and BP

List of Equipment and Medicine for Ketamine Anesthesia

No.	Equipment
1.	Oxygen
2.	Suction
3.	Patient monitor
4.	Ambu bag
5.	Pulse oximeter
6.	Nasal prongs/face mask with reservoir bag

No.	Medicine
1.	IV Ketamine
2.	IV Atropine
3.	IV Diazepam
4.	IV crystalloid solution
5.	Resuscitation medicine;
6.	IV Ranitidine 50mg and Metochlorpramide

9.4. Local Anesthesia

The calculation for safe local anesthesia administration

Local anesthetic agents (LA)

It can be toxic to the central nervous system and cardiovascular system if their plasma level is increased. It may be due to the administration of overdose or improperly administered. It is imperative to calculate the maximum allowable safe dose before administration. In combination with adrenaline maximum safe dosage of LA can be increased.

The common maximum safe recommended dose is as follows:

Table 26: Common Maximum Safe Recommended Dose of Local Anesthesia

Description	Maximum dose without adrenaline (mg/kg)	Maximum dose with adrenaline (mg/kg)
Lignocaine	4mg/kg	7mg/kg
Bupivacaine	2mg/kg	3mg/kg

Table 27: Conversion of Concentration (%) to Milligram per Milliliter (mg/ml)

Concentration of LA	mg/ml (each ml contains)
0.125%	1.25mg/ml
0.25%	2.5mg/ml
0.5%	5mg/ml
1%	10mg/ml
2%	20mg/ml

- For surgical anesthesia 0.5% - 2% lignocaine or 0.25- 0.5% bupivacaine can be used. Lignocaine and bupivacaine can be mixed also.
- To calculate the maximum recommended dose for 50 kg adult patient
- Lignocaine without adrenaline- 4mg/kg –> 200 mg can be used.
- Maximally either 1% lignocaine 20ml or 2% lignocaine 10ml can be administered locally.
- Lignocaine with adrenaline - 7mg/kg 350 mg is allowed
- Maximally either 1% lignocaine with adrenaline 35 ml or 2% lignocaine with adrenaline 17 ml can be administered locally.
- To add adrenaline to LA (How to dilute to get 1:200,000 solution)
- Adrenaline one ampoule contains 1mg. It is 1:1000 solution and it means 1mg in 1000ml. If it is diluted to 10ml of distilled water, its concentration becomes 1:10,000. Each 1ml from this 1;10,000 dilution is added to 20ml of LA to become 1:200,000 dilution of adrenaline in LA.

Steps for LA administration

1. Check O_2 supply and accessories.
2. Prepare resuscitative drugs.
3. Open IV line.
4. Calculate the maximum allowed dose and prepare in a sterile bowl.
5. Measures and record baseline BP & PR and attach SpO_2 monitor (pulse oximeter)
6. Communicate verbally throughout your procedure to know early signs of local anesthetic toxicity. (Manifestations of LA toxicity typically appear 1-5minutes after injection but maybe later)
7. To reduce the dose in the area around the increased vascularity.
8. To administer in divided amount and each injection should be after aspiration to make sure not to be administer intravascular.
9. The first sign of LA toxicity is circumoral numbness and dizziness.

Management of LA toxicity

1. Stop the injection immediately.
2. Give O_2
3. Maintain Airway. Assist the breathing with Ambu bag (attach O_2) if required.
4. Small incremental dose of IV diazepam 3-5mg if convulsion occurs
5. Consider IV ephedrine 5mg/dose, IV adrenaline 0.1 mg/dose (can repeat) & dopamine infusion (Put 200mg into 500ml of 0.9% N/S 15-20 DPM) to augment cardiac output and peripheral vascular tone.
6. IV Atropine 0.4-0.6 mg if bradycardia (HR <60/ min)
7. CPR if a cardiorespiratory arrest

List of Equipment and Medicine for Local Anesthesia

No.	Equipment
1.	Oxygen
2.	Suction
3.	Pulse oximeter
4.	Ambu bag

No.	Medicine
1.	Lignocaine
2.	Bupivacaine
3.	Distilled water
4.	IV crystalloid solution; NS
5.	Resuscitation medicine; IV ephedrine, IV adrenaline, dopamine infusion, IV Atropine
6.	IV diazepam

9.5. Obstetric Anesthesia

Spinal anesthesia

Indication:

It is the preferred technique if there is no contraindication to it. General Anesthesia can be associated with airway problems, such as inability to intubate, inability to ventilate, or aspiration pneumonitis

Steps for spinal anesthesia for LSCS (after exclusion for contraindication to spinal Anesthesia)

Please follow the protocol of preoperative assessment and preparation of Spinal Anesthesia.

- Follow fasting guidelines except for emergencies for mother or fetus.
- Administer IV Ranitidine 50mg and IV Metochlorpramide 10mg 1 hr. before operation.
- Review preoperative assessment and risks, height of the patient
- An access IV line and makes sure patent. Infuse 0.9% N/S or Ringer's Lactate
- Measure baseline parameters such as BP, PR and SpO_2%
- Check resuscitative measures, O_2 source, medicines (Ephedrine, Atropine, Adrenaline, dopamine) Infusion N/S, R/L
- Dose adjustment according to the height according to the recommended dose stated in spinal anesthesia guide
- Conduct of Spinal anesthesia according to recommended guides
- Left uterine replacement manually or by putting a wedge under right hip
- Monitor BP, PR SpO_2%. Assess the level of the sensory block if possible every 5min up to 15 minutes after block.
- Assess and treat hypotension, bradycardia& respiratory insufficiency according to spinal anesthesia management
- Bolus and infusion Syntocinon (Oxytocin) as according to Obstetric Guidelines
- Management of complications is same as that mentioned in Spinal Anesthesia portion.

If there are contraindications for Spinal Anesthesia or inadequate or failed Spinal Anesthesia, proceed with General Anesthesia.

General Anesthesia (Ketamine Anesthesia)

Indications

1. It is used for emergency LSCS when spinal anesthesia is contraindicated.
2. It also facilitates management in the event of severe hemorrhagic complications such as APH or PPH with shock
3. Ruptured ectopic pregnancy.
    - Although standard General Anesthesia includes endotracheal intbation with use of muscle relaxant and ventilator as well as the use of inhalational anaesthetic agents, Ketamine Anesthesia mentioned above can be given in emergency situation with limited resources and facilities.
    - Airway obstruction, difficult airway management and aspiration are significant risks.
    - Please follow the protocol of preoperative assessment and preparation of ketamine Anesthesia. Monitoring during anesthesia and management of complications are the same.
    - Oxygen 4-6 L/min via the face mask or face mask with reservoir bag and lateral uterine tilt are mandatory.
    - Giving induction of anesthesia after cleaning and draping of her abdomen could reduce the transfer of ketamine to baby.
    - Combined use with local infiltration technique (described below) could also reduce total dose requirement of ketamine and its complications.

Local Anesthesia

Indications:

1. Local anesthesia for LSCS can be safely used in high-risk patients where spinal anesthesia or general anesthesia can be associated with complications. ACOG clearly states that infiltration of local anesthesia can be used for cesarean delivery when adequate general or regional anesthesia is unavailable.
2. It can be used in very poor clinical state e.g., heart failure, patients who have potential difficult airway/intubation for GA, or contraindication for spinal anesthesia.
3. Repair of the vaginal injuries following vaginal delivery.

Local anesthetic toxicity is a significant risk due to requirement for potentially large volume. Calculation of the maximum allowable dose and taking care not to get inadvertent intravascular administration are the cornerstones in this technique.

Contraindications:

1. Eclampsia, severe pre-eclampsia
2. Previous laparotomy
3. Obese
4. Placenta previa
5. If the surgeon is inexperienced at caesarean section

Instructions:

1. Follow fasting guideline except for life threatening emergency situation either for mother or foetus.
2. Administer IV Ranitidine 50mg and IV Metoclopramide 10mg before going to OT.
3. Review preoperative assessment and risks and height of the patient.
4. Informed consent after explanation on the detailed procedure.
5. Access IV line and make sure patent.
6. If necessary, up to 0.5ml/kg of ketamine can be given intravenously to provide maternal analgesia without risk of depressing the baby.
7. Give additional oxygen to the mother during a cesarean section.
8. Lateral uterine displacement until baby is delivered.

Steps for local anesthesia for LSCS

1. Calculate the maximum allowed dose of local anaesthetic agents based on the body weight of the patient (according to table 25&26). Prepare either 0.5% or 1% lignocaine and keep it in sterile bowl. (Lignocaine 0.5% or 1% is recommended because of its rapid onset and least effects on neonatal neurobehavioral reflexes. Total dose should not exceed 500 mg (i.e., 100ml of 0.5% lignocaine or 50 ml of 1% lignocaine)
2. Adrenaline must be added to prepared lignocaine bowl in a dilution of 1:200,000 (see dilution guide at Local Anesthesia section), every 1ml of 1:10,000 dilution of adrenaline to each 20 ml of prepared lignocaine)
3. Step wise procedure of local anaesthetic infiltration for LSCS is as follow:

Advices: ➜

a. Not to use retractors or packs

b. To be very gentle as well as to avoid any sudden movement

c. Inject in divided doses and aspirate (pull back on the plunger) before each administration to be sure that no vascular penetration because of vascularity

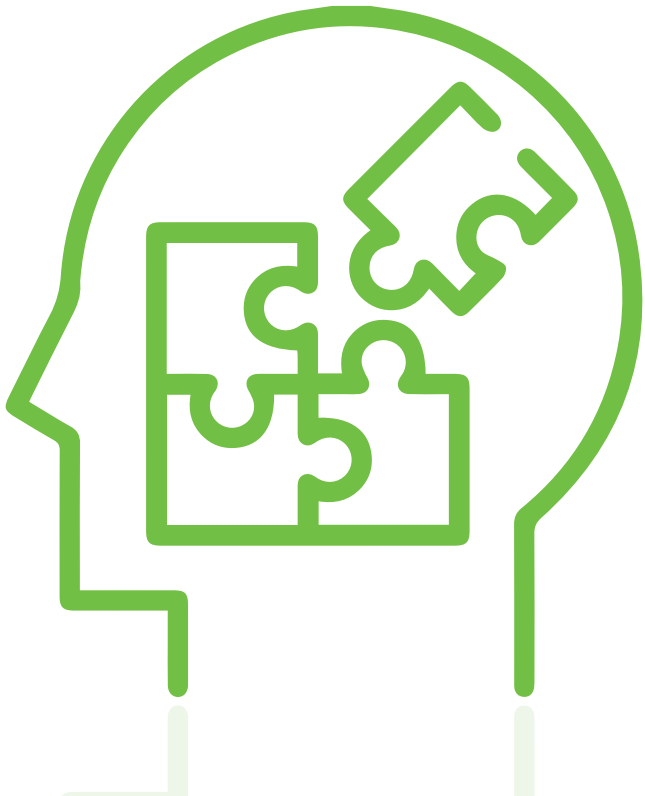
1. After cleaning and draping her abdomen, local anaesthetic solution (calculated and prepared in the bowl) is administered to subdermal layer, the various layers of fascia, muscle, and peritoneum, excluding the fatty tissue.
2. Firstly, skin, and subcutaneous infiltration (with 0.5% lignocaine 8-10 ml) to the proposed incision line. (Pfannenstiel incision should not be used as it takes longer and requires more lignocaine and retraction is poor). A long wheal of local anaesthetic solution is raised 3-4 cm either side of the midline. Infiltrate the solution down through the layers of the abdominal wall using a long needle, which should remain almost parallel to the skin. Wait 5-7 min to take effect. Pinch the incision site with forceps and wait 2 more minutes if still have pain.
3. Another 6-8ml of 0.5% lignocaine was infiltrated in the rectus sheath.
4. Parietal peritoneal infiltration & incision.
5. Visceral peritoneal infiltration & incision. (Inject 30ml of 0.5% lignocaine beneath the utero-vesical peritoneum as far laterally as the round ligament because peritoneum is sensitive to pain, but myometrium is not)
6. Broad ligament infiltration
7. Paracervical injection (take extra-care not to be vascular penetration)
8. Uterine incision and delivery
9. Intravenous pethidine 2mg/kg can be given slowly to mother after baby was delivered.
10. Infiltrate another 6ml of 0.5% lignocaine to rectus sheath and close back in layers.

CHAPTER-10

Clinical Management Guidelines for Essential Mental Health Care

Basic Essential Mental Services

- **Persons with Agitated (and/or) Aggressive Behavior**
- **Alcohol Withdrawal**



10.1. Persons with Agitated (and/or) Aggressive Behavior

Assessment:

Attempt to communicate with the person.

Evaluate for an underlying cause:

- Check Blood Glucose. If low, give glucose.
- Check vital signs, including temperature and oxygen saturation. Give oxygen if needed.
- Rule out delirium and medical causes including poisoning.
- Rule out drug and alcohol use. Specifically, consider stimulant intoxication and/or alcohol/sedative withdrawal.
- Rule out agitation due to psychosis or manic episode in bipolar disorder.

Communication

- Safety is first!
- Remain calm and encourage the patient to talk about his or her concerns.
- Use a calm voice and try to address the concerns if possible.
- Listen attentively. Devote time to the person.
- Never laugh at the person.
- Do not be aggressive back.
- Try to find the source of the problem and solutions for the person.
- Involve carers and other staff members.
- Remove from the situation anyone who may be a trigger for aggression.
- If all possibilities have been exhausted and the person is still aggressive, it may be necessary to use medication (if available) to prevent injury.

Sedation and use of medication

- Sedate as appropriate to prevent injury.
- For agitation due to psychosis or mania, consider the use of haloperidol 2mg PO/IM hourly up to 5 doses (maximum 10 mg).
- Caution: high doses of haloperidol can cause dystonic reactions.
- For agitation due to ingestion of substances, such as alcohol/sedative withdrawal or stimulant intoxication, use diazepam 10-20 mg p.o. and repeat as needed.

In cases of extreme violence

- Seek help from police or staff
- Use haloperidol 5mg IM, repeat in 15-30mins if needed (maximum 15 mg)
- Consult a specialist if the person remains agitated, recheck oxygen saturation, vital signs, and glucose. Consider pain. Refer to the hospital.

List of Equipment and Medicine for Persons with Agitated (and/or) Aggressive Behavior

No.	Equipment
1.	Glucometer
2.	Thermometer
3.	Pulse oximeter
4.	Oxygen

No.	Medicine
1.	IV glucose
2.	Oral haloperidol
3.	Inj; haloperidol
4.	Oral diazepam

10.2. Alcohol Withdrawal

Does the person have features of alcohol withdrawal?

Alcohol withdrawal:

It occurs following cessation of heavy alcohol consumption, typically between 6 hours and 6 days after the last drink

Look for

- Tremor in hand
- Sweating
- Vomiting
- Increased heart rate and blood pressure
- Agitation

Ask about

- Headache
- Nausea
- Anxiety

Note

Seizures and confusion may occur in severe cases.

Is withdrawal likely to be SEVERE?

Look for:

- Past episodes of severe alcohol withdrawal including delirium and seizures
- Other medical or psychiatric problems or benzodiazepine dependence
- Severe withdrawal symptoms already present only a few hours after stopping drinking

If present: ➜
Treat immediately with diazepam.

Management of alcohol withdrawal

- Be alert for the person at risk of a withdrawal syndrome, for example, the person with undiagnosed alcohol dependence in the hospital.
- When there is evidence of a withdrawal syndrome developing (or before withdrawal symptoms develop in the case of planned withdrawal), administer diazepam at an initial dose of up to 40 mg daily (i.e., 10 mg four times daily or 20 mg twice daily) for 3 – 7 days.
- In people with impaired hepatic metabolism (e.g., liver failure, elderly) use a single low dose initially (5 – 10 mg) and determine the duration of action of this dose before prescribing further doses
- The dose and duration of diazepam treatment should be determined individually, according to the severity of withdrawal and the presence of other medical disorders.
- In the hospital setting, diazepam can be given more frequently (i.e., hourly) and up to higher daily doses (i.e., up to 120 mg daily for the first 3 days) if necessary and based on a frequent assessment of the person.
- Administer thiamine 100 mg/day orally for 5 days (or longer if required) to prevent the development of thiamine-deficiency syndromes such as Wernicke's encephalopathy.
- Consider other vitamin supplementation when indicated.
- Ensure adequate fluid intake and electrolyte requirements are met. Correct potassium and magnesium levels are typically low.
- Ensure carer support.
- Provide as quiet and non-stimulating an environment as possible, which is well lit in the daytime and lit enough at night to prevent falls if the person gets up in the night.
- When the person has severe alcohol dependence (previous history of severe alcohol withdrawal, seizures, or delirium) or concurrent serious medical or psychiatric disorders or is lacking adequate support, CONSULT A SPECIALIST, if available.
- Consider and treat other medical problems (e.g., Wernicke's encephalopathy, hepatic encephalopathy, gastrointestinal bleeding, head injury with or without subdural haematoma). Benzodiazepines should not be used in people with hepatic encephalopathy or respiratory depression.

WHERE to withdraw from alcohol?

1. Have there been past episodes of severe withdrawal symptoms, seizures, or delirium?
2. Are there other significant medical or psychiatric problems?
3. Do significant withdrawal features develop within 6 hours of the last drink?
4. Has outpatient withdrawal failed?
5. Is the person homeless or without any social support?
6. Withdrawal delirium (Delirium tremor)
7. Withdrawal seizure (Rum fit)

If YES to any of the above, then in-patient withdrawal is preferable.

After detoxification, needs to do counselling and psychosocial support for relapse prevention. (WHO, 2011)

List of Equipment and Medicine for Alcohol Withdrawal

No.	Equipment

No.	Medicine
1.	Oral thiamine
2.	Oral diazepam
3.	Oral Vitamin supplementation

CHAPTER-11

Clinical Management Guidelines for Essential Dental Care

Basic Essential Dental Services

- **Simple Extraction (Adult & Paediatric)**
- **Oral Prophylaxis (Scaling - [a] Gingivitis [b] Periodontitis, [c] Pregnancy Gingivitis)**
- **Restoration (Temporary & Permanent) including Atraumatic Restorative Treatment)**

11.1. Simple Dental Extractions (Adult & Pediatric)

Definition of Dental Extraction (Geoffrey Lhowe Definition)

Painless removal of the whole tooth or root with minimal trauma to the investing tissues so that the wound heals uneventfully, and no post-operative prosthetic problem is created.

Types

1. Intra-alveolar extraction or conventional extraction or forceps extraction (Simple Extraction)
2. Trans alveolar extraction or surgical extraction

Indications for Dental Extractions

- Teeth severely damaged by dental caries retained roots
- Teeth severely damaged by periodontal disease
- Teeth with periapical infections that can neither be preserved by
- Root Canal Therapy or by surgery
  - » Apical periodontitis
  - » Apical cyst
- Teeth damaged by trauma
  - » Multiple fractures, longitudinal fractures, extensive bony defect in the periodontal region
- Crowding or impeded eruption, orthodontic reasons (Deciduous or Permanent teeth)
- Prosthodontic reasons (Elongated or heavily tilted teeth, particularly with previous contacts)
- Extraction of infected teeth before radiation therapy

Contraindications to dental extraction

- Bleeding tendency; anti-coagulation, haemorrhagic diathesis or haemophillia
- Immunosuppression
- The acute phase of myocardial infarction/myocardial infarction within the last six months
- Local surgical disorder (abscess, tumor)
- Acute inflammation
- During radiation and chemotherapy
- Pregnancy, 1st trimester and 3rd trimester

  Adequate pre-treatment or referral for consultation with a physician

Complications of Dental Extraction

- Swelling and pain
- Dry socket (alveolitis)
- Osteomyelitis
- Bleeding
- Osteonecrosis of the jaw

Antibiotic and Analgesics for Simple Dental Extraction

When to prescribe antibiotics

In case of Infection,

- Apical abscess
- Periapical abscess
- Cellulitis
- Severe trauma to surrounding tissues during dental extraction

When not to prescribe antibiotics

- If there is no infection
- A simple removal of deciduous or milk teeth

Antibiotics used for dental extraction

- Amoxicillin 500 mg tds for 5 days
- Amoxicillin + clavulanic acid 375 mg tds for 5 days
- Flucloxacillin + Amoxicillin 500 mg tds for 5 days
- Cefixime 200 mg bd for 5 days
- Metronidazole 200 mg tds for 5 days

For Penicillin Sensitive Patients

- Tetracycline 250 mg qid for 5 days
- Clindamycin 150 mg tds for 5 days
- Lincomycin 500 mg tds for 5 days

Analgesics used for dental extraction

- Paracetamol 500 mg
- Ibuprofen 200 mg
- Paracetamol + Ibuprofen 325 + 200 mg
- Mefenamic acid 250 mg
- Diclofenac sodium 50 mg

List of Equipment and Medicine for dental extraction

No.	Equipment
1.	Dental unit
2.	Autoclave
3.	Non-disposable dental syringes
4.	Instrument tray
5.	Dental examination set including: Mouth mirror, tweezer, exploratory probe, excavator
6.	Dental extraction forceps
7.	Suturing instruments
8.	Disposable items; Dental needle, exam gloves, masks, disposable cups (plastic/paper)

No.	Medicine
1.	Local anesthetic agents - Lignocaine 2% with Adrenaline (Dental Cartridge)
2.	Oral Amoxicillin
3.	Oral Amoxicillin + clavulanic acid
4.	Oral Flucloxacillin + Amoxicillin
5.	Oral Cefixime
6.	Oral Metronidazole
7.	Oral Tetracycline, Clindamycin, Lincomycin
8.	Analgesics - Paracetamol + Ibuprofen, Mefenamic acid, Diclofenac

11.2. Oral Prophylaxis (Scaling)

1. Gingivitis
2. Periodontitis
3. Pregnancy gingivitis

List of Equipment and Medicine for oral prophylaxis (scaling)

No.	Equipment
1.	Dental unit
2.	Autoclave
3.	Ultrasonic scaler and scaler tips
4.	Instrument tray
5.	Dental examination set including: Mouth mirror, tweezer, exploratory probe, excavator
6.	Universal scaler
7.	Disposable items; Dental needle, exam gloves, masks, disposable cups (plastic/paper)

No.	Medicine

11.3. Dental Restoration (Temporary/Permanent)

Indications

- Dental caries
- Reversible pulpitis

Contraindication

- Irreversible pulpitis

List of Equipment and Medicine for oral prophylaxis (scaling)

No.	Equipment
1.	Dental unit
2.	Autoclave
3.	Dental examination set
4.	Dental restoration set
5.	Disposable items; Dental needle, exam gloves, masks, disposable cups (plastic/paper)

No.	Medicine
1.	Zinc oxide + eugenol set
2.	Glass ionomer filling materials

CHAPTER-12

Supportive Services

12.1. Guidelines for Blood Transfusion Services

1. Assess and select the blood donors systematically according to the guidelines and take the blood under strict guidelines.
2. All the donated blood must be tested for "Transfusion transmissible infection" according to National Policy and testing guidelines.
3. Must test at least two major blood groups (ABO and RhD) and do compatibility test before every transfusion according to guidelines.
4. Handle and store the blood component under optimal environments of cleanliness and temperature.
5. Investigate transfusion and post donation reactions of patient and donor according to the guidelines.
6. Use the Register, Request Form, Issue Form, and Work Sheet as necessary according to the instruction.
7. Record and report errors of transfusions systematically.
8. Discard the reactive and damage units according to the Ministry of Health and Sports guidelines.

For detailed:
Please refer to the guidelines for blood transfusion services (2nd edition), 2018, Department of Medical Services, MOH

12.2. Guideline for Radiology services

Following radiology services are available in Township Hospitals.

- Plain X-ray Chest
- Plain X-ray Abdomen
- Bone X-ray

(Appropriate measures to avoid radiation exposure should be practiced)

For detailed:
Please refer to Textbook of Radiographic Positioning and Related Anatomy (8th Edition), 2014, Bontrager and Lampignano. Elsevier Inc.

12.3. Guidelines for Basic Laboratory Services

Table 28: Type-C Laboratory Services

No.	Services	Township Hospital	Station Hospital	Remarks
1.	Blood Glucose	✓	✓	
2.	Total cholesterol	✓	✓	
3.	Total bilirubin	✓	✓	
4.	LFT	✓		
5.	Total and Differential Protein	✓	✓	
6.	Uric Acid	✓	✓	
7.	Urea	✓	✓	
8.	Creatinine	✓		
9.	Hb%	✓	✓	
10.	T&DC	✓	✓	
11.	Platelet count	✓	✓	
12.	CP	✓		
13.	ESR	✓	✓	
14.	BT/CT	✓	✓	
15.	PCV	✓	✓	
16.	Blood Grouping (ABO & Rh)	✓	✓	
17.	ZN Stain	✓	✓	
18.	Gram's Stain	✓	✓	
19	MF	✓	✓	
20.	MP	✓	✓	
21.	RA Test	✓	✓	
22.	Widal Test	✓	✓	
23.	HBsAg	✓	✓	
24.	HBsAB	✓	✓	
25.	Anti HCV Antibody	✓	✓	
26.	HIV Ab	✓	✓	
27.	ICT Syphilis	✓	✓	
28.	ICT Malaria	✓	✓	
29.	Urine RE	✓	✓	
30.	UCG	✓	✓	
31.	Stool RE	✓	✓	
32.	ICT Dengue	✓		
33.	ASO	✓		

Type-C laboratory services will be available at every township hospital whereas station hospitals will also provide those services package with the exception of LFT, Creatinine, CP, ASO and ICT Dengue.

For detailed: Please refer to Basic Laboratory Manual for Type "C" Hospital Laboratory (4th Edition), 2018 October, National Health Laboratory, Department of Medical Services, MOH

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ANNEXES

Annex 1:

List of Equipment and Medicine Required for Basic EPHS

- Equipment (Anesthesia and Resuscitation equipment)
- A manual bag valve/self-inflating resuscitation bag. (Ambu bag)
- Oxygen supply (cylinder or concentrator)
- Suction apparatus
- A Stethoscope
- Monitor with basic parameters(Pulse Oximeter, NIBP, ECG) If there is no monitor
  - » A Sphygmomanometer (*Digital Sphygmomanometer is better)
  - » Pulse Oximeter monitoring is compulsory
- Airway management instruments
  - » (face mask, oropharyngeal airways, laryngoscope sets, LMA*, etc.)
- Appropriate accessories for circulation management (IV cannula, Drip N/S, R/l, Gelofusin)
- Lighting for clinical observation of patients.
- Emergency lighting and alternative electric power supply.
- Sterilization - Autoclave
- Adjustable operating table.
- Intravenous fluid infusion stand.
- Equipment for difficult airway management
- Cardiac defibrillator
- Equipment for spinal anesthesia, GA
- Drugs (Expired date, plant)
- Recovery area with resuscitation equipment

List of Equipment and Medicine for Basic EPHS

List of Equipment and Medicine for
Emergency/ lifesaving treatment

No.	Equipment
1.	Patient trolley
2.	Medicine trolley
3.	Equipment trolley
4.	Drip stands
5.	Spine board + head immobilizer
6.	Patient monitor
7.	ECG machine
8.	Defibrillator/AED
9.	Pulse oximeter
10.	Glucometer
11.	Nebulizer
12.	Minor surgical set
13.	Oxygen cylinders + flow meter (O_2 concentrator if supply is difficult)
14.	Suction machine
15.	Laryngoscope
16.	BP cuff and stethoscope
17	Wooden fracture splints
18.	Bed sheet for pelvic binding
19.	Bag Valve Mask
20.	Oropharyngeal airway sets
21.	Endotracheal tubes
22.	IV cannulae
23.	Infusion sets
24.	Urinary catheters
25.	Suction tips and tubes

No.	Medicine
1.	Inj; Adrenaline
2.	Inj: Atropine
3.	Inj: Antibiotics
4.	Inj: Analgesics
5.	Inj; Anesthetics (Local)
6.	Inj: Chlophenaraminemeleate
7.	IV fluids (N/S, D/S, R/L)

List of Equipment and Medicine for
Cardiac Arrest

No.	Equipment
1.	Patient trolley
2.	Medicine trolley
3.	Oxygen cylinders + flow meter
4.	Drip stands
5.	Endotracheal tubes
6.	Patient monitor
7.	ECG machine
8.	Pulse oximeter
9.	Bag-Valve-Mask
10.	Defibrillator/AED
11.	BP cuff and stethoscope
12.	IV cannulae
13.	Infusion sets

No.	Medicine
1.	Inj; Adrenaline
2.	Inj: Amiodarone
3.	Inj: Epinephrine
4.	IV fluids

List of Equipment and Medicine for
Oxygen Therapy

No.	Equipment
1.	Oxygen cylinders + flow meter
2.	Pulse Oximeter
3.	A nasal cannula (Nasal prongs)
4.	Simple Face Mask
5.	Non-Rebreather Mask
6.	Partial rebreather mask
7.	Venturi Mask

List of Equipment and Medicine for **Shock**

No.	Equipment
1.	Patient trolley
2.	Medicine trolley
3.	Oxygen cylinders + flow meter
4.	Drip stands
5.	Endotracheal tubes
6.	Patient monitor
7.	ECG machine
8.	Pulse oximeter
9.	Bag-Valve-Mask
10.	Defibrillator/AED
11.	BP cuff and stethoscope
12.	IV cannulae
13.	Infusion sets
14.	chest X-Ray
15.	Catheter
16.	large bore cannula

No.	Medicine
1.	Inj; Adrenaline
2.	Inj: Amiodarone
3.	Inj: Epinephrine
4.	IV Crystalloids 0.9% saline
5.	IV Chlorphenamine
6.	IV Ranitidine
7.	Inj: Hydrocortisone
8.	IV Antibiotics; Cetriaxone, Amoxicillin/ clavulanic acid + gentamycin + metronidazole
9.	IV Noradrenaline
10.	IV Dobutamine, Dopamine

List of Equipment and Medicine for **Venous Cut Down**

No.	Equipment
1.	No.10 scale
2.	No.2/0 silk suture with cutting needle
3.	18G Canula
4.	5 cc syringe
5.	Dressing tray
6.	Feeding tube (No:4,5,6) or canula
7.	Curved Haemostat
8.	Surgical gloves

No.	Medicine
1.	2% Lignocaine

List of Equipment and Medicine for **Seriously Injured Patients**

No.	Equipment
1.	100 % Oxygen with Face Mask
2.	Cervical collar
3.	Bag-Valve-Mask
4.	Oropharyngeal airway sets
5.	Endotracheal tubes
6.	X rays
7.	Wide bore cannulation
8.	Catheter

No.	Medicine
1.	IV Crystalloids–Normal Saline,
2.	Ringer Lactate
3.	Analgesia; IV Morphine with antiemetic
4.	IV Antibiotics; Cephalosporins and flucloxacillin

List of Equipment and Medicine for **Chest Tube Insertion**

No.	Equipment
1.	Intercostal drain » 28 FG for pneumothorax » 32 FG for empyema thoracic, haemothorax
2.	Underwater seal containing water to up to mark
3.	Connection tubing
4.	Roberts or other instruments for blunt dissection
5.	Line clamp
6.	No '0' silk on a large handheld needle
7.	10 cc syringe and 18 G Cannula
8.	11-blade scalpel
9.	Sterile drape, gloves and gown, gauze swabs.

No.	Medicine
1.	20 mL 1% lidocaine
2.	20 mL saline
3.	Solutions for skin preparation

List of Equipment and Medicine for **Suprapubic Cystostomy Procedure**

No.	Equipment
1.	10cc syringe
2.	11- blade
3.	Trocar and cannula set with variable sizes (Different gauges)
4.	drip set
5.	2/0 silk
6.	urine bag

No.	Medicine
1.	Local anaesthetic agent (1 % lignocaine)

List of Equipment and Medicine for **Burn and Scald**

No.	Equipment
1.	Blood bags and accessories
2.	18 G cannula
3.	Non-adherent dressing (e.g.,Sofratulle) ~ Maximum 30 nos per patient
4.	Urinary catheter and bag

No.	Medicine
1.	Ringer lactate solution
2.	Normal saline solution
3.	Inj Gelofusin
4.	Injection ATT
5.	Injection morphine
6.	Injection Pantoprazol
7.	Injection Ceftriaxone
8.	Topical silver sulphadiazine ~ Maximum 30 nos per patient
9.	Povidone-iodine solution

List of Equipment and Medicine for **Acute Poisoning**

No.	Equipment
1.	Oxygen
2.	Endotracheal intubation
3.	Glucometer

No.	Medicine
1.	IV fluid; NS
2.	IV 50% dextrose
3.	IV Benzodiazepines
4.	Inj Atropine
5.	Ethanol
6.	Inj Naloxone
7.	Inj N-Acetylcysteine
8.	Inj Glucose
9.	Inj Sodium bicarbonate
10.	Inj Vitamin K
11.	Specific Antisnake venom Inj

List of Equipment and Medicine for
Acute Airway Obstruction

No.	Equipment
1.	Oxygen
2.	Suction machine and tips
3.	Bag-Valve-Mask
4.	Oropharyngeal airway sets
5.	Nasopharyngeal airway sets (latex free)
6.	Endotracheal tubes
7.	laryngoscope
8.	CXR
9.	BP cuff and stethoscope

No.	Medicine
1.	Sedative agents (Propofol, Ketamine, etomidate)
2.	Muscle relaxants (Succinylcholine Inj)
3.	analgesics

List of Equipment and Medicine for
Emergency Cricothyroidotomy

No.	Equipment
1.	Mini tracheostomy, size 6.0 ET tube or 12G cannula in emergencies
2.	Artery forceps
3.	10mL syringe
4.	Blue needle and a green needle
5.	2 or 3/0 silk on a large handheld needle
6.	11-blade scalpel
7.	Sterile gloves and gown
8.	Sterile drape
9.	Gauze swabs

No.	Medicine
1.	10 mL 1% lidocaine
2.	20 mL saline
3.	Solution for skin preparation

List of Equipment and Medicine for
Convulsion

No.	Equipment
1.	Oxygen
2.	Glucometer + Strips
3.	ECG
4.	CXR
5.	Syringe pump or infusion pump
6.	Pulse Oximeter

No.	Medicine
1.	Dextrose saline
2.	Injection Diazepam
3.	Injection Dexamethasone
4.	Injection Thiamine

List of Equipment and Medicine for
Acute Severe Asthma

No.	Equipment
1.	PEFR meter
2.	Pulse oximeter
3.	ECG
4.	CXR
5.	Nebulizer
6.	Oxygen

No.	Medicine
1.	Nebulized solutions – salbutamol
2.	IV hydrocortisone
3.	Oral Prednisolone

List of Equipment and Medicine for **Chronic Obstructive Pulmonary Disease (COPD)**

No.	Equipment
1.	Oxygen
2.	Nebulizer
3.	Pulse Oximeter

No.	Medicine
1.	Salbutamol 5mg (Neb solution)
2.	Inj; Hydrocortisone
3.	Oral Prednisolone 30mg
4.	Oral Amoxicillin 500mg
5.	Oral Doxycycline 100 mg

List of Equipment and Medicine for **Snake Bite**

No.	Equipment
1.	Ambu bag
2.	Oropharyngeal airway

No.	Medicine
1.	ASV viper
2.	ASV cobra
3.	Injection flucloxacillin + amoxicillin 500mg
4.	Injection ceftriaxone 1G
5.	Medicine for anaphylaxis » IM adrenaline » IV chlorpheniramine maleate » IV hydrocortisone
6.	Injection ATT
7.	Antiseptic – Povidone Iodine

List of Equipment and Medicine for **Dog Bite**

No.	Equipment
1.	Syringe (1cc syringe needle removable for ID)
2.	Oropharyngeal airway

No.	Medicine
1.	Injection 0.1 ml of reconstituted vaccine
2.	Immunoglobulin (Anti-rabies serum 1000 IU)
3.	Rabuman Berna (Human anti-rabies Ig)
4.	Inj ATT
5.	Antibiotics: IV and PO Flucloxacillin + Amoxicillin 500 mg
6.	IV Ceftriaxone
7.	Oral cefixime 200 mg

List of Equipment and Medicine for **Acute Gastroenteritis/Diarrhoea**

No.	Equipment
1.	Materials for IV access

No.	Medicine
1.	ORS
2.	IV solution – Ringer's Lactate and Normal saline
3.	Oral Azithromycin
4.	Oral Ofloxacin
5.	Oral Doxycycline
6.	Oral Ciprofloxacin
7.	Oral Loparamide

List of Equipment and Medicine for
Upper Respiratory Tract Infection

No.	Equipment
1.	CXR
2.	Oxygen
3.	Pulse Oximeter

No.	Medicine
1.	Oral Antibiotics – Amoxicillin, Doxycycline, Clarithromycin, Levofloxacin
2.	Injection – Co-amoxiclav, Azithromycin, Cefuroxime, Ceftriaxone
3.	IV Fluid
4.	Antipyretics – Oral paracetamol 500 mg

List of Equipment and Medicine for
Urinary Tract Infection

No.	Equipment
1.	Urine dipstick and RE

No.	Medicine
1.	Injection – Cetriaxone, Piperacillin, Tazobactam
2.	Oral – Cefalexin, Ciprofloxacin, Coamoxiclav
3.	Antipyretics – paracetamol 500mg

List of Equipment and Medicine for
Vitamin B1/Thiamine Deficiency

No.	Equipment
1.	3 cc syringe
2.	Drip set

No.	Medicine
1.	Oral – thiamine
2.	IV thiamine (B1)

List of Equipment and Medicine for
Acute Appendicitis

No.	Equipment
1.	Blade - No.10
2.	The drainage tube (Foley catheter) and urine bag
3.	Prolene 0 with a round body
4.	urinary catheter and Urine Bag
5.	2/0 vicryl or 2/0 chromic with round body needle
6.	2/0 prolene or 2/0 Nylon with round body needle
7.	2/0 silk and 2/0 nylon with cutting needle

No.	Medicine
1.	IV fluid
2.	IV ceftriaxone
3.	IV metronidazole
4.	Injection analgesics (of available)
5.	Oral Cefixime Tab
6.	Oral Metronidazole 200 mg Tab

List of Equipment and Medicine for
Cellulitis and Abscess

No.	Equipment
1.	Oxygen

No.	Medicine
1.	IV Flucloxacillin
2.	IV Amoxicillin/clavulanic acid
3.	Oral Flucloxacillin
4.	Oral Amoxicillin/clavulanic acid

List of Equipment and Medicine for
Superficial Abscess

No.	Equipment
1.	11 blade
2.	2/0 silk or 2/0 nylon for skin
3.	Sinus forceps

No.	Medicine
1.	IV Flucloxacillin + amoxicillin
2.	Oral Flucloxacillin + Amoxicillin
3.	Analgesic – IV / Oral
4.	EUSOL solution

List of Equipment and Medicine for
Wound management

No.	Equipment
1.	Sutures depend on site and depth of wounds e.g., 2/0 chromic catgut for muscle repair
2.	2/0 silk or 2/0 nylon for skin
3.	Minor surgical set

No.	Medicine
1.	Antibiotics types and route depends on the type of wound E.g., amoxicillin + flucloxacillin TDS x 5 days
2.	Analgesic depends on wounds
3.	Solution I, II, III

List of Equipment and Medicine for
Normal Labour

No.	Equipment
1.	Sterile gloves
2.	Amniohook or Kocher's forceps
3.	Sterile drapes
4.	Episiotomy scissors
5.	Small artery forceps
6.	Dissecting forceps, toothed
7.	Dissecting forceps, non-toothed
8.	Needle holder
9.	Sponge forceps
10.	Syringe (5cc)
11.	Sutures and ligature (Polyglycolic (2/0) (0)
12.	Gauze swabs
13.	Suction catheters
14.	Sterile pads
15.	Kidney dish
16.	Suction tube or ball
17	Cord clamp
18.	Bag & mask

No.	Medicine
1.	Solution-III
2.	Local anaesthetic agent (1 % lignocaine)
3.	Antiseptic solutions
4.	IV oxytocin

List of Equipment and Medicine for
Instrumental Vaginal Delivery

No.	Equipment
1.	Sterile gloves
2.	Forceps
3.	Sterile drapes
4.	Episiotomy scissors
5.	Needle holder
6.	Syringe (5cc)
7.	Sutures and ligature (Polyglycolic (2/0) (0)
8.	Gauze swabs
9.	Suction catheters
10.	Sterile pads
11.	Kidney dish
12.	Suction tube or ball
13.	Cord clamp
14.	Bag & mask

No.	Medicine
1.	Local anaesthetic agent; 1% lignocaine
2.	Antiseptic solutions
3.	IV oxytocin

List of Equipment and Medicine for
Vacuum Assisted Delivery

No.	Equipment
1.	Sterile gloves
2.	Vacuum
3.	Sterile drapes
4.	Episiotomy scissors
5.	Needle holder
6.	Syringe (5cc)
7.	Sutures and ligature (Polyglycolic (2/0) (0)
8.	Gauze swabs
9.	Suction catheters
10.	Sterile pads
11.	Kidney dish
12.	Suction tube or ball
13.	Cord clamp
14.	Bag & mask

No.	Medicine
1.	Local anaesthetic agent; 1% lignocaine
2.	Antiseptic solutions
3.	IV oxytocin

List of Equipment and Medicine for
Antepartum Haemorrhage

No.	Equipment
1.	Equipment for Vaginal Delivery
2.	Equipment for LSCS

No.	Medicine
1.	Medicine used in Vaginal Delivery
2.	Medicine used in LSCS

List of Equipment and Medicine for **Postpartum Haemorrhage**

No.	Equipment
1.	Evacuation & Curettage tray
2.	Sim's speculum
3.	Vulsellum forceps
4.	Uterine sound
5.	Uterine curette
6.	Sponge forceps
7.	Indwelling catheter
8.	Gauze swabs
9.	Condom
10.	Sterile elbow-length gloves
11.	Dilatation & Curettage Tray
12.	uterine dilators
13.	Folley catheter

No.	Medicine
1.	Injection antibiotics - cephalosporin
2.	IV Fluid – N/S, R/L
3.	PR prostaglandin (Cytotec)
4.	IV Oxytocin
5.	IV ergometrine
6.	Distilled water
7.	IV crystalloid
8.	Analgesics : Paracetamol suppo, diclofenac suppo, injection tramadol

List of Equipment and Medicine for **Severe Pre-eclampsia and Eclampsia**

No.	Equipment
1.	Oxygen
2.	Drip set
3.	Syringes
4.	Mouth gag

No.	Medicine
1.	IV/IM Magnesium Sulphate ($MgSO_4$)
2.	Inj: 2% Lignocaine
3.	IV frusemide
4.	IV N/S
5.	IV labetalol
6.	IV hydralazine
7.	Oral Nifedipine
8.	Injection Dexamethasone
9.	Injection Betamethaxone

List of Equipment and Medicine for **Caesarean Section**

No.	Equipment
1.	Green-Armytage forceps
2.	Low forceps
3.	Midstraight forceps
4.	Curved dissecting scissors
5.	Scalpel handle and blade
6.	Short dissecting scissors
7.	Long dissecting scissors
8.	Stitch scissors
9.	Small, curved artery forceps
10.	Small, straight artery forceps
11.	Large, curved artery forceps
12.	Large, straight artery forceps
13.	Needle holder (long)
14.	Needle holder (short)
15.	Retractors (Doyen)
16.	Self-retaining retractor
17.	Dissecting forceps (toothed)
18.	Long dissecting forceps (non-tooth)

No.	Equipment
19.	Tissue forceps (Alllis)
20.	Tissue forceps (Duval)
21.	Tissue forceps (Babcock)
22.	Sponge forceps
23.	Occlusion clamps (straight, curved)
24.	Crushint clamps (large, small)
25.	Syringe (5cc, 10cc)
26.	Suture (polyglycolic 0, 1, 2/0, nylon 0)
27.	Suction nozzle
28.	Diathermy electrode
29.	Flexible probe with round point
30.	Grooved director
31.	Nasogastric tube
32.	Towel clips
33.	Stainless steel bowls
34.	Kidney dish
35.	Gallipots(Steel Bowl)
36.	Linen tapes
37.	Gauze swabs
38.	Antiseptic solution
39.	Adhesive tape (Primapore or Silk plaster
40.	Drainage tube (if necessary)
41.	Sterile drapes (for infection case)
42.	Sterile gloves
43.	Cannula (18G)
44.	Blood set
45.	Drip set
46.	Foley Catheter
47.	Urine bag
48.	Cord clamp
49.	Caps and masks
50.	Aprons

No.	Medicine
1.	IV Oxytocin
2.	IV Fluid- Normal Saline
3.	Distilled water
4.	Injection cephalosporin
5.	Oral antibiotic (Flucloxacillin)
6.	Solutions(I,II,III)

List of Equipment and Medicine for
Bleeding in early pregnancy

No.	Equipment
1.	Manual Vacuum Aspirator
2.	Dilatation and curettage (D&C) Set
3.	Sterile gloves
4.	Sterile drapes
5.	Urine hCG

No.	Medicine
1.	Oral antibiotics: Metronidazole, Doxycycline and Azithromycin
2.	Antiseptic solutions
3.	SL Misoprostol
4.	PV Misoprostol

List of Equipment and Medicine for
Ruptured Ectopic Pregnancy

No.	Equipment
1.	Laparotomy set
2.	Sterile gloves
3.	Sterile drapes
4.	Foley's catheter
5.	Gauze swabs
6.	Sponge forceps
7.	Sterile gloves

No.	Medicine
1.	Injection antibiotics – 3rd generation cephalosporin
2.	IV Fluid – N/S
3.	Antiseptic solution

List of Equipment and Medicine for
Sick Newborn

No.	Equipment
1.	Bag-Valve-Mask
2.	Pulse Oximeter
3.	Cord clamp
4.	Oxygen
5.	Baby warmer
6.	Glucometer
7.	Weighing machine
8.	Thermometer
9.	Chest X-Ray
10.	LED Photo

No.	Medicine
1.	IV Fluid – N/S, R/L
2.	Inj: Vitamin K1
3.	IV Dopamine
4.	IV 10 % Dextrose
5.	IV Phenobarbitone
6.	Oral Phenobarbitone
7.	Distilled water
8.	Injection antibiotics: Cefotaxime, Ampicillin, Cloxacillin, Gentamicin, Amikacin

List of Equipment and Medicine for
Sick Infants and Children

No.	Equipment
1.	Oxygen
2.	Bag-Valve-Mask
3.	Pulse Oximeter
4.	Glucometer
5.	Thermometer

No.	Medicine
1.	IV Fluid – N/S, R/L
2.	IV 10 % Dextrose
3.	IV calcium gluconate
4.	IV Phenobarbitone
5.	Oral Phenobarbitone
6.	ORS
7.	Injection antibiotics; Cefotaxime/ Ceftriaxone, Ampicillin, Cloxacillin, Gentamicin, Amikacin

List of Equipment and Medicine for
Acute Respiratory Infection in Children

No.	Equipment
1.	Oxygen
2.	Chest X-ray
3.	Pulse Oximeter
4.	Thermometer

No.	Medicine
1.	Oral antibiotics; Amoxicillin, Amoxicillin/ Clavulanic acid, Azithromycin, Flucloxacillin
2.	IV antibiotics; Benzylpenicillin, Ampicillin, Amoxicillin/ Clavulanic acid, Cefotaxime
3.	IV Fluid; NS, DS, DW
4.	Oral Paracetamol

List of Equipment and Medicine for
Diarrhoea in children

No.	Equipment
1.	Weighing machine
2.	IV cannula

No.	Medicine
1.	ORS
2.	Oral Zinc tab
3.	IV Fluid; RL, NS
4.	Oral antibiotics for cholera; Azithromycin, Cotrimoxazole
5.	Oral Paracetamol

List of Equipment and Medicine for
Dengue Haemorrhagic Fever

No.	Equipment
1.	Microcentrifuge for Hematocrit
2.	IV cannula
3.	BP cuff

No.	Medicine
1.	ORS
2.	Oral antipyretics: paracetamol
3.	IV fluid (crystalloid); NS, RL,
4.	IV fluid (colloid)

List of Equipment and Medicine for
Pediatrics Ear Infections

No.	Equipment
1.	Otoscopy

No.	Medicine
1.	IV or IM cloxacillin, flucloxacillin, ceftriaxone
2.	Oral paracetamol
3.	Oral antibiotics; amoxicillin, co-trimoxazole

List of Equipment and Medicine for
Orthopaedic Care

No.	Equipment
1.	POP 4 in Roll
2.	POP 6 in Roll
3.	Soft Ban/ Cotton Wool 4 in
4.	Soft ban/ Cotton Wool 6 in
5.	Bandage 4 in Roll
6.	Bandage 6 in Roll
7.	Gauze Roll/ Pad
8.	Basic Dressing Instrument Set
9.	Sterilizer/ Autoclave
10.	Basic or local made sandbag, tape, piece of cloth, wood stick, bamboo stick, stretcher, rigid cervical collar, spine board
11.	Arm sling
12.	Pillow
13.	Thomas splint (child size, adult size)
14.	OT bed sheet

No.	Medicine
1.	Oxygen
2.	Normal Saline 500 ml
3.	IM Tetanus Toxin (TT) injection amp
4.	IV Ceftriaxone injection vial IV Crystalline Penicillin injection vial, IV Cefotaxime
5.	IV Levofloxacillin
6.	IV Metronidazole
7.	Soap (Solution 1)
8.	Spirit sol
9.	Povidone Iodine sol

List of Equipment and Medicine for **Spinal Anesthesia**

No.	Equipment
1.	spinal needle (24-25G)
2.	3ml or 5ml syringe
3.	Sterile gauze, swab

No.	Medicine
1.	Local Anesthetic agent –Bupivacaine 0.5% hyperbaric (heavy)
2.	Emergency drugs – Adrenaline 1:10,000, 1;100,000: Atropine 0.6mg – diluted in 0.2mg per cc: ephedrine 30 mg – diluted in 5-6mg per cc
3.	antiseptic for cleaning the skin (Solution III and Solution II)

List of Equipment and Medicine for **Ketamine Anesthesia**

No.	Equipment
1.	Oxygen
2.	Suction
3.	Patient monitor
4.	Ambu bag
5.	Pulse oximeter
6.	Nasal prongs/face mask with reservoir bag

No.	Medicine
1.	IV Ketamine
2.	IV Atropine
3.	IV Diazepam
4.	IV crystalloid solution
5.	Resuscitation medicine;
6.	IV Ranitidine 50mg and Metochlorpramide

List of Equipment and Medicine for **Local Anesthesia**

No.	Equipment
1.	Oxygen
2.	Suction
3.	Pulse oximeter
4.	Ambu bag

No.	Medicine
1.	Lignocaine
2.	Bupivacaine
3.	Distilled water
4.	IV crystalloid solution; NS
5.	Resuscitation medicine; IV ephedrine, IV adrenaline, dopamine infusion, IV Atropine
6.	IV diazepam

List of Equipment and Medicine for **Persons with Agitated (and/or) Aggressive Behavior**

No.	Equipment
1.	Glucometer
2.	Thermometer
3.	Pulse oximeter
4.	Oxygen

No.	Medicine
1.	IV glucose
2.	Oral haloperidol
3.	Inj; haloperidol
4.	Oral diazepam

List of Equipment and Medicine for **Alcohol Withdrawal**

No.	Equipment

No.	Medicine
1.	Oral thiamine
2.	Oral diazepam
3.	Oral Vitamin supplementation

List of Equipment and Medicine for
dental extraction

No.	Equipment
1.	Dental unit
2.	Autoclave
3.	Non-disposable dental syringes
4.	Instrument tray
5.	Dental examination set including: Mouth mirror, tweezer, exploratory probe, excavator
6.	Dental extraction forceps
7.	Suturing instruments
8.	Disposable items; Dental needle, exam gloves, masks, disposable cups (plastic/paper)

No.	Medicine
1.	Local anesthetic agents - Lignocaine 2% with Adrenaline (Dental Cartridge)
2.	Oral Amoxicillin
3.	Oral Amoxicillin + clavulanic acid
4.	Oral Flucloxacillin + Amoxicillin
5.	Oral Cefixime
6.	Oral Metronidazole
7.	Oral Tetracycline, Clindamycin, Lincomycin
8.	Analgesics - Paracetamol + Ibuprofen, Mefenamic acid, Diclofenac

List of Equipment and Medicine for
oral prophylaxis (scaling)

No.	Equipment
1.	Dental unit
2.	Autoclave
3.	Ultrasonic scaler and scaler tips
4.	Instrument tray
5.	Dental examination set including: Mouth mirror, tweezer, exploratory probe, excavator
6.	Universal scaler
7.	Disposable items; Dental needle, exam gloves, masks, disposable cups (plastic/paper)

List of Equipment and Medicine for
Dental Restoration

No.	Equipment
1.	Dental unit
2.	Autoclave
3.	Dental examination set
4.	Dental restoration set
5.	Disposable items; Dental needle, exam gloves, masks, disposable cups (plastic/paper)

No.	Medicine
1.	Zinc oxide + eugenol set
2.	Glass ionomer filling materials

Annex 2:

Surgical Safety Checklist

<table>
<tr><th colspan="3">SURGICAL SAFETY CHECKLIST</th></tr>
<tr><td colspan="3">Before induction of anesthesia----> Before skin incision----> Before a patient leaves the operating room</td></tr>
<tr><th>SIGN IN</th><th>TIME OUT</th><th>SIGN OUT</th></tr>
<tr><td>• PATIENT HAS CONFIRMED
» Identity
» Site
» Procedure
» Consent</td><td>CONFIRMED ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE</td><td rowspan="4">• NURSE VERBALLY CONFIRMS WITH THE TEAM:
» THE NAME OF THE PROCEDURE RECORDED
» THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE)
» HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME)
» WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED</td></tr>
<tr><td>• SITE MARKED/NOT APPLICABLE</td><td>• SURGEON, Anesthesia PROFESSIONAL, AND NURSE VERBALLY CONFIRM
» Patient
» Site
» Procedure</td></tr>
<tr><td>• Anesthesia SAFETY CHECK COMPLETED</td><td rowspan="2">• ANTICIPATED CRITICAL EVENTS
• SURGEON REVIEWS: What are the critical or unexpected steps, operative duration, anticipated blood loss?
• Anesthesia TEAM REVIEWS: Are there any patient-specific concerns?
• NURSING TEAM REVIEWS: Has sterility (including indicator results) been confirmed? Are there equipment issues or any concern?</td></tr>
<tr><td>• PULSE OXIMETER ON PATIENT AND FUNCTIONING</td></tr>
<tr><td>DOES PATIENT HAVE A: KNOWN ALLERGY?
• No
• Yes

DIFFICULT AIRWAY/ ASPIRATION RISK?
• No
• Yes, and equipment/assistance available

RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)?
• No
• Yes, and adequate intravenous access and fluids planned</td><td>HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES?
• Yes
• Not Applicable

IS ESSENTIAL IMAGING DISPLAYED?
• Yes
• Not Applicable</td><td>SURGEON, ANAESTHESIA PROFESSIONAL, AND
NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT</td></tr>
</table>

This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Annex 3:

Requirements for Neonatal Care

1. LED Phototherapy

Features:

- LED Phototherapy for the treatment of neonatal unconjugated hyperbilirubinemia
- Compact and Lightweight
- Must work within the most effective wavelength range of 460 - 490 nm
- Should fulfill the requirements of the American Academy of Pediatrics (APP) or other standards
- Organizations
- Phototherapy light should cover a large surface area of full-term and premature babies and
- evenly distributed over the entire mattress to ensure effective phototherapy
- Should be designed for easy and fast cleaning, good for infection prevention
- Better to include Radiometer to measure the irradiance in real-time, to ensure the correct
- the positioning of the baby and adequate irradiance
- All the phototherapy treatment should be recorded, stored, and downloaded

Accessories:

- Trolley
- Light shield curtain x 1
- Phototherapy mask x 2 sets
- Radiometer (Optional), with Accuracy +3%/ -15%

2. Bilirubinometer

Features:

- Total Serum Bilirubin Testing (TSB) to measure neonatal jaundice
- Very quick measurement: one second measurement time
- LED light source: No lamp replacement
- Compact and Light Weight
- Can connect with computers by USB interface
- No daily calibration is required
- Printer: Thermal serial dot

Accessories:

- Capillary tube (Heparinized, Red) x 1 vial (100 pcs)
- Capillary tube (Plain, Blue) x 1 vial (100 pcs)
- Clay sealer (wax plate) x 1 pc

- Standard solution (ABY) x 2 bottles
- USB cable x 1
- USB driver software x 1
- APEL AC adapter set x 1 set

3. Patient Monitor

Features:

- At least 12 inches high-resolution colour TFT display with touch screen
- Can record at least 240 hours graphic and tabular trends, 500 NIBP records, 300 alarm events
- and 2-hour ECG waveform storage and review
- Rechargeable Li-ion battery up to 5 hours continuous work
- Support external USB storage

Accessories:

- ECG Trunk Cable,3-lead,IEC/AHA (Neonate)
- ECG Limb Wires, 3-lead, AHA (Neonate)
- SPO_2 Finger Sensor (Neonate)
- NIBP Tube 3m (Neonate)
- NIBP Cuff (Neonate)
- Temperature Probe rectal/oral (Neonate)

4. Radiant Warmer

Features:

- Radiant warmer to provide even heat distribution over the entire bed area
- Continuous monitoring of the baby's central and peripheral temperature
- Should have a convenient control panel and easy-to-spot alarm
- Manual mode (+)
- Skin servo mode (+)
- Bright and soft light (+)
- Central Alarm (+)
- Thermo Monitoring (+)
- Bed tilt (+)
- Inner sidewalls (+)

Accessories:

- Central and Periphery Temperature Probe

5. Hematocrit Centrifuge

Features:

- Hematocrit Centrifuge is the gold standard to determine the packed cell volume (PCV)
- Compact, robust, and durable
- Use of standard capillary tubes
- Result in 5 min
- Easy to clean
- Almost vibration-free
- Time-saving quick acceleration and braking system
- Clear visibility of RPM

Accessories:

- Aluminum hematocrit percentage reader
- Rotor with 24 positions

Annex 4:

A Report by the American Society of Anesthesiologists Task Force on Preoperative Fasting

Ingested Material	Minimum fasting period(hours)
Clear fluids	2
Non-human milk	6
Light meal	6
Fried food, fatty food	8

Remarks: Prolong emptying time for trauma, history of opioid administrations, etc.

Annex 5:

Mallampati Classification

Class 1: ➜Faucial pillars, soft palate, and uvula visible

Class 2: ➜Faucial pillars and soft palate visible, uvula masked by the base of the tongue

Class 3: ➜Only soft palate visible

Class 4: ➜Soft palate not visible

Annex 6:

Recovery position after general anesthesia