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MINISTRY OF HEALTH-ETHIOPIA

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HEALTHIER CITIZENS FOR PROSPEROUS NATION!

EMERGENCY AND CRITICAL CARE DIRECTORATE

Emergency Medical Technician Refreshment Training Participant Manual

JUNE 2020

Addis Ababa

Ethiopia

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Acronyms

1. EMT –Emergency medical technician
2. CPR-cardiopulmonary resuscitation
3. MCI-mass casualty incidence
4. PPE –Personal protective equipment
5. FMOH-Federal ministry of health
6. WHO-World health organization
7. ECS-Emergency care service
8. **ABC:** Airway, Breathing, Circulation
9. **BVM:** Bag Valve Mask
10. **BSI:** Body Substance Isolation
11. **EMTs:** Emergency Medical Technicians
12. **GCS:** Glasgow Coma Scale
13. **IV:** Intravenous
14. **MCQs:** Multiple Choice Questions
15. **Hg:** Mercury
16. **ABC:** Airway Breathing Circulation
17. **APGAR:** Appearance Pulse Grimace Activity Rate
18. **BP:** Blood Pressure
19. **BSI:** Body Substance Isolation Mask
20. **APH:** Ante Partum Hemorrhage
21. **EMTs:** Emergency Medical Technicians
22. **HEELP:** Hemolysis Elevated Liver Enzymes Low Platelet
23. **IUGR:** Intra Uterine Growth Retardation
24. **IV:** Intravenous
25. **MOH:** Ministry Of Health
26. **OB:** Obstetric
27. **PPH:** Post Partum Hemorrhage
28. **RUQ:** Right Upper Quadrant
29. **MCQs:** Multiple Choice Questions

1. COURSE SYLLABUS

a. INTRODUCTION

Emergency medicine is very young discipline even in developed country it is aged about a five-decade old globally(1). Hence, the formal pre-hospital care is a current phenomenon in Ethiopia which is before, after Ethiopia millennium (2). It is suggested that well organized and appropriate utilization of pre-hospital emergency services play a crucial role in enhancing the emergency care system. Ethiopia is now challenged with highest road traffic fatality rate which is 68% fatalities per 10,000 vehicles per year (3). According to the report from world health organization (WHO) the majority of trauma related death occurs in the pre-hospital setting(4). Until the last two-decade facilities, equipment and human resource with the necessary skill and knowledge that support and coordinate emergency medical system is lacking in Ethiopia. However, in the recent years there is a significant improvement in the human resource development and also infrastructure. Regards to expansion of federal and regional schools that provide training for EMT-B our Ethiopia need a long way to go to produce an ambulance crew (EMT-B's) that meet international standard. Ethiopia ministry of health did an enormous contribution for this endeavor in terms of supporting the emergency service system by provision of ambulance to all regional state. Furthermore, by training of basic emergency medical technician (EMT-B) or ambulance crews to improve pre-hospital

care system. It is worthwhile to improve the knowledge and skill of EMT-B through continuous professional development in regular interval. So, it will reduce the mortality and morbidity of patients at the pre-hospital setting moreover, improve quality of care and patient outcome. Thus, this participant manual aimed to trainee and update with current knowledge, skill and competency of EMT- B through continuous professional development within their designated scope of practice.

b. Scope of the training

This training manual will teach the following ten chapter both the theory and practical. Each of the chapter will have its own chapter description, chapter objective, enabling objective and session outline. The manual comprised the following chapters both the theory and practical sessions of each chapter: -

- Introduction to EMS system, Ambulance Operation & EMS Safety
- Emergency Patient Assessment and Management
- Basic Life Support
- Medical Emergencies
- Obstetrics and Gynecology Emergency
- Mass Causality Incidents
- Trauma Management in pre hospital Setting
- General pharmacology
- Communication, Documentation, Monitoring and Evaluation

c. Course Description

This emergency medical technician training/course is designed to train EMTs, nurses and health officers, on the emergency care about knowledge, attitude and skills, they need to use to save lives and limbs in pre hospital settings with available resources.

d. Course Goal

To improve knowledge and skill of health professionals on emergency patients' assessment and management of critically sick/injured patients .

Course Objectives

At the end of this course participants will be able to:

- Describe EMS structure and functions

- Apply proper ambulance operation and, management
- Recognize adult triage and categorize emergent patients based on their acuity level.
- Explain how to approach critically ill patients.
- Assess and manage airway and breathing problems

e. Course Evaluation

Each day's courses will be evaluated based on the developed format addressing the provided documents, training contents, instructors, facilities, time and interactions. Feedbacks will be given based on the given comments immediately at end of training session. Course evaluation format will be used to assess the overall effectiveness of the course as perceived by the trainees.

Course Duration

5 days with a total of 48hours courses with:

f. Training/Learning Methods

- Interactive lectures
- Demonstration
- Brainstorming
- Small group discussions
- Individual and group exercise
- Role-plays and simulations
- Videotapes and discussions

g. Instructional materials, supplies and equipment needed in the training

- Participant Manual
- Facilitator Guide
- Case study booklet
- Power point slides
- Training videotapes
- Class rooms should include a space for the lecture presentations and a room for skill stations Mannequins and other trauma care equipment's
- Paediatrics, neonatal and obstetric mannequins and supplies
- Laptop and LCD projectors for lecture presentations
- Flip chart, markers, pen, note books

h. Target audience

Health professional (EMT, nurses, Health officers and other health workers) who have working in healthcare facilities, ambulance and health system. Trainer selection criteria Instructors will be selected from manual developers, and health professionals who has score very good result during TOT and certified. The trainer must have experience using the master learning approach to provide the training, which is conducted according to adult learning principles- learning is participatory, relevant, and practical-and uses behaviour modelling, is competency-based, and The trainer should have taken TOT and expected have an experience in emergency care system. Schedule a daily meeting of all trainers at the close of each day to review progress, solve problems, and to plan for the following day.

Conduct Pre and Post Test

Develop norms on how to behave during the training period

Encourage active participation of trainee

At the end of the training course conduct training evaluation using pre prepared evaluation questioner

Trainees’ Assessment, Qualification and Criteria for Certification

All the trainees will be assessed at the start and end of the course by pre test and post-test respectively and will be certified with >70 % of post test result and 100% of attendance.

Core competencies

The followings are core competencies that will be achieved after this training.

- Patient care: Triage patients
- Providing lifesaving intervention life and limb threatening situation
- Access and manage critically ill/injured patients in all age groups and obstetric emergencies
- Utilize emergency drugs and equipment’s
- System development
- Emergency medical service system

Training Schedule

Day	Time	Topic		Remark
		Registration		
		Well coming		

Day One		Introduction To EMS And Ambulance Operation	Chapter	
	5 min	Overview Of Emergency Medical Service System	Session One	
	20 min	Ambulance Operation System and Ems Safety	Session Two	
	15 min	Responding to Ambulance Call	Session Three	
	30 min	Ems Safety	Session Three	
		Emergency Patient Assessment and Management	Chapter Two	
		Airway Assessment and Management	Session One	
		Breathing Assessment and Management	Session Two	
		Circulation Assessment And Management	Session Three	
Day Two		Basic Life Support	Chapter Three	
	10 min	Cardiac Chain of Survival	Session One	
	10 min	Adult Rescuer BLS Sequence	Session Two	
	30 min	BLS For Infants And Children	Session Three	
	20min	BLS For Pregnant Mother	Session Four	
	40 min	Foreign body air way obstruction or Chocking	Session Five	
	220 min			
Day Three		Medical Emergencies	Chapter 4	
	70 mints	Respiratory Emergencies	Sessions 1:	
	90 min	Cardiovascular Emergencies	Sessions 2	
	50 min	Diabetic Emergencies	Sessions 3	
	60 min	Poisoning Emergency	Sessions 4	
	60 min	Neurologic Emergencies	Sessions 5	

Day Four		Trauma Management in Pre Hospital Setting	Chapter 5	
		Approach To Assess Trauma	Sessions 1	
		Special Considerations: Pregnant Trauma	Sessions 2	
		Mass Casualty Incidents (MCIs)	Chapter 6	
		Roles Of Major Responding Agencies	Session 1	
		Scene Assessment	Session 2	
		Principles Of MCI Triage	Session 3	
Day Five		Obstetric Emergencies	Chapter 7	
		Emergencies Before Deliveries	Session 1	
		Post-delivery emergency	Session 2	
Day Six		Communication and M&E	Chapter seven	
			Chapter 8	
			Chapter 9	

Chapter One

1. Introduction to EMS and Ambulance Operation

Chapter Description:

This chapter will cover about the emergency medical service system, component of the EMS, how to access EMS, and criteria to select ambulance station, Medical oversight and role and responsibility of EMT-B .In addition to this the chapter also have an overview of ambulance operations. The chapter have a brief summarized note, chapter objective, enabling objective and session outline. At the end summary question to as part of formative assessment of trainees at the end of the session.

Chapter Objective

By the end of this chapter the participants will be able to:

- Explain about the EMSS
- List the component of emergency Medical system

- Discuss about the role and responsibility of EMTB
- Develop knowledge and skill on the assessment and treatments of critically ill or injured patients in Ambulance transportation and undertake safety measures in EMS services

Enabling Objectives

- To create emergency medical service system
- Develop the component of EMSS
- Define Ambulance and EMS safety
- Identify and utilize the types of Ambulances with their equipment's and supplies
- Respond and apply appropriate phases of Ambulance call
- Undertake appropriate safety measures
- Prevent and control for EMS providers

Total time allotted: 3:30 hrs.

Session outline

This chapter has the following sessions:

- | |
|--|
| <ul style="list-style-type: none"> • Emergency medical service system? • Component of Emergency Medical service system • Access to Emergency medical system • Role and responsibility of EMTB • Introduction to Ambulance • BLS Ambulance • ALS Ambulance • Responding to Ambulance call • EMS safety • Infection prevention and control guidance for ems providers • Reference |
|--|

Session One

1.1. Overview of Emergency Medical Service System

EMS is defined as the system that organizes all aspects of medical care provided to patients in the pre-hospital or out-of-hospital environment(5,6). It also known as emergency medical services, also known as ambulance services or EMTB services, are emergency services which treat illnesses and injuries that require an urgent medical response, providing out-of-hospital treatment and transport to definitive care. EMS is also the foundation for effective disaster response and management of mass casualty incidents.

Why EMSS?

1. Activate the emergency medical service system communication immediately
2. Provide immediate care and support to injured and medical emergencies
3. Support the by stander care in organized way via virtual communication
4. Provide organized out of hospital care for as at the scene, during transportation and communicate professionally the receiving hospital
5. Alert the receiving hospital to prepare the necessary human and material resource as pre the demand. For instance, (activation of trauma team, Stroke team, obstetric etc....)
6. Dispose the causality to appropriate care centre within the recommended timeline, and provide the proper patient history that helps for the patient continuum care.

Components of Emergency Medical Service System

For the effective and efficient function of emergency medical service system, it is required to be familiar with the component of the system.

EMSS comprises the following; recognition of an emergency situation, provision of first Aid, ability to communicate with emergency treatment facilities, transportation in appropriate vehicles, availability of well-trained EMT-B, or Paramedics, categorization of emergency care facilities and data collection and audits. Furthermore, the system should be led by dynamic, informed and professionals

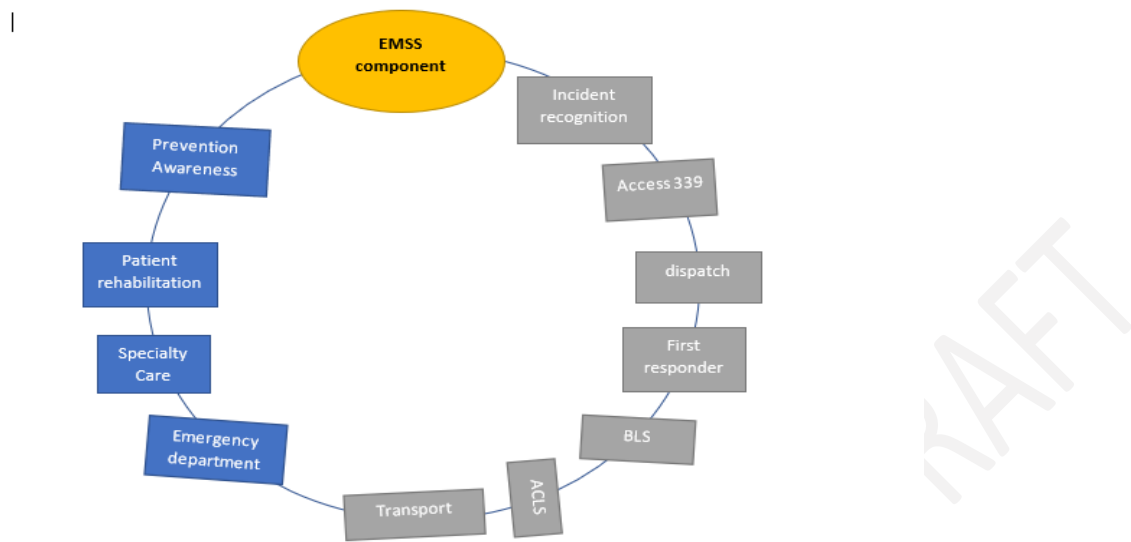


Figure 1: component Emergency Medical service system

1.2. Access to Emergency Medical Service

1.2.1 Call Centre (ECC)

The emergency call centre is located on-site and should be operational for 24/7. It should be staffed with or operated by trained medical professional who could be able to provide medical advice over the phone for the caller (bystander). Additionally, the call taker should collect all the pertinent information from the caller using the appropriate local language and excellent verbal communication skills. And, entering all the into computer aided dispatch system and routing the call to the appropriate dispatcher. Ideally there should one national call centre for all emergency agencies, but the dispatch centres might be designated to respective organizations or agencies.

- ✓ Number to ECC should be 3-digit and easy to remember and free
- ✓ Public shall be familiar with the number and regular notification through mass media

Role of a call taker

- ✓ Obtain critical information and route the call as quickly as possible
- ✓ Make quick decisions and react with reason
- ✓ Properly screen calls to determine whether they of an emergency or non-emergency nature
- ✓ Gather critical information from callers
- ✓ Enter information into the CADS system

Good call taker

- ✓ **Excellent voice Quality** – speak clearly, slowly and confidence
- ✓ **Proper Etiquette and professionalism**- Remain calm, professional, courteous and respectful at all time
- ✓ **Authority**- a 393 call takers should always maintain control of the phone
- ✓ **Patience** – 393 call takers should have patience with the caller who may have difficulty conveying the nature of the emergency or their needs, such as children, elderly and illiterate people.

1.2.3 Ambulance Dispatch System and Dispatcher

The emergency ambulance dispatch system or computer aided dispatch system (CAD) is a web-based application that efficiently receives a phone call from all service, records the details of an emergency including location, find the next available ambulance and dispatches the ambulance as fast as possible with approximately in minute.

1.2.4 Medical Oversight

Medical oversight is supervision of the service, groups or system providing emergency medical service (EMS). It is also called medical direction to incorporate all the complex and multiphase activities(7). It is categorized as direct medical oversight when the physician provide order to an EMS provider over the radio, phone or on scene. Indirect impacting the EMS system by the medical director through developing protocols, promulgation, education, credentialing of EMS providers, advocating for patients, EMS provider and system.

1.2.5. Ambulance Station and Criteria of Selection

An ambulance station is a structure or area aside for storage of ambulance vehicles and the medical equipment moreover, working and living space of their staff. Appropriate selection of Ambulance station is paramount for easy and quick access of the caller. Selection of the Ambulance station depend on the situation of specific localities some of the general criteria are; Spital proximity Euclidean space or static road network, size of the population in the locality, distance from the station to receiving hospital and another situation in the locality.

1.2.6. Major role and responsibility of EMS providers

- Respond to emergency calls to provide efficient and immediate care to the critically ill and injured and transport patient to a receiving facility
- Determine the nature and extent of illness or injuries and establish priorities as per the required emergency care and render care.
- involve actively during emergency situation or disaster through notification, command, communication, public information and operation.
- Reassure patients and bystanders by working in a confident and efficient manner.
- Assists in the lifting and carrying the patient out of the ambulance and into the receiving facility
- Report verbally and in writing their observation and emergency care of the patient at the emergency scene and in transit to the receiving facility staff for purposes of records, diagnostics and continuum of care.
- After each call, restocks and replace used supplies, cleans all equipment following appropriate disinfecting protocol and make careful check of all equipment so that the ambulance is ready for the next run.
- Determine that vehicles are in proper mechanical condition and maintain familiarity with specialized equipment used by the service
- Attend CPD and refresher training programs as required by employers, licensing or certifying agencies
- Maintains current knowledge of local, regional, and national issues affecting EMS
- Puts patient's needs as a priority without endangering self

1.2.7. Medical /legal & Ethical issue

1.Scope of Practice

A. Legal duties to the patient, and public

1. Provide for the well-being of the patient by rendering necessary interventions outlined in the scope of practice.

2. Defined by state legislation

- ✓ Enhanced by medical direction through the use of protocols and standing orders
- ✓ Referenced to the National Standard Curricula

3. Legal right to function as an EMT-Basic may be contingent upon medical direction.

- Telephone/radio communications
- Approved standing orders/protocols
- Responsibility to medical direction

B. Ethical responsibilities

- Make the physical/emotional needs of the patient a priority.
- Practice/maintenance of skills to the point of mastery.
- Attend continuing education/refresher programs

1.2.8. Terminologies

- a. **Community First Responders (CFR)** are volunteers who are trained to attend certain types of **emergency** calls in the area where they live or work.
- b. **Emergency medical services**, also known as ambulance services or paramedic services, are emergency services that provide urgent pre-hospital treatment and stabilization for serious illness and injuries and transport to definitive care
- c. **EMT-Basics/Level III/-** are the first level of EMS personnel to provide patient care both at the scene and during transportation.

- d. **EMT-Intermediates/Level IV/-** are EMT-Basics who have acquired additional training to provide more complicated care to patients.
- e. **Paramedics Masters level-** is the most highly trained pre-hospital care providers in the EMS system.

Session 2

1.2. Ambulance Operation System and EMS Safety

a. Introduction

An **ambulance** is a medically equipped vehicle which transports patients to treatment facilities, such as hospitals typically, out-of-hospital medical care is provided to the patient. Ambulances are used to respond to medical emergencies by emergency medical services. For this purpose, they are generally equipped with flashing warning lights and sirens. They can rapidly transport paramedics and other first responders to the scene, carry equipment for administering emergency care and transport patients to hospital or other definitive care.

The term *ambulance* comes from the Latin word "*ambulare*" as meaning "to walk or move about" which is a reference to early medical care where patients were moved by lifting or wheeling.

Emergency ambulances provide care to all patients with an acute illness or injury mainly serves in the pre-hospital care. It has ability to store significantly larger amounts of medical equipment and supplies to provide emergency care. And can respond independently to emergency calls. The size of the ambulance and the interior content (medical and non-medical equipment) and color may vary from country to country. but the Standard specifies that all ambulances should be painted yellow, with specific color standards, as their primary body color . Because it remains visible to almost all people in all lighting conditions, including the majority of those with colour-blindnes.

In Ethiopia, the types of vehicle used for ambulance and its speed, warning light, siren, right-of-way etc are determined by federal road and transport authority. However, the apparatus utilized and the personnel involved are determined by federal ministry of health



Figure 2. Ambulance color description

b. Description of Some Terms

Pre hospital care encompasses the care provided from the community (scene of injury, home, school, or other location) until the patient arrives at a formal health care facility capable of giving definitive care. This care should comprise basic and proven strategies and the most appropriate personnel, equipment, and supplies needed to assess, prioritize, and institute interventions to minimize the probability of death or disability. Most effective strategies are basic and inexpensive, and the lack of high-tech interventions should not deter efforts to provide

good care. Even where resources allow them, the more-invasive procedures performed by physicians in some prehospital settings, such as intravenous access and fluid infusion or intubations, do not appear to improve outcomes, and evidence suggests that they may, in fact, be detrimental to outcomes

Emergency medical conditions typically occur through a sudden insult to the body or mind, often through injury, infection, obstetric complications, or chemical imbalance; they may occur as the result of persistent neglect of chronic conditions. Emergency medical services (EMS) to treat these conditions include rapid assessment, timely provision of appropriate interventions, and prompt transportation to the nearest appropriate health facility by the best possible means to enhance survival, control morbidity, and prevent disability

The goal of effective EMS is to provide emergency medical care to all who need it. Advances in medical care and technology in recent decades have expanded the parameters of what had been the traditional domain of emergency services. These services, no longer limited to actual in-hospital treatment from arrival to stabilization, now include prehospital care and transportation.

Emergency medical technician (EMT) and **ambulance technician** are terms used in some countries to denote a health care provider of emergency medical services. EMTs are clinicians, trained to respond quickly to emergency situations regarding medical issues, traumatic injuries and accident scenes

There are several categories of ground ambulance services and two categories of air ambulance services under the fee schedule. (Note that “ground” refers to both land and water transportation All ground and air ambulance transportation services must meet all requirements regarding medical reasonableness and necessity as outlined in the applicable statute, regulations, and manual provisions.

c. Ambulance Service Requirements

1. Vehicle Requirement for Basic Life Support and Advanced Life Support

- The ambulance service shall provide to every emergency patient who needs the service without any discrimination.
- The ambulance service may provide for clients who need the service without any prerequisite and discrimination.
- The ambulance service shall be available 24 hrs a day and 365 days a year

2. Basic Life Support (BLS) ambulances must be staffed by at least two people, *who meet the* requirements of state and local laws where the services are being furnished and where, at least one of whom must

1. Be certified at a minimum as an emergency medical technician-basic (EMT basic) by the state or local Authority where the services are being furnished and
2. Be legally authorized to operate all lifesaving and life-sustaining equipment on board the vehicle.

The **Basic Life Support (BLS) ambulances service shall provide the following services**

a. Patient transportation service from health facility to other health facilities and from home to health facility

b. Clinical examination including brief history, vital signs and pertinent physical examination and glucose test when needed

c. Clinical lifesaving support that includes:-

- ABC of life threatening
- Oxygen administration
- Splinting
- Delivery attending
- Immobilization
- IV Securing
- Pain management

➤ The ambulance service shall comply with the patient rights stated under this requirement.

➤ The ambulance service shall register patient/clients:

➤ Identification, address, arrival time, finding and treatment given if any.

Upon arrival to the intended health facility the ambulance staff shall transfer the patient to the emergency service. The handover of patients shall be accompanied by a written document which at least includes: identification, address, arrival time, finding and treatment given if any.

✓ If death happens on the way to a health facility the dead body shall be taken to the health facility and death shall be confirmed and certified by authorized health professional.

- ✓ The health facility shall receive the dead body and dead body care shall provide by the facility.
- ✓ Ambulance vehicles shall serve only for designated services.
- ✓ After providing a service the vehicle shall be cleaned and made standby.
- ✓ Each item after providing service equipment transported in an ambulance shall be check every time and shall be properly restrained in the ambulance.
- ✓ Each ambulance should carry extrication equipment appropriate for the level of extrication the ambulance service provides
- ✓ Upon arrival if there is placenta, severed extremity or other body part the ambulance staff shall handover the patient with stated body parts to the receiving health facility

Professionals/Staffs

The ambulance service shall be led by either of the following licensed health professionals with at least one year relevant work experience.

- *Emergency medical technician professionals*
- *Paramedics*
- *Nurse*

The minimum number of personnel for ambulance service shall include:

- nurse or Emergency medical technician professionals or Paramedics per ambulance per shift # 1
- Licensed driver per vehicle per shift # 1
- Telephone operator and coordinator per shift # 1
- Diploma nurse or Trained care giver per ambulance per shift # 1
- Cleaner #2

The health professionals shall be trained on emergency medical services

The driver shall be oriented on emergency situation management

3.Ambulance service requirements for advanced life support (ALS)

- The ambulance service shall provide to every emergency patient who needs the service

without any discrimination.

- The ambulance service may provide for clients who need the service without any prerequisite and discrimination.
- The ambulance service shall be available 24 hrs a day and 365 days a year

The **advanced life support (ALS) ambulances service shall provide the following services**

a. Patient transportation service from health facility to other health facilities and from home to health facility

b. Clinical examination including brief history, vital signs and pertinent physical examination and glucose test when needed

c. Clinical life saving support that includes:-

- ABC of life threatening
- Oxygen administration
- Splinting
- Delivery attending
- Immobilization
- IV Securing
- Pain management
- Advanced airway management
- ECG monitoring and defibrillators
- Ventilatory management
- Circulatory management and support

Ambulance Utilization System

- The ambulance service shall comply with the patient rights stated under this requirement.
- The ambulance service shall register patient/clients:
- Identification, address, arrival time, finding and treatment given if any.

Upon arrival to the intended health facility the ambulance staff shall transfer the patient to the emergency service. The handover of patients shall be accompanied by a written document

which at least includes: identification, address, arrival time, finding and treatment given if any.

- ✓ If death happens on the way to a health facility the dead body shall be taken to the health facility and death shall be confirmed and certified by authorized health professional.
- ✓ The health facility shall receive the dead body and dead body care shall provide by the facility.
- ✓ Ambulance vehicles shall serve only for designated services.
- ✓ After providing a service the vehicle shall be cleaned and made standby.
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- ✓ Upon arrival if there is placenta, severed extremity or other body part the ambulance staff shall handover the patient with stated body parts to the receiving health facility
- ✓ If death happens on the way to a health facility the dead body shall be taken to the health facility and death shall be confirmed.
- ✓ The health facility shall receive the dead body and dead body care shall provide by the facility.
- ✓ Ambulance vehicles shall serve only for designated services.
- ✓ After providing a service the vehicle shall be cleaned and made standby.
- ✓ Each item after providing service equipment transported in an ambulance shall be check every time and shall be properly restrained in the ambulance.
- ✓ Each ambulance should carry extrication equipment appropriate for the level of extrication the ambulance service provides
- ✓ All communications equipment shall be maintained in good working order. The Communications equipment must be capable of transmitting and receiving clear voice communications.
- ✓ Each ambulance responding to a request for service shall be staffed with at least two staffs without driver.
- ✓ Each person transported in an ambulance shall be properly restrained in the ambulance.

- ✓ Each ambulance service shall establish a communications linkage and consult with the local health care facilities.
- ✓ Each ambulance care provider shall ensure that he or she follows every direction or instruction issued by a communications officer with respect to the assignment of calls to ambulance.
- ✓ The driver of an ambulance, in which a patient/client is being transported, shall transport the patient/client to a facility as directed by a communications officer ordering the movements of the ambulance. In the absence of a direction from a communications officer, the driver will transport the patient to the closest health care facility that can provide the care apparently required by the patient.

Professionals/Staffs for Advanced life Ambulance

- ✓ .The ambulance service shall be led by either of the following licensed health professionals with at least one year relevant work experience.

- ❖ *Emergency professionals*

- ❖ *Anesthesia professionals*

- ❖ *Emergency Nurse*

- ✓ The minimum number of personnel for ambulance service shall include:
 - a) Emergency professionals or anesthesia professionals or emergency nurse per ambulance per shift # 1
 - b) Licensed driver per vehicle per shift # 1
 - c) Telephone operator and coordinator per shift # 1
 - d) Diploma nurse or Trained care giver per ambulance per shift # 1
 - e) Cleaner #2

.The health professionals shall be trained on advanced life support.

The driver shall be oriented on emergency situation management

Session Three

1.3. Responding to Ambulance Call

The emergency system of the federal government or regional government can give guidance on who to call with what numbers when emergency happens. For instance digital ambulance call number (939) is functional in Addis Ababa city administration.

At the international level, response to an emergency call involves five different phases:

These are:-

1. Dispatch centre
2. Response to the scene
3. Arrival at the scene
4. Provide Emergency Care
5. Post run

1.3.1. Phases of an Ambulance Call

1. Preparation phase

Is the phase in which the EMT organizes necessary equipment's and supplies to provide pre health facility emergency care. When EMT dispatched or get information from the centre it is not expected to prepare the necessary supplies and equipment's but just move to the scene

In preparation phase we should prepare the followings

a. Basic Supplies (B/P apparatus):,Stethoscope,Thermometer,Pulse oximeter,Bedpan, Garbage,Sharp container,Pillow,Blanket: **Linen**, Suction machine:

b. Basic wound care supplies(Gauze,Roller bandage,Scissors,Disposable glove,Cotton, Antiseptics (Povidone, Iodine , Savelon) Elastic bandage:Plaster:

c. Oxygen and Airway Devices(oxygen source, oxygen cylinder with accessory oxygen delivery devices,Ambubag,Nasal prongs,Face masks of different types,Oropharyngeal airways,Nasopharyngeal airway,LMA)



Figure 2 Oxygen source



Figure 3 Ambubag

d. Trauma kits(referre

e. Emergency delivery kits

f. Patient Transfer and Stabilization Equipments(Ambulance stretcher, Cervical collar, Long backboard, short board)

g.PPE and Operational Equipment (Uniform, Surgical masks, Helmets: ,Goggles, Safety shoes or boots ,Surgical gloves)

h. Heavy duty gloves

i. Extrication equipment's (pry bar, axe, large screw driver, hammer, Knife, Rope, hand saw with metal cutting blade)

j. Personnel's

Every ambulance must be staffed with at least one EMT and one driver. Both are responsible in taking the stretcher towards patient, transferring and moving the patient to the ambulance. Having accomplished the loading mission, the paramedic attends the patient and the driver drives to the required area.

2. Dispatch phase

The dispatch facility is a center that citizens can call to request emergency and medical care. Dispatchers gather relevant information as discussed in responding to ambulance calls, inform ambulance crews to move to the scene. Without good dispatch information, one cannot respond properly.

3. En route to the scene phase

When dispatched, the EMT departs to the scene. It is the most dangerous phase for EMTs. Because collisions may cause many serious injuries.

4. Arrive at the scene

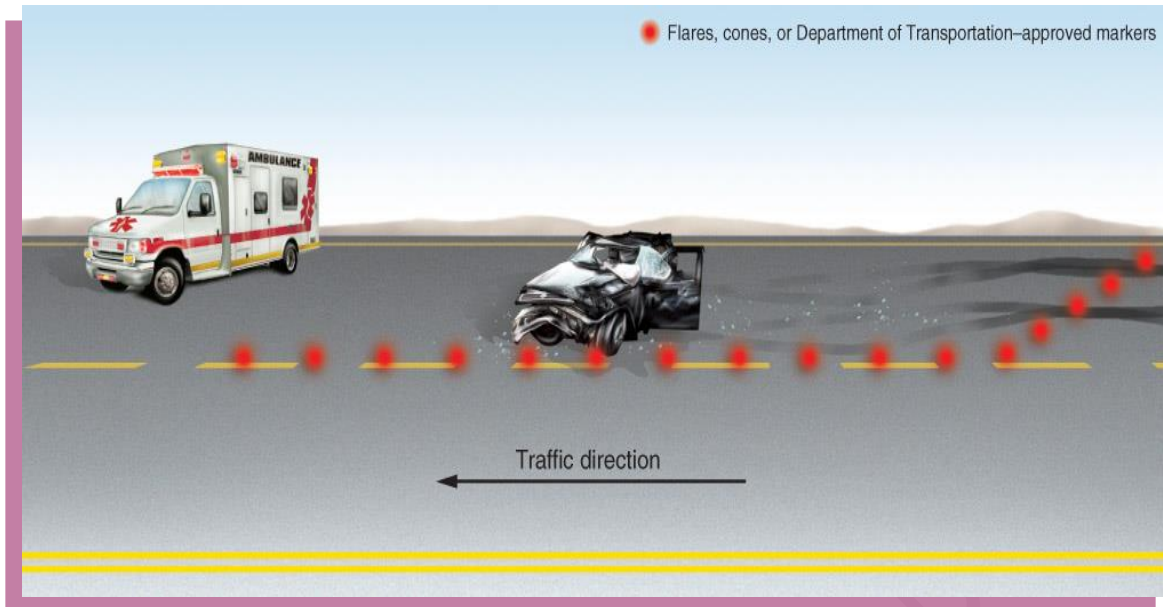
Inform dispatch that you have arrived and give a brief report about the scene

Do not enter the scene if there are any hazards to you and bystanders

Immediately scene size up

- Look for safety hazards
- Evaluate the need for additional units
- Determine the mechanism of injury or nature of the illness

5. Safe parking



6. Traffic control

7. The transfer phase



Figure 4 safe transfer of patient

8. The transport phase

- Inform dispatch when you are ready to leave the scene
- Conduct ongoing assessments

9. The delivery phase

Inform dispatch as soon as you arrive at the health facility

Complete a detailed written report and leave a copy with an appropriate staff member

10. En route to the station

- During the post run phase, you should inform the dispatch about your status, location and availability.
- Clean the ambulance and any equipment that was used back at the station
- Complete and file written reports

Session Four

1.4. EMS Safety

Out-of-hospital emergency medical care is a very dynamic and complex environment. Personnel working in this setting have to struggle with time constraints and with acute patient conditions potentially subject to unpredictable changes. In order to ensure faster and safer provision of emergency care, rescue operations must be coordinated

EMS Safety: Techniques & Applications was developed by the International Association of Fire Fighters (IAFF) under Federal Emergency Management Agency in the United States Fire Administration.

Safety should always be a primary consideration when making these decisions. For example, the smart EMS provider is always thinking, “How can I negotiate this traffic safely?” Or “How can I work with these people safely?” Or “What about this scene needs to be moved or changed so I can work safely?” Safety is an underlying theme that no one can afford to forget. Yet, it’s because this vital element of EMS is such a constant issue that it sometimes becomes a backdrop rather than a priority. The delivery of emergency medical services (EMS) involves hazardous work. Anyone who has spent time providing emergency medical care knows this. Consider the headlines that appear all too frequently: “Traffic fatalities involving EMS units.” “Downed power lines hamper rescue effort.” “Paramedics held at gunpoint during narcotics robbery attempt.” “EMT struck by hit-and-run motorist, critically injured.” “Dogs attack would-be helpers.” “Firefighter succumbs to hepatitis.” “Retired EMT dies of heart attack. . . stroke . . . cancer. . .” The same safety issues are common to all EMS personnel. They include physical or environmental hazards, traffic, the frequently strenuous physical

labor and emotionally charged interactions. Safety issues cross all levels of certification, territorial boundaries and population demographics.

The principles in EMS safeties are wide-ranging, including

- How to approach scenes safely?
- principles of safe driving,
- Use of seatbelts in the cab and the patient compartment, interfacing safely with hazardous material teams,
- Safe interpersonal communication strategies,
- Back safety
- The long-term safety-related views of health maintenance through physical fitness and stress management.

1.4.1. Infection prevention and control guidance for EMS providers

Emergency Medical Services (EMS) providers play an important role in the prevention and control of infections. EMS providers are at the front line of medical care and have a high risk of exposure to patients with known or unknown infectious diseases or germs. The emergence of antimicrobial-resistant bacteria such as methicillin resistant *Staphylococcus aureus*(MRSA) and vancomycin-resistant enterococcus (VRE), along with growing concerns regarding the spread of *Clostridium difficile* (*C. diff*) and viruses, are major problems facing all healthcare providers, including EMS providers.

1.4.2. Ambulance cleaning and disinfection

Compliance with best practices for cleaning and disinfecting EMS vehicles and patient care equipment is an important factor in preventing the spread of infections. EMS providers and their patients have an increased risk for spreading infections without clear policies and an understanding of these procedures

Items or surfaces that have been exposed to the patient’s skin, blood, or body fluids are considered contaminated.

Disease causing microorganisms or germs can live on objects for extended periods of time. Contaminated objects can cause disease and spread infection (Siegel et al., 2007). In order to prevent the spread of infections in the prehospital environment, it is essential that patient care items (i.e. items that come in contact with skin and/or mucous membranes) and environmental surfaces are cleaned and disinfected after each patient

Patient care items and surfaces that can contribute to the spread of infection include

- Stethoscopes
- Laryngoscope blades
- Radios
- Shelves
- Door handles
- Blood pressure cuffs
- Monitors
- Stretchers, backboards, and immobilization devices

Recommended Ambulance Cleaning and Disinfection Products

Product	Uses	Advantages	Disadvantages
Alcohols (70-95%)	<ul style="list-style-type: none"> - External surfaces of some equipment (e.g., stethoscopes, pulse oximeters) 	<ul style="list-style-type: none"> - Non-toxic - Low cost - Rapid action - No residue 	<ul style="list-style-type: none"> - Evaporates quickly, not an ideal surface disinfectant - Highly flammable - Harmful to plastic, silicone, and rubber - Deactivated by organic material (surface must be cleaned prior to use)
Standard Bleach (Normal dilution 1:10)	<ul style="list-style-type: none"> - External surfaces - Blood spills 	<ul style="list-style-type: none"> - Low cost - Rapid action - Readily available - Available in ready to use wipes and sprays - Sporicidal and Virucidal (effective against <i>C. difficile</i> and Norovirus) 	<ul style="list-style-type: none"> - Harmful to metals - Deactivated by organic material (surface must be cleaned prior to use) - Irritant to skin and mucous membranes - Once diluted, it must be used within 24 hours - Stains clothing
Hydrogen Peroxide (0.5%)	<ul style="list-style-type: none"> - External surfaces of some equipment - Floors, walls, and furnishings 	<ul style="list-style-type: none"> - Safe for the environment - Non-toxic - Rapid action - Active in the presence of organic materials - Available in wipes and liquid - Excellent cleaning ability due to its detergent properties 	<ul style="list-style-type: none"> - Harmful to copper, zinc, brass, acrylics, and aluminum - Leaves visible residue
Quaternary ammonium compounds (Quats)	<ul style="list-style-type: none"> - Floors, walls, and furnishings - Blood spills, prior to disinfection 	<ul style="list-style-type: none"> - Non-toxic - Non-corrosive - Good cleaning ability due its detergent properties 	<ul style="list-style-type: none"> - Cannot be used to disinfect medical instruments - Limited use as a disinfectant because of its narrow microbial spectrum

1.4.2. Dangerous for EMS providers

- Ambulance crews are at increased risk of road accidents due to high driving speeds under emergency conditions.
- Ambulance crews often are in physical contact with people who have contagious diseases, which is a serious health hazard.
- Ambulance crews often help to lift and move patients. They also do other physically demanding jobs, which may result in back pains and other similar problems.
- Ambulance staffs often work under time pressure and at irregular hours.

1.4.3. Hazards related EMS providers

- Accident hazards
- Physical hazards
- Chemical hazards
- Biological hazards
- Ergonomic, psychosocial and organizational factors

1.4.4. Preventive measures

- Only a trained and qualified professional ambulance crews should be employed in that occupation
- Wear safety shoes with non-skid soles
- Protect hands with chemical-resistant gloves; if impractical, use a barrier cream
- Test for latex allergy and provide non-allergenic gloves if necessary
- Hepatitis B vaccination must be available to ambulance drivers; ambulance drivers must be familiar with the ambulance service procedures control plan regarding exposure to body fluids
- Follow established appropriate infection control precautions assuming blood, body fluids and tissue are infectious
- Routinely use barriers (such as gloves, eye protection (goggles or face shields) and gowns)
- Wash hands and other exposed skin surfaces after coming into contact with blood or body fluids
- Follow appropriate procedures in handling and disposing of sharp instruments or needles
- Learn and use safe lifting and moving techniques for heavy or awkward loads; use mechanical aids to assist in lifting
- Seek psychological or vocational advice if experiencing work-related stresses or burnout
- Train employees how to recognize and respond to threat of violence; provide means for summoning help or escort if needed

CHAPTER TWO:

2. EMERGENCY PATIENT ASSESSMENT AND MANAGEMENT

Chapter Description

This chapter helps the trainees to acquire theoretical knowledge on emergency assessment and management of patients. Besides, they develop good attitude through team work and effective communication among themselves and with emergency health facility professionals, and demonstrate the basic skills that enable them to provide emergency care for patients with airway, breathing and circulatory problems at the scene and / while enroute

General objective

At the end of this chapter, trainees will be able to:

- ✓ Develop knowledge and skills on the assessment and management of airway, breathing and circulation of emergency patients

Enabling objectives

- ✓ Describe the anatomy and physiology of respiratory and cardiovascular systems
- ✓ Assess airway, breathing and circulation of emergency patients
- ✓ Manage airway, breathing and circulation of emergency patients

Session outline

This chapter has the following sessions

Session 2.1 AIRWAY ASSESSMENT AND MANAGEMENT

Session 2.2 BREATHING ASSESSMENT AND MANAGEMENT

Session 2.3. CIRCULATION ASSESSMENT AND MANAGEMENT

2.2. AIRWAY ASSESSMENT AND MANAGEMENT

General objective

At the end of this session, trainees will be able to

- ✓ Develop knowledge and skills on the assessment and management of airway of emergency patients

Enabling objectives

- ✓ Describe the anatomy and physiology of respiratory system
- ✓ List causes of upper airway obstruction
- ✓ Assess air way in conscious and unconscious emergency patients
- ✓ Use airway adjuncts
- ✓ Develop skills on the management of emergency patients with air way problems

3.1.1 Introduction

Anatomy and physiology of the respiratory system

Airway is the passage through which the air/gas passes during respiration

It is divided into: upper airway and lower airway

The upper airway consists of the nose, mouth, throat, and epiglottis

The lower airway consists of the larynx (voice box), trachea, bronchi, and alveoli

The trachea, or windpipe, lies within the space between the lungs. It extends from lower border of cricoid cartilage (C₆) to its division into 2 main bronchi (T₄) and is 11-13 cm long

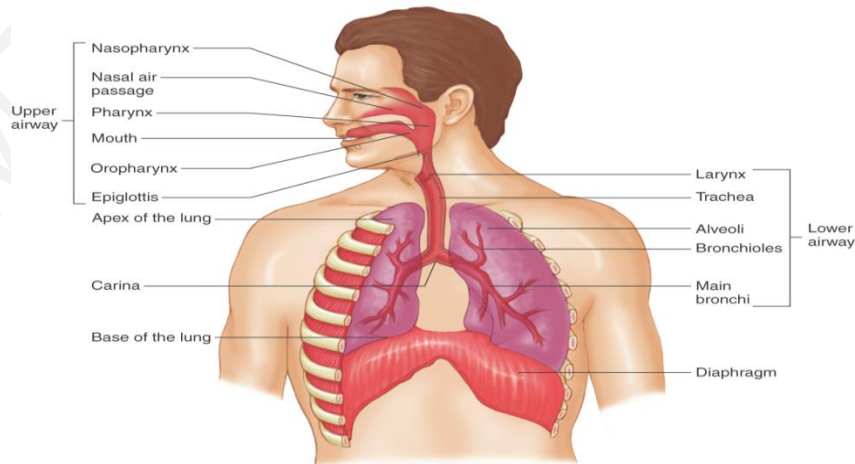


Figure 1 The respiratory System

3.1.2 Airway Emergencies

Causes of upper airway obstruction include

- a. Tongue, in patients with loss of consciousness (most common)
- b. Secretions
- c. Foreign body
- d. Swelling (Anaphylaxis)
- e. Infections (e.g. Epiglottitis)

3.1.3 Air Way Assessment

Airway assessment in conscious patients

- Look for: dyspnea, hoarseness or weakness of the patient's voice, stridor, and trauma to the airway and inhalational burn
- If the patient is sitting up and talking normally, he/she has an adequate airway, if so, reassess regularly

Airway assessment in unconscious patient

- Check the air way for any secretions, foreign body, blood, broken bones etc
- If cervical spine injury is suspected, either apply rigid cervical collar and head blocks or sand bags; or maintain in-line stabilization manually, while attempting airway maneuvers
- Position of the patient is important to maintain airway and prevent complications. Put
 - Left lateral position in unconscious patient with adequate spontaneous breathing (unless suspected cervical spine injury)
 - Left lateral position (or wedge) in 3rd trimester of pregnancy
- Patients with a GCS ≤ 8 are unable to protect their airway, due to the absence of coughs, swallowing and gag reflex

3.1.4 Air Way Management

Basic Airway Skills

Open the airway using head tilt chin lift maneuver in non trauma patient and jaw thrust for trauma patients

Head tilt-Chin lift

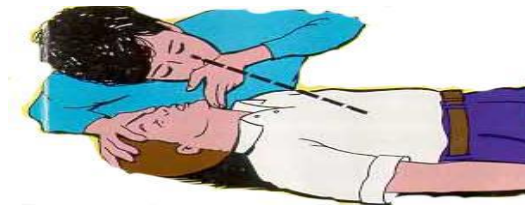


Figure 2 Head Tilt - Chin Lift maneuver

Jaw thrust

Jaw-thrust maneuver is another way to open an airway. We use this maneuver for patients with suspected spinal injury

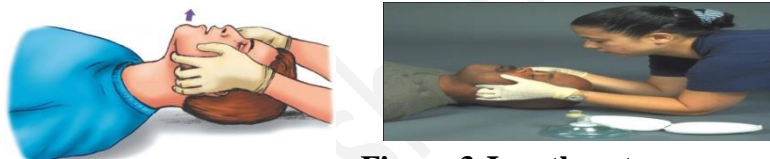


Figure 3 Jaw-thrust maneuvers

Check the presence of any foreign body or secretions - suction or remove manually if the foreign body is reachable (if no chest movement after head tilt chin lift / jaw thrust maneuvers)

Recovery position

Unconscious patients who have adequate breathing effort should turn into the recovery position, (left lateral position) if no contraindications (C-spine injury)

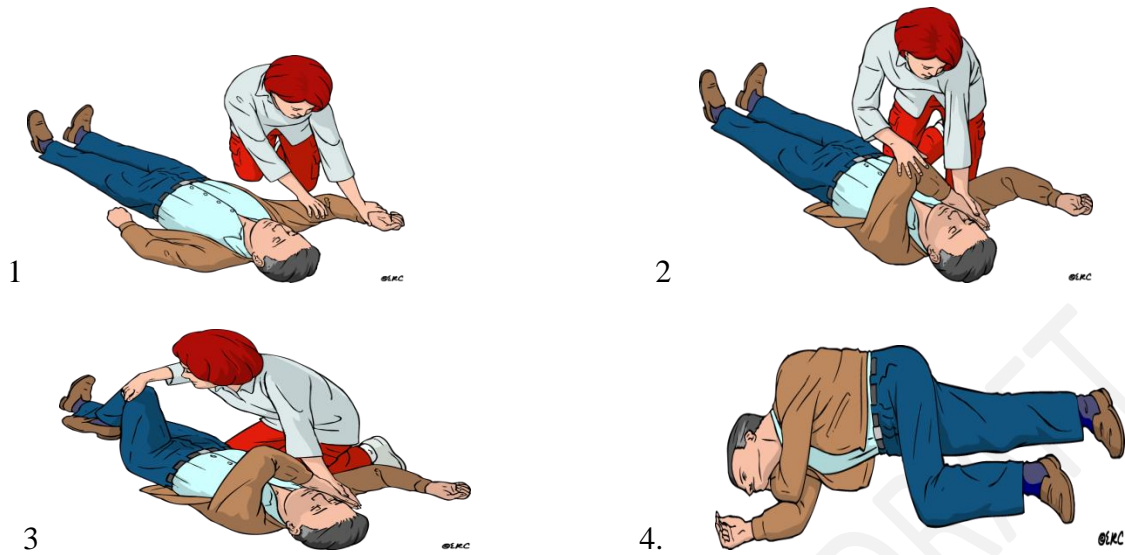


Fig 4 Steps of recovery position

Basic Airway adjuncts

Oropharyngeal airways

An Oropharyngeal (Oral) airway has two principal purposes

- To keep the tongue from blocking the upper airway
- To make it easier for suctioning the airway

Indications

- Unconscious patient without a gag reflex
- Apneic patient who is being ventilated with a BVM device

Contra indication

- A patient who has an intact gag reflex





Figure 5 Oropharyngeal airways
Measuring the size of oral airway

Figure 6

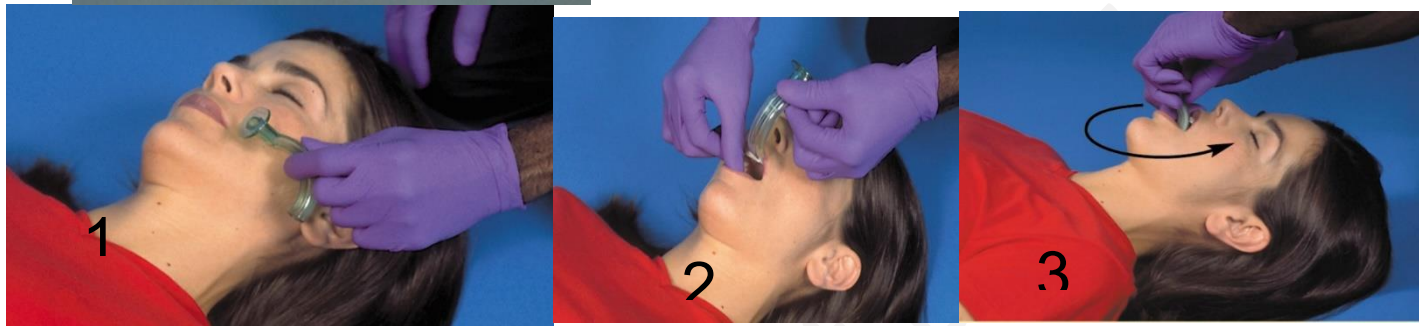


Figure 7 Steps of inserting an oropharyngeal air way

Nasopharyngeal airways

Indications

- A semiconscious patient with an intact gag reflex
- A patient who otherwise will not tolerate an oropharyngeal airway

Contra indications

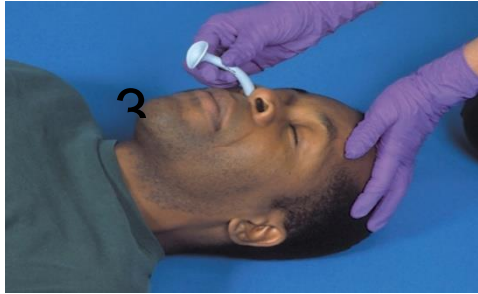
- Severe head injury with blood draining from the nose
- History of fractured nasal bone



Figure 8 Nasopharyngeal airway



Figure 9 Measuring the size of nasal airway



Figures 10 Steps of inserting nasopharyngeal airway

2.3. BREATHING ASSESSMENT AND MANAGEMENT

General objective

At the end of this session, trainees will be able to:

- ✓ Develop knowledge and skills on the assessment and management of breathing of emergency patients

Enabling Objectives

- ✓ List signs of adequate and inadequate breathing
- ✓ Manage breathing problems
- ✓ Use adjunct equipment to rescue breath and oxygen administration

2.3.7. Breathing Assessment

- Use look, listen, and feel technique
- Look for the rising and falling of the patient's chest and abdomen
- Listen for the sound of air moving in out of the patient's mouth and nose by placing your ear about 10 inch above the patient's nose and mouth
- Feel for movement of air on the side of your face and ear. Place a hand on the patient's chest to feel movement
- Continue to look, listen and feel for at least 5 seconds. Your breathing check should not take more than 10 seconds

If there are no signs of breathing, beginning rescues breathing. If the patient is breathing adequately, you can continue to maintain airway and monitor the rate and depth of respiration to ensure adequate breathing



Figure 11 Breathing assessment

- Any patient identified as having potential airway or breathing problem should be given supplemental oxygen

Assessment of the Adequacy of Breathing

- Signs of adequate breathing
 - A normal respiratory rate
 - A regular pattern of inhalation and exhalation
 - Normal breathing sounds
 - Regular and equal chest rise and fall (chest expansion)
 - Adequate depth (tidal volume)
- Normal respiratory rates
 - Adults - 12 to 20 breaths/min
 - Children - 15 to 30 breaths/min
 - Infants - 25 to 50 breaths/min
- Signs of inadequate breathing
 - Respiratory rate of out of the normal ranges
 - Irregular rhythm
 - Diminished, absent, or noisy breath sounds
 - Reduced flow of expired air at the nose and mouth
 - Unequal or inadequate chest expansion resulting in reduced tidal volume

- Increased effort of breathing
- Shallow depth (reduced tidal volume)
- Pale, cyanotic, cool, or moist skin
- Retraction around ribs or above the clavicles during inspiration

2.3.8. Management Of Breathing Difficulty

a. BVM ventilation

Indication

- For patients with inadequate ventilation simply to provide positive pressure



Figure 12 Bag valve masks (different size)

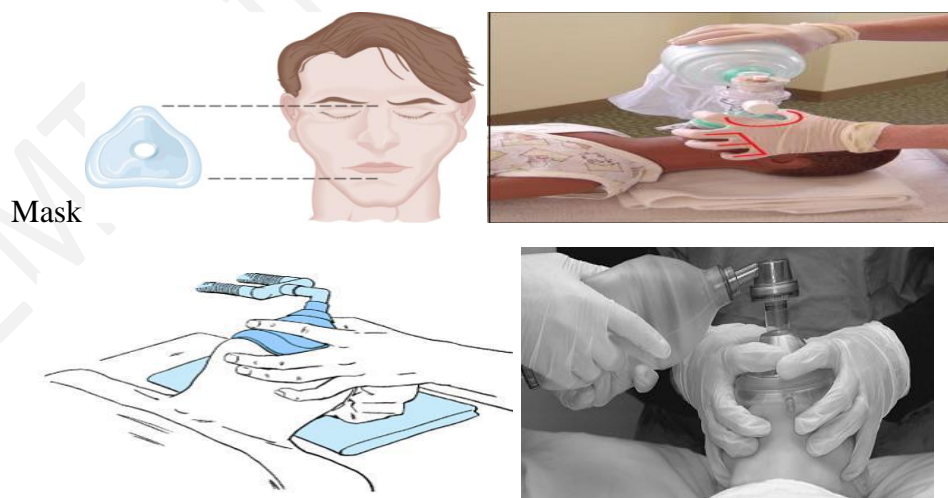


Figure 13 Technique of BVM ventilation

b. Oxygen Therapy

Nasal prongs or catheter

- Oxygen administration via nasal prong / canula range from 1-5 liter/minute

Face mask

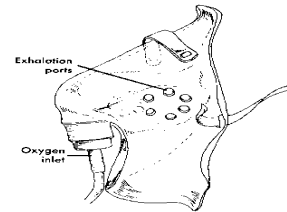
- There are different types of facemasks
- They could be with reservoir or without
- A flow rate of 6-15 lit/minute can be provided



Figure 14 Nasal canula



Figure 15 Face masks (simple face mask and with reservoir)



2.4. CIRCULATION ASSESSMENT AND MANAGEMENT

General objective

At the end of this session, trainees will be able to

- ✓ Develop knowledge and skill on the assessment and management of circulation of emergency patients

Enabling objectives

- ✓ Describe the anatomy and physiology of cardiovascular system
- ✓ List signs and symptoms of shock
- ✓ List causes of shock
- ✓ Provide emergency care for patients with shock
- ✓ List types of bleeding
- ✓ Mention clinical features of internal bleeding
- ✓ Provide emergency care of patients with internal and external bleeding

2.4.7. Introduction

Anatomy and physiology of cardiovascular System

Cardiovascular system is frequently divided into heart, blood vessels and blood

The heart is the pumping organ

The blood vessels are the media/pipes through which the blood is pumped

The blood is the fluid part that delivers oxygen and nutrients to various body organs

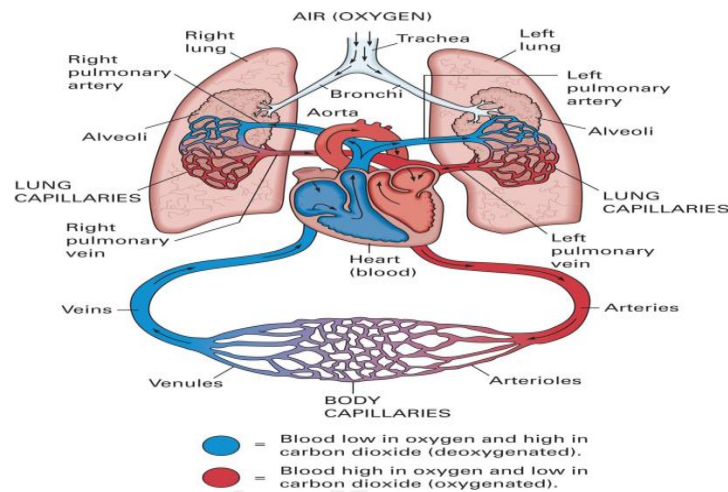


Figure 16 The cardiovascular system

2.3.2 Shock

Definition

It is a state of collapse and failure of cardiovascular system/ ineffective blood circulation

Causes

- Internal or external bleeding
- Multiple fractures
- Severe burn
- Severe diarrhoea
- Sepsis
- Anaphylactic reaction
- Spinal cord injuries ...

Sign and symptoms of shock

- Tachycardia
- Weakness, faintness, or dizziness at rest
- Thirst, Nausea or vomiting
- Cold, moist (clammy) skin
- Ashen, mottled, or cyanotic skin
- Shallow, rapid breathing
- Capillary refill in infants and children of more than 2 seconds
- Weak, rapid (thready) pulse, decreasing blood pressure
- Altered level of consciousness
- Falling blood pressure (< 90 mm Hg in an adult) (latter)
- Poor urinary output

Emergency care

- Ensure scene safety
- BSI precautions
- Assess and maintain airway, breathing and circulation
- Vascular access and start isotonic IV fluid (normal saline/Ringer lactate)
- If conscious lie the patient flat with legs elevated and, in recovery position if unconscious

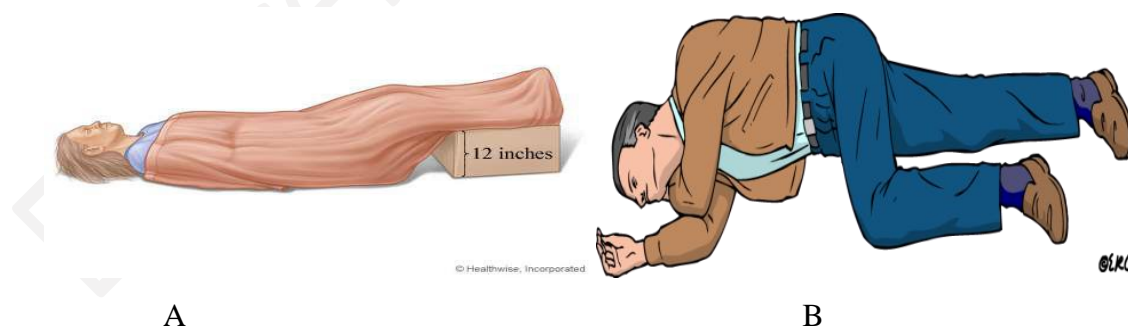


Figure 17 Positions for treatment of shock (A- conscious and, B-unconscious patients)

- Control external bleeding, stabilize fractures and treat injuries
- Reassure and monitor vital signs

- Give nothing by mouth
- Keep patient warm to maintain body temperature



Figure 18 Proper positioning for the maintainance of body temperature

2.4.8. Bleeding

A. External Bleeding

External bleeding is visible hemorrhage, including nosebleeds and bleeding from open wounds

Emergency care

- Ensure scene safety
- BSI precautions
- Assess and maintain ABC
- Control external bleeding
 - Direct Pressure: Gloved hand or dressing and bandage



Figure 19 Direct pressure

- Elevation: Raise extremity above the level of the heart



Figure 20 Elevation of the affected extremity

- Pressure Dressing: Use bandage to secure dressing in place



Figure 21 Pressure dressing

- Arterial Pressure Points
 - Upper extremity: Brachial, Radial
 - Lower extremity: Femoral, Popliteal

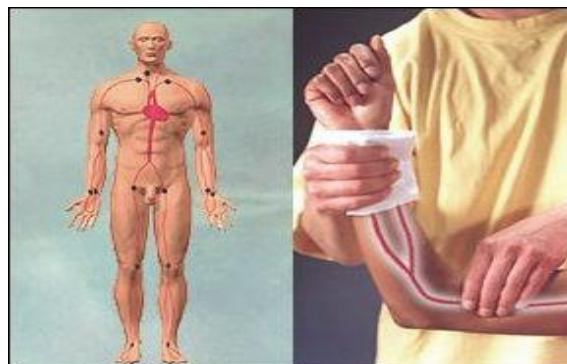


Figure 22 Arterial pressure points

- Apply Splints



Figure 23 Splinting as a mechanism of controlling bleeding

- Applying a tourniquet

It is considered a last resort with caution and if all the other measures fails

3-4" wide blood pressure cuffs can be used

Check neurovascular status below the wound frequently (skin color, sensation, movement)

Notify emergency personnel while transporting about the patient's condition



Figure 22 Blood pressure cuff as a tourniquet

Bleeding from the Nose (Epistaxis)

Steps to control epistaxis

- Follow BSI precautions
- Position the patient in sitting, leaning forward
- Advise the patient to clean the blood clot from his nose
- Ask him to breathe through his mouth and pinch the soft part of his nose for up to 10 minutes
- Apply covered ice over his nose
- Advise the victim not to speak, swallow, cough, spit or sniff
- After 10 minutes, release the pressure, if bleeding has not stopped, reapply the pressure for two further periods of 10 minutes
- Once the bleeding has stopped, and with the victim still leaning forward, clean around his nose with lukewarm water. Advise him to rest quietly for a few hours. Tell him to avoid exertion and, in particular, not to blow his nose, because this could disturb any clots
- Control bleeding from laceration and abrasion from surrounding structure with sterile dressing
- If the nosebleed is severe, or if it lasts longer than 30 minutes, arrange to take or send the patient to the hospital

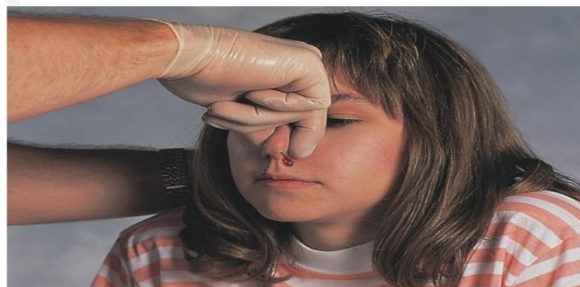


Figure 25 Controlling epistaxis

B. Internal Bleeding

Injury or damage to internal organs commonly results in extensive internal bleeding that leads to hypovolemic shock

Signs and symptoms

- Pain: the most common symptom of internal bleeding.
- Swelling in the area of bleeding
- Pain and distension: in intra-abdominal bleeding
- Bruising (Ecchymosis): Most common in head, extremity and pelvic injury
- Hematoma, Haematuria. Hematemesis, Haemoptysis...

Emergency care

- Make scene safe
- BSI precautions.
- Assess and maintain Air way, breathing and circulation
- Vascular access and start isotonic IV fluid to treat shock
- Give the patient nothing by the mouth
- Rapid transport of a patient to emergency facility

Annex II

A. Air Way Assessment And Management

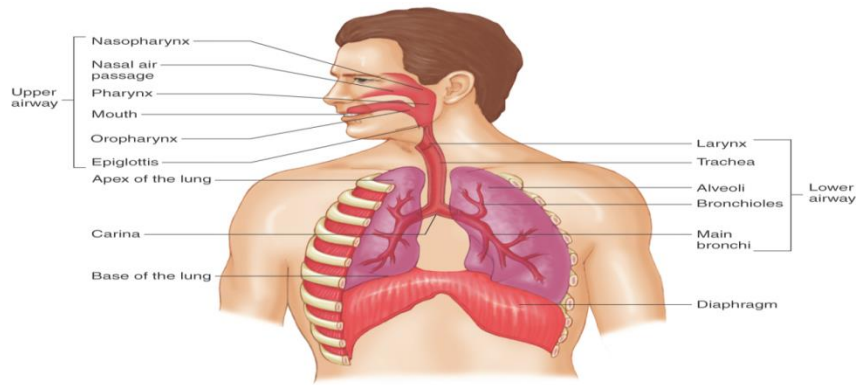


Figure 1 The Respiratory System

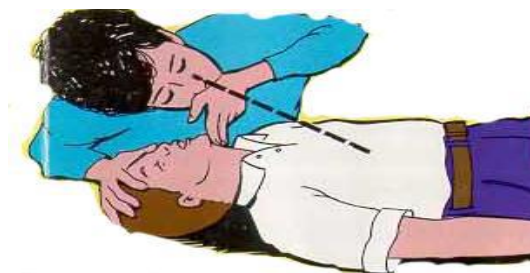


Figure 2 Head tilt-Chin lift maneuver



Figure 3 Jaw thrust maneuvers

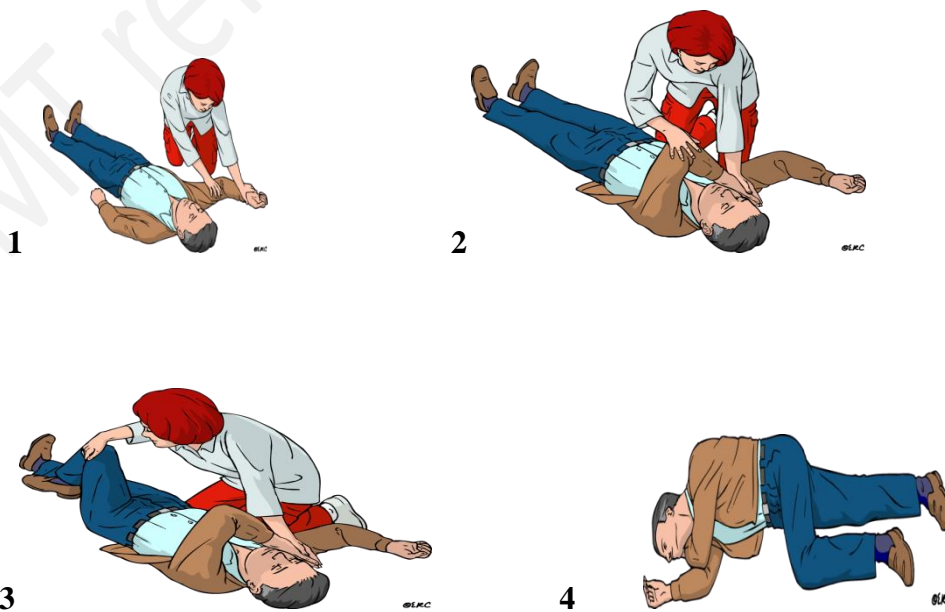


Fig 4 Steps of recovery position

Basic Airway adjuncts



Figure 5 Oropharyngeal airways



Figure 6 Measuring the size of oral airway

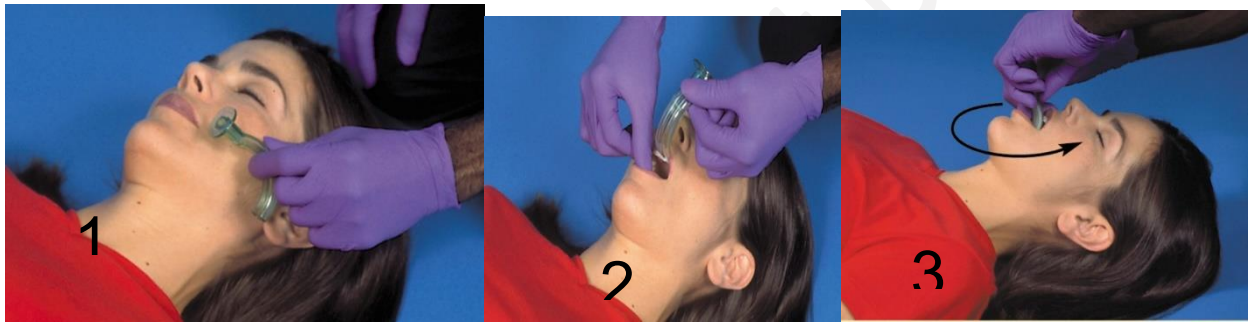


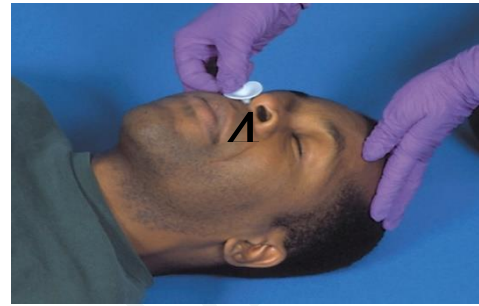
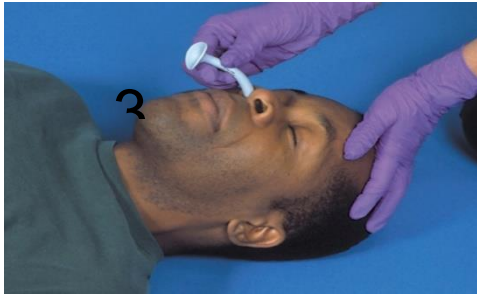
Figure 7 Steps of inserting oropharyngeal airway



Figure 8 Nasopharyngeal airway



Figure 9 Measuring the size of nasal airway



Figures 10 Steps of inserting nasopharyngeal airway

B. Breathing Assessment And Management



Figure 11 Breathing assessment

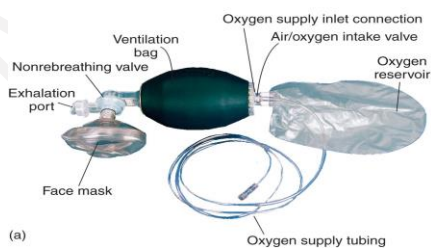


Figure 12 Bag valve masks (different size)

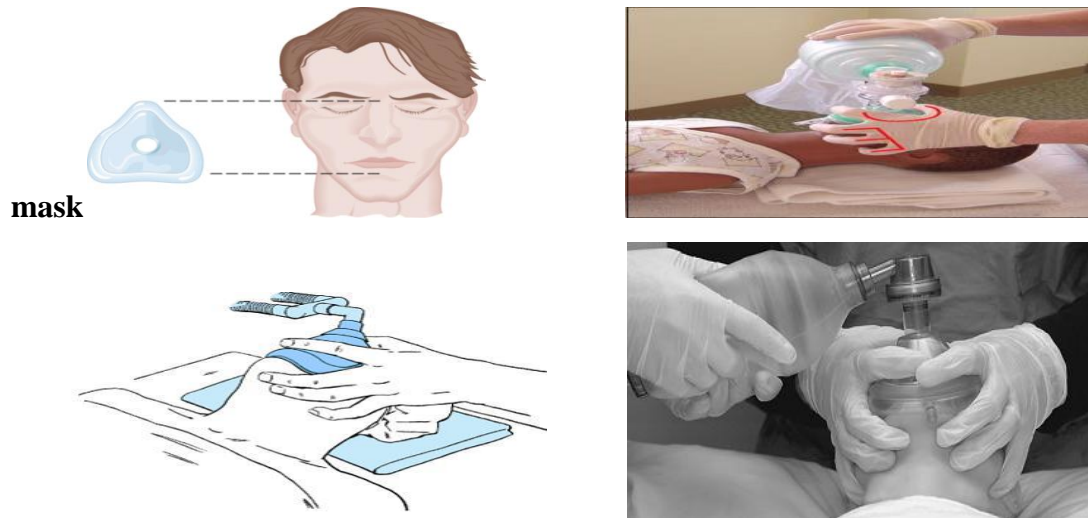


Figure 13 Techniques of BVM ventilation

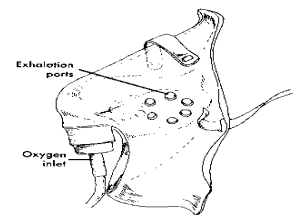
Oxygen delivery devices



Figure 14 Nasal cannula



Figure 15 Face masks (simple face mask and with reservoir)



C. Circulation Assessment and Management

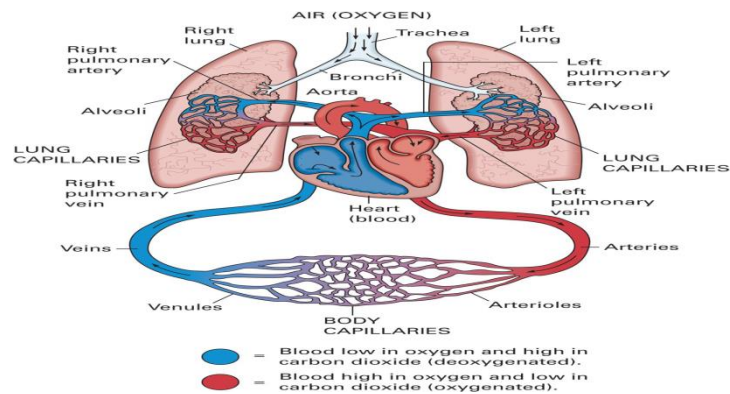


Figure 16 The cardiovascular system

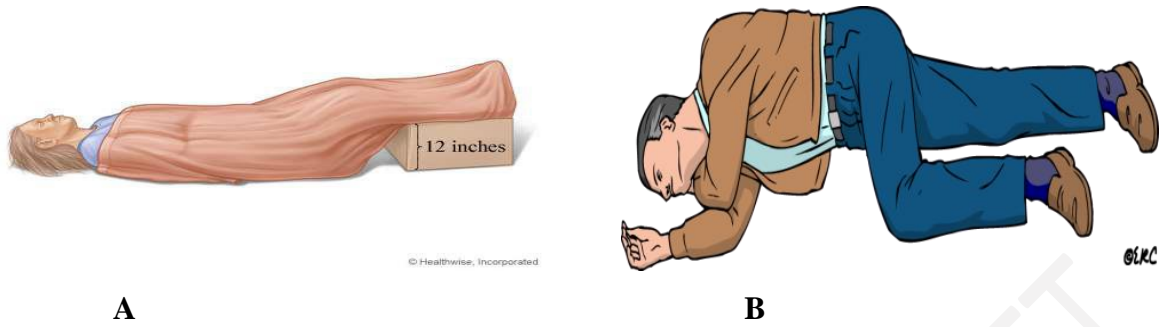


Figure 17 Positions for treatment of shock (A- conscious and, B- unconscious patients)



Figure 18 Proper positioning for the maintainance of body temperature

Control of external bleeding



Figure 19 Direct pressure extremity



Figure 20 Elevation of the affected



Figure 21 Pressure dressing

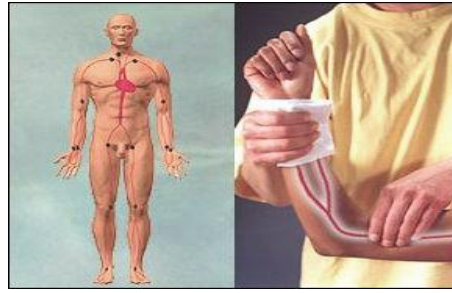


Figure 22 Arterial pressure points



Figure 23 Splinting as a mechanism of controlling bleeding



Figure 24 Blood pressure cuff as a tourniquet



Figure 25 Controlling epistaxis

Chapter Three

3. BASIC LIFE SUPPORT

Chapter Description:

Basic Life Support (BLS) refers to the care healthcare providers and public safety professionals provide to patients who are experiencing respiratory arrest, cardiac arrest or airway obstruction. BLS includes psychomotor skills for performing high-quality cardiopulmonary resuscitation (CPR), using an automated external defibrillator (AED) and relieving an obstructed airway for patients of all ages

Teaching Method

- PowerPoint Presentation
- Skills Stations

Allocated Time 2 hr

Chapter Objective

At the end of this session, participants will be able to Identify sudden cardiac arrest in out of hospital set up and follow basic life support steps in order to save lives.

Enabling Objectives

- Describe the aims of BLS
- Apply the BLS aspect of chain of survival
- Describe the steps of BLS
- Perform effective CPR
- Demonstrate the appropriate use of an AED
- Describe the technique of removing foreign body in adult, child and infant

Session outline

This chapter has the following sessions:

- Chain of survival
- Adult BLs steps
- Pediatrics BLS steps
- BLS in Pregnant mother
- Foreign body air way obstruction in Adult, children and infant

People often use the terms cardiac arrest and heart attack interchangeably, but they are not the same

- **Sudden cardiac arrest** occurs when the heart develops an abnormal rhythm and can't pump blood.
- **A heart attack** occurs when blood flow to part of the heart muscle is blocked.

CPR is a skill, which includes artificial respiration to provide oxygen to the lungs and It includes chest compressions and ventilations as well as the use of an automated external defibrillation to maintain blood flow through the body enough to give a person a chance for survival.

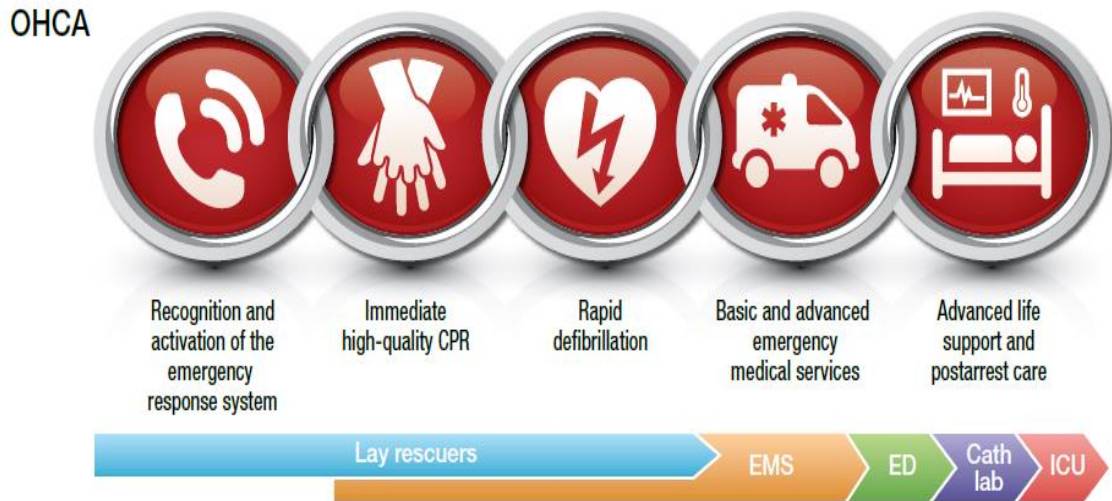
The main components of CPR are :

- **Chest compressions**
- **Airway**
- **Breathing**

3.2. Cardiac Chain of Survival

The Chain of Survival summarizes the vital links needed for successful resuscitation. Most of these links apply to victims of cardiac arrest.

Fig.4.1 chain of survival.



BLS Healthcare Provider Adult Cardiac Arrest Algorithm

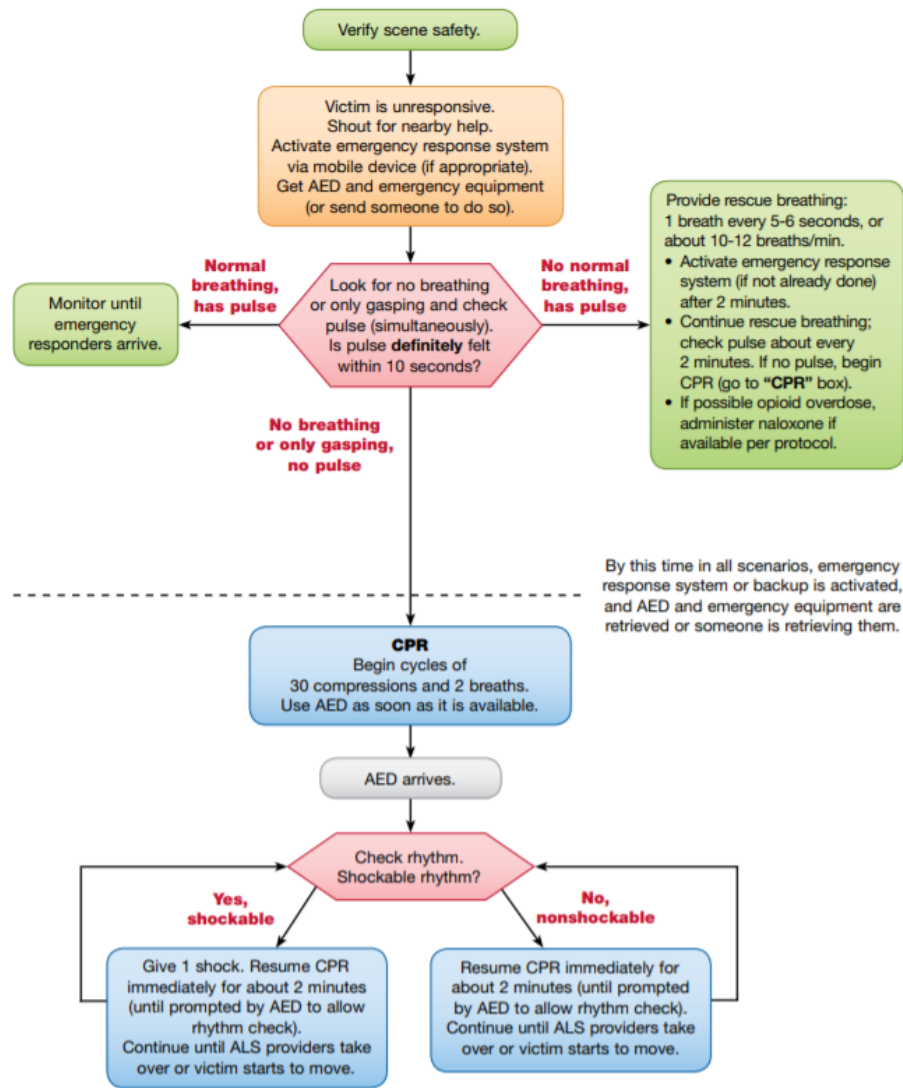


Fig 4.2 BLS Healthcare Provider Adult Cardiac Arrest Algorithm

3.3. Adult Rescuer BLS Sequence

The sequence of steps for the initial assessment and treatment of the unresponsive victim are as below. If the patient is unresponsive with abnormal or absent breathing, the emergency dispatcher has to assume that the patient is in cardiac arrest

Step 1 Scene Safety

- Make sure the scene is safe for you and the victim
- Wear PPE (gloves, apron, mask) if available Look out for blood spills, sharps, electric wires etc)

Step 2 Check for Responsiveness

- Check for responsiveness. Tap the victim's shoulder and shout, "Are you OK?"

Step 3 Get Help

- If the victim is not responsive, shout for nearby help.
- Activate the EMS, call 9-3-9, notify advanced life support.
- If you are alone, get the AED/defibrillator and emergency equipment.
- If someone else is available, send that person to get it

Step 4 Assess for Breathing and Pulse

- check for breathing and a carotid pulse at the same time
- for at least 5 but no more than 10 seconds.



Fig 4.3 checking pulse and breathing

1. If the victim is breathing normally and a pulse is present

- Monitor the victim
2. If the victim is not breathing normally but a pulse is present
 - Give 1 ventilation every 5 to 6 seconds for an adult patient, with each ventilation lasting about 1 second and making the chest rise
 3. If the victim is not breathing normally or is only gasping and has no pulse
 - Begin high-quality CPR

Step 5 Start Chest Compressions

1. Position yourself at the victim's side.
2. Make sure the victim is lying face up on a firm, flat surface. If the victim is lying face-down, carefully roll him face up. If you suspect the victim has a head or neck injury, try to keep the head, neck, and torso in a line when rolling the victim to a face up position.
3. Position your hands and body to perform chest compressions:
 - Put the heel of one hand in the centre of the victim's chest, on the lower half of the breastbone (sternum)
 - Put the heel of your other hand on top of the first hand.
 - Straighten your arms and position your shoulders directly over your hands.
4. Give chest compressions at a rate of 100 to 120/min.
5. Press down at least 2 inches (5 cm)
6. At the end of each compression, make sure you allow the chest to recoil completely.
7. Minimize interruptions of chest compressions
8. Compression to ventilation: 30:2 for adult (for both and single rescuer)

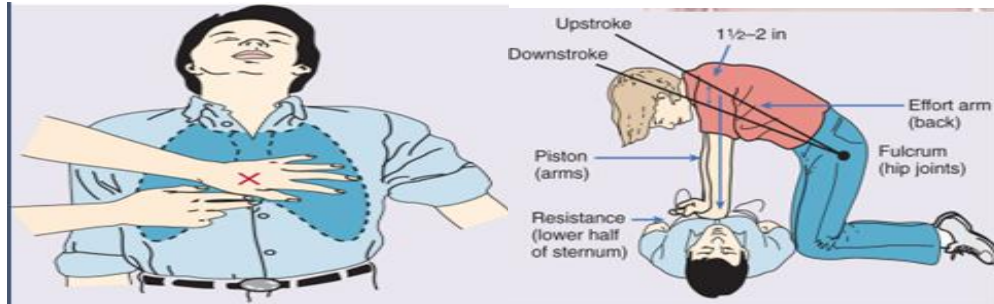


Fig.4.4 chest compression

Step 6 Open Air way and give rescue breathing

Opening the airway using

- Head tilt–chin lift
- Jaw thrust



Fig 4.5 head tilt - chin lift and Jaw thrust

Using pocket mouth/protective device

1. Position yourself at the victim's side.
2. Place the pocket mask on the victim's face, using the bridge of the nose as a guide for correct position.
3. Seal the pocket mask against the face.
4. Deliver each breath over 1 second, enough to make the victim's chest rise.

Using BVM

1. Position yourself directly above the victim's head.
2. Place the mask on the victim's face, using the bridge of the nose as a guide for correct position.

3. Use the C and E technique to hold the mask in place while you lift the jaw to hold the airway open
4. Perform a head tilt.
5. Place the mask on the face with the narrow portion at the bridge of the nose.
6. Use the thumb and index finger of one hand to make a “C” on the side of the mask, pressing the edges of the mask to the face.
7. Use the remaining fingers to lift the angles of the jaw (3 fingers form an “E”), open the airway, and press the face to the mask.
8. Squeeze the bag to give breaths (1 second each) while watching for chest
9. Deliver each breath over 1 second, whether or not you use supplementary oxygen.
10. Avoid hyperventilation

Step 7 Defibrillation using AED or manual

1. Power on the AED
 - Some devices will “power on” automatically when you open the lid or case.
 - Follow the AED prompts as a guide to next steps.
2. Attach AED pads to the victim’s bare chest.
 - Follow the placement diagrams on the AED
 - Attach the AED connecting cables to the AED device
3. “Clear” the victim and allow the AED to analyze the rhythm
 - The AED may take a few seconds to analyze.
 - The AED then tells you if a shock is needed.

If the AED advises a shock, it will tell you to clear the victim and then deliver a shock.

 - Clear the victim before delivering the shock: be sure that no one is touching the victim.
 - Loudly say “Everybody clear”
 - Look to be sure that no one is in contact with the victim.

- Press the shock button
 - The shock will produce a sudden Jerk of the victim's muscles.
4. If no shock is needed, and after any shock delivery, immediately resume CPR, starting with chest compressions.
 5. After about 5 cycles or 2 minutes of CPR, the AED will prompt you to repeat No. 3.

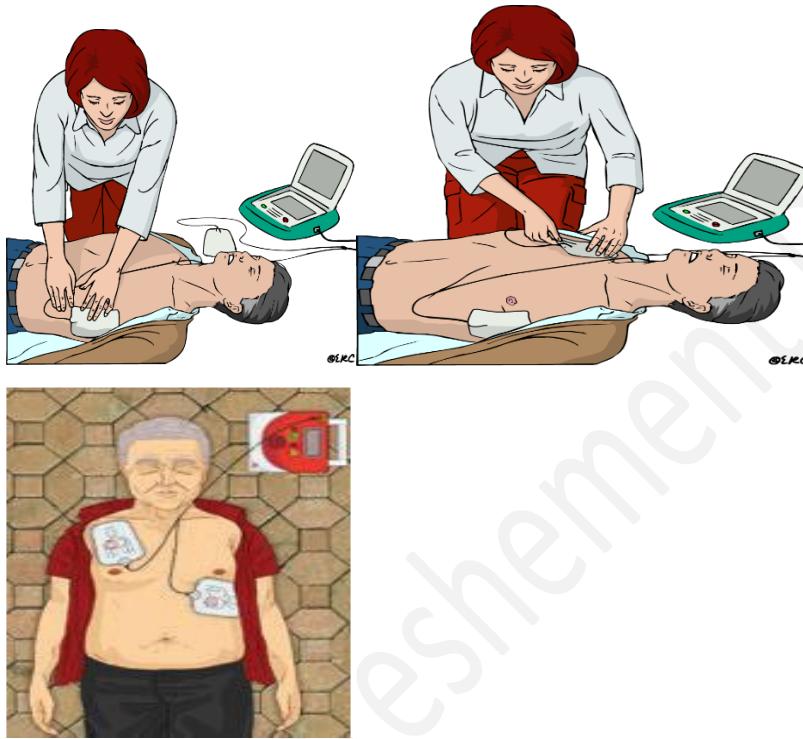


Fig. 4.6 AED pad Attachment

Special circumstances on attaching AED Victim who has:-

- A. Has a hairy chest
 - shave the area
- B. Is immersed in water or has water covering the chest
 - wipe the chest before attaching the AED pads
- C. Has an implanted defibrillator or pacemaker
 - If possible, avoid placing the AED pad directly over the implanted device.

- D. Has a transdermal medication patch or other object on the surface of the skin where the AED pads are to be placed
- Do not place AED pads directly on top of a medication

Step 8 Reassessment

After every 5 cycles or 2 minutes of CPR, HCP shall check for normal breathing and pulse

Do not stop resuscitation until:

- Victim recovers with normal breathing.
- HCP is exhausted.
- Assistance arrives to take over CPR.

NB. To avoid fatigue, the person applying chest compression should be switched every 5cycles or 2minutes

Step 9 Recovery position

- If you are certain the victim is breathing normally but is still unresponsive, place the victim in the recovery position.
- Check breathing Regularly



Fig. 4.7 Recovery position

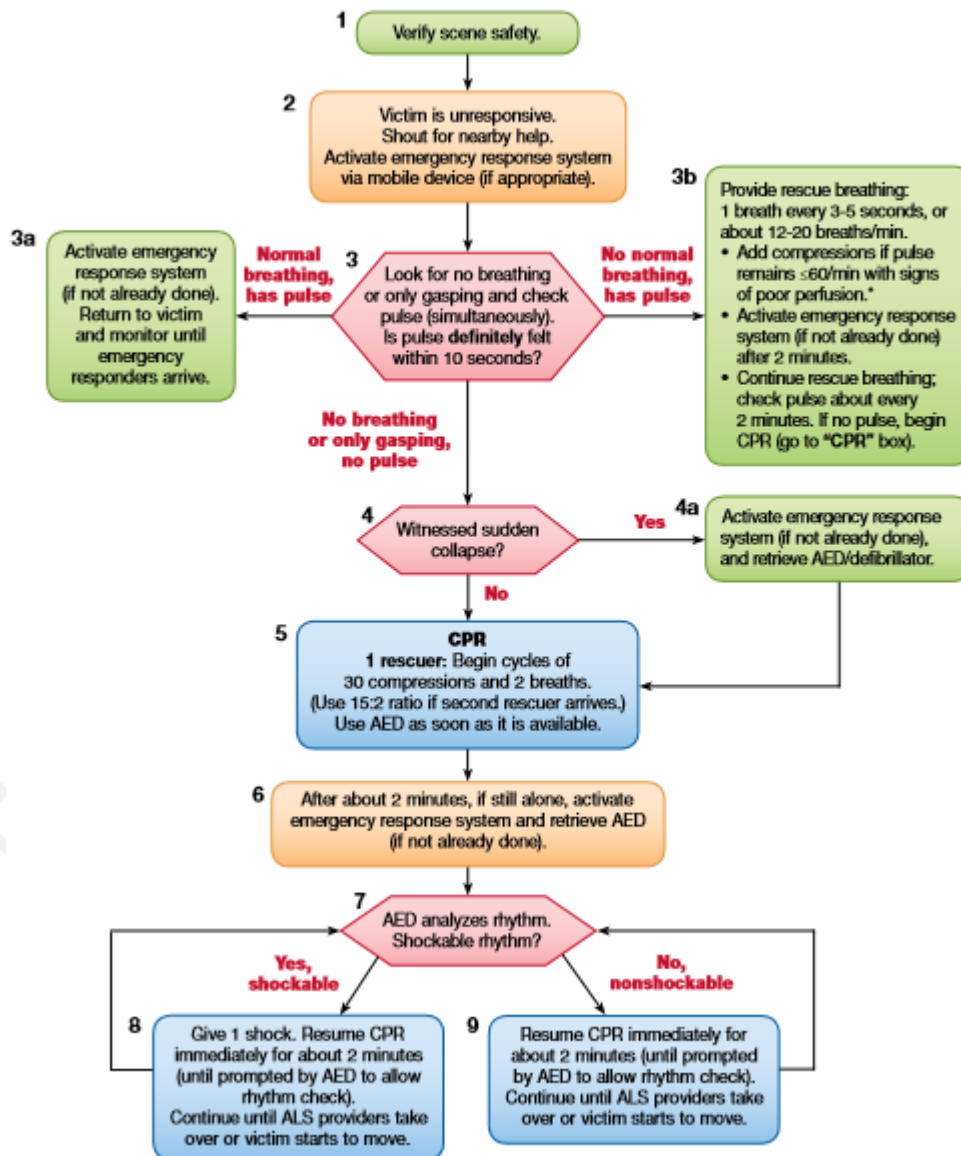
3.3. BLS for Infants and Children

The majority of paediatric cardiorespiratory arrests are mostly caused by respiratory insufficiency but not due to primary cardiac problem. Ventilation is a very important component of CPR in children.

The following age definitions are used in BLS:

- Children are from 1 year of age to puberty.
- Infants are less than 1 year of age (excluding the newly born).

BLS Healthcare Provider Pediatric Cardiac Arrest Algorithm for the Single Rescuer—2015 Update



Signs of poor perfusion may include cool extremities, decrease in responsiveness, weak pulses, paleness, mottling (patchy skin appearance), and cyanosis (turning blue).

Step 1 Scene Safety

- Make sure the scene is safe for you and the victim

Step 2 Check for Responsiveness

- Check for responsiveness. Tap the child's shoulder or the heel of the infants foot and shout, "Are you OK?"

Step 3 Get Help

- If the child is not responsive, shout for nearby help.
- Activate the EMS, call 9-3-9, notify advanced life support.
- If you are alone, get the AED/defibrillator and emergency equipment.
- If someone else is available, send that person to get it

Step 4 Assess for Breathing and Pulse

- To check for breathing look for chest rise and fall no more than 10 sec.
- **To perform a pulse check in an infant, palpate a brachial pulse**

If the victim is breathing normally

- Monitor the victim

If the victim is not breathing normally or is only gasping and has no pulse

Begin high-quality CPR



Fig 4.8 pulse check

Step 5 Begin High-Quality CPR, Starting With Chest Compressions

Child 1 or 2 hands (whatever is needed to provide compressions of adequate depth)

- The compression-to-ventilation ratio for single rescuers is the same (30:2) in adults, children, and infants.
- If 2 rescuers are present for the resuscitation attempt of an infant or child, use a compression-to-ventilation ratio of 15:2

Infant 2-finger chest compressions

Compress at least one third the AP diameter of the infant's chest (about 1½ inches [4 cm]).



Step 6 .Open the air way and Give to 2 rescue breath

As discussed in Opening the Airway in BLS for Adults,”

head tilt– chin lift and jaw-thrust maneuvers.

- Do not push on the soft tissues under the chin as this may block the airway
- Keep Head in Neutral Position (Do not hyperextend the infant's neck)
- Use age appropriate face mask and BVM



Sniffing position in child

Step 7 Attach the AED

AED for Infants and Children

A. Victims 8 Years of Age and Older

- Use adult pads. Do not use child pads

B. Victims Less Than 8 Years of Age

- Use child pads
- In situation in which there is no AED with a pediatric dose-attenuator system, the HCP may use an adult AED



**Pads placement in infant
(antero-posterior)**

Step 8 Re assessment

Look Adult BLS

3.4. BLS for Pregnant Mother

Cardiac arrest in pregnancy is one of the most challenging clinical scenarios. resuscitation of a collapsed pregnant woman whose GA prior to 22-24 weeks follows adult Basic and Advanced Life Support algorithms.

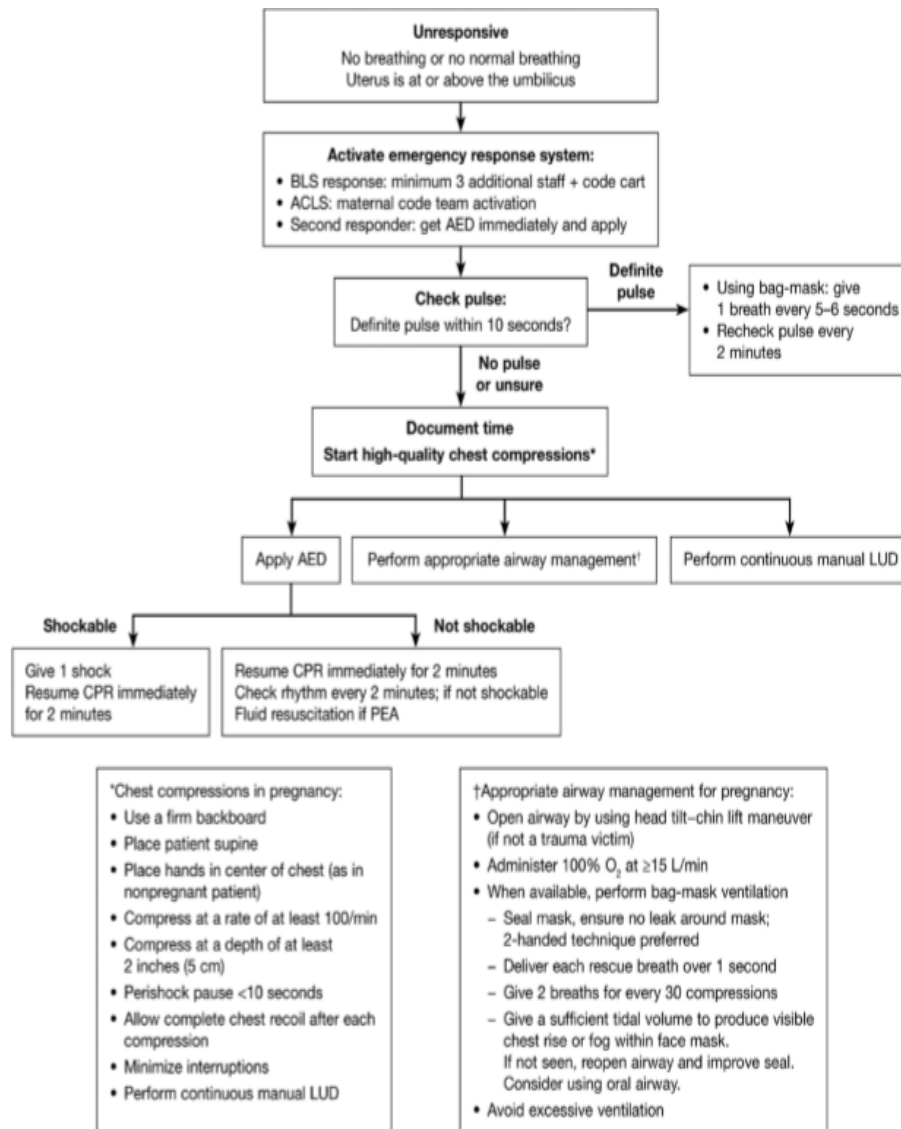
most features of resuscitating a pregnant woman are similar to adult resuscitation, some parts are uniquely different. The most obvious difference is that

1. There are 2 patients, the mother and the fetus
2. Rapid notification of the response team
3. Manual leftwards displacement of the uterus using external pressure can be employed
4. Document the time when pulselessness was confirmed
5. A member of the first responder team should perform bag-mask ventilation with 100% oxygen flowing to the bag at a rate of at least 15 L/ min
6. Two-handed bag-mask ventilation is preferred



Figure 4. Manual left uterine displacement by the 2-handed technique from the left of the patient.

EMT refreshment DRAFT



Cardiac arrest in pregnancy in-hospital basic life support (BLS) algorithm:
 Simultaneous C-A-B-U (chest compressions/current airway-breathing-uterine displacement). ACLS indicates advanced cardiovascular life support; AED, automated external defibrillator; CPR, cardiopulmonary resuscitation; LUD, left uterine displacement; and PEA, pulseless electric activity.

3.5. FOREIGN BODY AIRWAY OBSTRUCTION (FBAO) or CHOKING

Adults, Children, Infants and pregnant

Choking is an uncommon but potentially treatable cause of accidental death. As most choking events are associated with eating, they are commonly witnessed. As victims are initially conscious and responsive, early interventions can be life-saving.

A patient who cannot cough, speak, cry or breathe requires immediate care.

Choking can be classified in to:

- Mild obstruction
- Severe obstruction

1. Mild Obstruction

Sign:-

- Good air exchange
- Can cough forcefully
- Can speak

Actions

- encourage the victim to continue coughing.
- Do not interfere with the victim's own attempts to relieve the obstruction, but stay with the victim and monitor the condition.
- If mild airway obstruction continues or progresses to signs of severe airway obstruction, activate the emergency response system

2. Severe airway obstruction

Signs

- Clutching the throat with the thumb and fingers, making the universal choking sign
- Unable to speak or cry
- Poor or no air exchange
- Weak, ineffective cough or no cough at all
- High-pitched noise while inhaling or no noise at all

- Increased respiratory difficulty
- Possible cyanosis



Fig 4. Universal sign of choking

Actions

- If the victim is an adult or child, ask him if he is choking. If the victim nods “yes” and cannot talk, severe airway obstruction is present.
- Take steps immediately to relieve the obstruction
- If you are not alone, send someone to activate the EMS.

Steps

1. Stand or kneel behind the victim and wrap your arms around the victim’s waist
2. Make a fist with one hand.
3. Place the thumb side of your fist against the victim’s abdomen, in the midline, slightly above the navel and well below the breastbone.
4. Grasp your fist with your other hand and press your fist into the victim’s abdomen with a quick, forceful upward thrust.
5. Repeat thrusts until the object is expelled from the airway or the victim becomes unresponsive.
6. Give each new thrust with a separate, distinct movement to relieve the obstruction.
7. If the victim is pregnant or obese, perform chest thrusts instead of abdominal thrusts

8. If severe airway obstruction continues and the victim becomes unresponsive, start CPR.



Choking Relief in an Unresponsive Adult or Child

1. Shout for help. activate the EMS
2. Gently lower the victim to the ground if you see that he is becoming unresponsive.
3. Begin CPR, starting with chest compressions. **Do not check for a pulse.**
4. Each time you open the airway to give breaths, open the victim's mouth wide. Look for the object.
 - If you see an object that can be easily removed, remove it with your fingers.
 - If you do not see an object, continue CPR.
5. After about 5 cycles or 2 minutes of CPR, activate the EMS if someone has not already done so.

Choking Relief in Infants

1. Kneel or sit with the infant in your lap.
2. If it is easy to do, remove clothing from the infant's chest.
3. Hold the infant facedown with the head slightly lower than the chest, resting on your forearm. Support the infant's head and jaw with your hand. Take care to avoid compressing the soft tissues of the infant's throat. Rest your forearm on your lap or thigh to support the infant.
4. Deliver up to 5 back slaps forcefully between the infant's shoulder blades, using the heel of your hand. Deliver each slap with sufficient force to attempt to dislodge the foreign body.
5. After delivering up to 5 back slaps, place your free hand on the infant's back, supporting the back of the infant's head with the palm of your hand. The infant will be adequately cradled between your 2 forearms, with the palm of one hand supporting the face and jaw while the palm of the other hand supports the back of the infant's head.
6. Turn the infant as a unit while carefully supporting the head and neck. Hold the infant faceup, with your forearm resting on your thigh. Keep the infant's head lower than the trunk.
7. Provide up to 5 quick downward chest thrusts in the middle of the chest, over the lower half of the breastbone (the same location as for chest compressions during CPR). Deliver chest thrusts at a rate of about 1 per second, each with the intention of creating enough force to dislodge the foreign body.
8. Repeat the sequence of up to 5 back slaps and up to 5 chest thrusts until the object is removed or the infant becomes unresponsive.



Choking Relief in Infants

1. Shout for help. activate the EMS. Place the infant on a firm, flat surface.
2. Begin CPR (starting with compressions) with 1 extra step: each time you open the airway, look for the object in the back of the throat. If you see an object and can easily remove it, remove it.

Note that you do not check for a pulse before beginning CPR.

3. After about 2 minutes of CPR, activate the emergency response system (if no one has done so).

N.B Do not perform a blind finger sweep, because it may push the foreign body back into the airway, causing further obstruction or injury

CHAPTER FOUR:

4. MEDICAL EMERGENCIES

Chapter description

This is a training that gives the trainee the opportunity to learn the knowledge and skills that are crucial for the recognition, diagnosis and management of patients with Acute Asthma/Chronic Obstructive Pulmonary Disease, Pneumonia, Pulmonary Embolism (PTE), acute heart failure with pulmonary edema, hypertensive emergencies, heart attack cardiac arrest, DKA and hypoglycemia, Seizures status epileptics and . Approach to a poisoned patient is also included in this chapter. It is organized in different teaching methods.

Chapter Objective

At the end of this chapter participants will be able to:

- Asses and manage common medical emergencies encountered in the facility.

Enabling objective: -

At the end of the session, participants will

- Describe Emergency management of patients with acute asthmatic exacerbation and CO₂ pneumonia and PTE
- Describe Emergency management of patients with heart failure and pulmonary edema
- Hypertensive emergencies and stroke
- Describe Emergency management of cardiac arrest patients with ACS
- Describe Emergency management of patients with DKA and hypoglycemia
- Describe Emergency management of patients with acute poisoning
- Describe Emergency management of Neurologic emergencies

Session out line;

Sessions 4.1: Respiratory Emergencies

Sessions 4.1.1: Asthma and Chronic Obstructive Disease (COPD)

Sessions 4.1.2: Pulmonary Embolism (PTE)

Sessions 4.1.3. Pneumonia

Sessions 4.2: Cardiovascular Emergencies

Sessions 4.2.1: Heart Failure & Pulmonary Edema

Sessions 4.2.2: Hypertensive Emergencies

Sessions 4.2.3: Heart attack/Acute Myocardial Infraction

Sessions 4.2.4: Cardiac Arrest.

Sessions 4.3: Diabetic Emergency

Sessions 4.3.1: Diabetes ketoacidosis (DKA)

Sessions 4.3.2: Hypoglycemia

Session 4.4: Poisoning Emergency

Sessions 4.5: Neurologic Emergency

Sessions 4.5.1: Coma

Sessions 5.12: Seizures

sessions 4.1:

4.2. Respiratory Emergencies

Sessions 4.1.1: Asthma and Chronic Obstructive Disease (COPD)

Introduction

Respiratory emergency is one in which normal breathing stops or in which breathing is reduced so that oxygen intake is insufficient to support life. In condition where a person's breathing is so impaired, life is threatened because of lack or insufficient oxygen which is vital for life. Therefore, a person who has difficulty in breathing is always in respiratory emergency. Difficulty in breathing is often a symptom of many different conditions, such as Bronchial asthma, COPD (chronic obstructed pulmonary disease), Pulmonary embolism, Pneumonia etc.

Asthma is a chronic inflammatory condition of the airways resulting in hyper responsiveness of the airways to various stimuli. This leads to excessive narrowing of the airways with reduced airflow and symptoms of dyspnea and wheezing. COPD refers to triad of disease processes: Asthma (airway reactivity), Bronchitis (airway inflammation), Emphysema (airway collapse), All 3 coexist to some degree in same pt. COPD may result from lung and airway damage from repeated infections or inhalation of toxic agents, most often from cigarette smoke.

Anatomy Review

- **Nose and mouth**
- **Pharynx**
 - Oropharynx

- Nasopharynx
- **Epiglottis** – a leaf-shaped structure that prevents food and liquid from entering the trachea during swallowing
- **Trachea (windpipe)**
- **Cricoid cartilage** – firm cartilage ring forming the lower portion of the larynx
- **Larynx (voice box)**
- **Bronchi** – two major branches of the trachea to the lungs. Bronchus subdivides into smaller air passages ending at the alveoli
- **Alveoli** – site of oxygen and carbon dioxide exchange

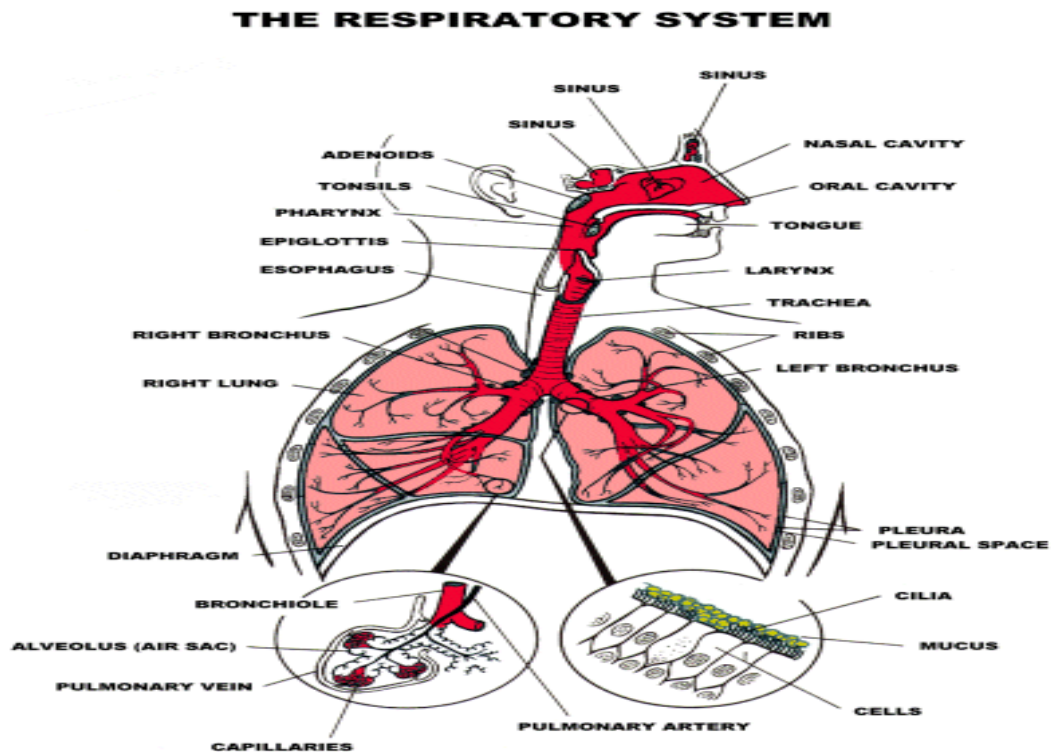


Fig.5.1 Anatomy of upper and lower respiratory system

Adequate Breathing

- ✓ Normal rate and depth,
- ✓ Regular breathing pattern

- ✓ Good breath sounds on both sides of lungs
- ✓ Equal chest rise and fall
- ✓ Pink, warm, dry skin

Difficulty's in Breathing

- ✓ **Breathing rate < 10 or > 25**
- ✓ **Shallow or irregular respirations**
- ✓ **Unequal chest expansion**
- ✓ **Decreased or absent lung sounds**
- ✓ **Accessory muscle usage**
- ✓ **Pale or cyanotic skin color**

Asthma can be triggered by: Several stimuli trigger airway narrowing, wheezing, and dyspnea in asthmatic patients

- ✓ Allergens
- ✓ upper respiratory tract infections
- ✓ exercise and hyperventilation, chest infections (viral or bacterial),
- ✓ cold air, irritant gases, sulfur dioxide, drugs (B blockers, aspirin), Stress, irritants
-household sprays, paint fumes.

The risk factors increasing the risk of severe life-threatening asthma include

- ✓ Previous ventilation and Hospital admission for asthma in the last year.
- ✓ Heavy rescue medication use.
- ✓ Repeated attendances at an emergency room for asthma care Presentation
- ✓ Patients with Characteristic symptoms of dyspnea, cough productive of whitish sputum, chest tightness, and wheezing.
- ✓ Acute attacks may build up over minutes, hours, or days and the patients may deteriorate very rapidly and present as respiratory or cardio-respiratory arrest

Characteristics defining a patient in imminent arrest

- ✓ Wheezing/ No wheezing
- ✓ Cough
- ✓ Accessory muscle use
- ✓ May have history of asthma/COPD,
- ✓ Allergies or smoking
- ✓ Unable to walk
- ✓ Drowsy or confused
- ✓ Has paradoxical chest movements
- ✓ Bradycardia

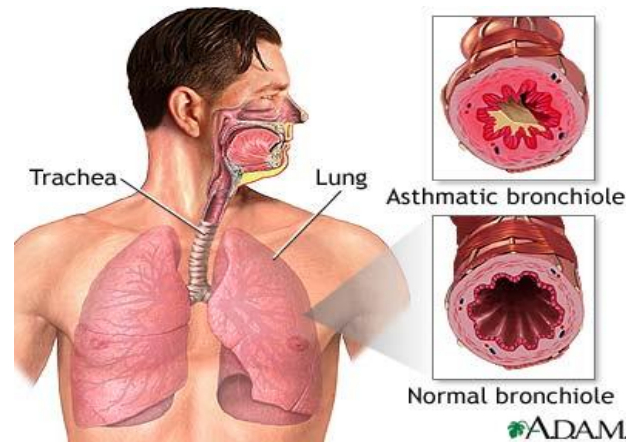


Fig. 5.2 narrowing of

bronchial tubes

Specific Emergency Care Measure

- Assess patient (ABCDE) and manage accordingly.
- Administer supplemental oxygen.
- Allow the patient to sit in upright position.
- Suction large amount of mucus, if suction machine available
- Assess vital signs.
- **If patient is COPD** give high pressure oxygen
- Assist with inhaler bronchodilator drugs :
- Salbutamol/Albuterol Puff: 4-8 puffs Q 20 min for up to 4 hours, then Q 1-4 hours as needed. Use a spacer for effective improvement.

4.1.2: Pulmonary Embolism (PTE)

Part of pulmonary circulation is blocked and embolus reaches to an area that is too narrow to pass through and lodges in the pulmonary circulation.

Blood does not pass alveoli and do not exchange gases .Embolus usually originates in lower extremities or pelvis

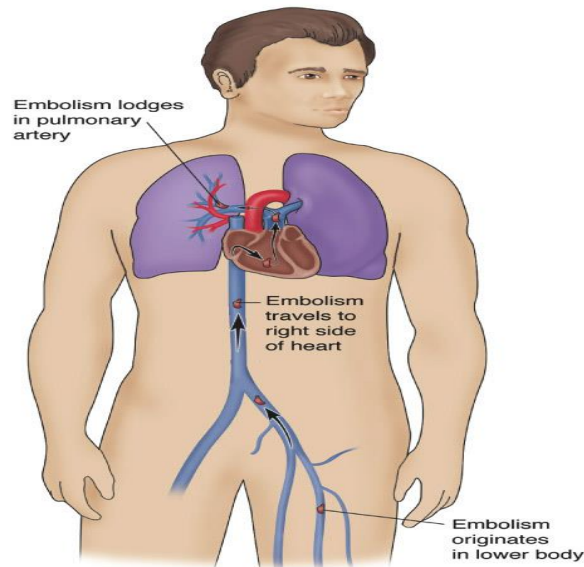


Fig..5.3. Origen and traveling of embolism

Risk factors of PTE

Hemostasis or DVT, recent surgery or trauma, long bone fractures (lower) oral Contraceptives, pregnancy, smoking, air amniotic fluid and cancer are the most common risks.

Signs & Symptoms

- Rapid Onset,
- **dyspnea**, tachycardia, tachypnea early
- **pleuritic pain**, coughing wheezing and
- **Hemoptysis** (rarely).Large Emboli would have Shock (obstructive) and finally cardiac arrest

Emergency Management

- **Asses airway & breathing**
 - Give high pressure consented O₂

- Consider early transferring.
- **Circulation:** Check signs of shock, if signs of shock
 - Give IV fluids as required
 - Early referral to higher health organizations

4.1.3: Pneumonia

Is an inflammatory process of the lung parenchyma that is commonly caused by infectious agents.

Pneumonia: classification based on Etiology

- Viral, Bacterial, Fungi (pneumocystis)
- Aspiration, chemical

Classification of pneumonia; According to areas involved

- **Lobar pneumonia; if one or more lobes are involved**
- **Broncho-pneumonia; the pneumonic process has originated in one or more bronchi and extends to the surrounding lung tissue**

Ways how you get pneumonia include:

- Hematogenous
- **Bacteria and viruses** living in your nose, sinuses, or mouth may spread to your lungs.
- **Inhalation** - You may breathe some of these germs directly into your lungs (droplets infection).
- **Aspiration** -You breathe in (inhale) food, liquids, vomit, or fluids from the mouth into your lungs (aspiration pneumonia).

Predisposing factors:

- Immune-suppressed patients,
- cigarette smoking,
- chronic lung disease ,difficult swallowing (due to stroke, dementia, Parkinson's disease, or other neurological conditions)

- Impaired consciousness (loss of brain function due to dementia, stroke, or other neurological conditions),
- Frequent suction ,recent cold, laryngitis or flu

Sign and symptoms:

- Shortness of breath,
- Dyspnea ,Fever, chills
- Pleuritic Chest Pain,
- Tachycardia, Productive cough

Emergency management

- **Scene safety**
- **PPE**
- **Asses patients condition and give**
- Oxygen,
 - IV Access & Rehydrate
 - Antipyretics
 - Urgent referral Rarely is intubation required

General management for respiratory emergencies with difficulty of breathing

If difficulty of breathing is associated with:

- suspected **airway inflammation or burns**:
 - Keep patient calm
 - Give OXYGEN if it does not upset the patient
 - If patient is alert without other injuries, seated upright may make the patient more comfortable
 - Consider early advanced airway management AND PLAN for rapid HANDOVER/TRANSFER
- **choking**:
 - Use age-appropriate chest thrusts/abdominal thrusts/back blows
 - In infants, alternate between 5 back blows and 5 chest thrusts

- **Allergic reaction:**
 - Remove allergen
 - For severe allergic reaction with difficulty breathing
 - Give intramuscular ADRENALINE without delay and Give OXYGEN
- **Asthma/COPD**
 - Give SALBUTAMOL
 - Give OXYGEN if indicated and early transfer.
- **Heart attack:**
 - Give ASPIRIN
 - With symptoms of shock or difficulty breathing give OXYGEN and urgent transfer
- **Diabetic ketoacidosis (DKA):**
 - Give IV FLUIDS
 - Prepare for urgent transfer
- **Opioid overdose**
 - Support breathing with a BAG-VALVE-MASK as needed
 - Give NALOXONE
- **Trauma:**
 - Give OXYGEN
 - If tension pneumothorax or cardiac tamponade give IV FLUIDS
 - If tension pneumothorax is suspected perform NEEDLE DECOMPRESSION as soon as possible
 - Prepare for rapid transfer for chest tube insertion
 - Treat sucking chest wounds with a 3-sided occlusive dressing
 - Prepare for rapid transfer for chest tube insertion

Session 4.2:

4.2. Cardiac Emergencies

Session 4.2.1: Heart Failure & Pulmonary Edema

Introduction

Occurs when the ventricular heart muscle is so damaged that it can no longer keep up with the return flow of blood from the atria. Blood backs up in the pulmonary veins, increasing the pressure in the lung capillaries. Fluid (mostly water) passes through the walls of the capillary vessels and into the alveoli, a condition called pulmonary edema. It occurs most frequently in left sided heart failure

Common underlying causes of heart failure include

- Structural, functional disorders impairing systolic and/or diastolic function
- **Valvular heart disease**
- **Ischemic heart disease**
- **Congenital heart disease**
- **Cardiomyopathy**, Pericardial disease
- Thyrotoxicosis, anemia

Types of Heart failure

Right-sided heart failure: presents with bilateral leg swelling, ascites, and hepatomegaly

Left-side heart failure: presents with pulmonary edema. In general, they occur together though they could as well present separately. Heart failure can complicate with pulmonary edema occurs due to fluid leak into the interstitial of the lungs and alveoli during severe heart failure, most frequently in left-sided heart failure.

Pulmonary edema is characterized by

- Shortness of breath, dyspnea and orthopnea, hemoptysis
- anxiety, tachypnea, and tachycardia.
- productive cough (frothy sputum),
- wheezing.

Common precipitating factors

- anemia
- thyrotoxicosis
- arrhythmia
- drug discontinuation
- salt intake
- infection
- Spontaneous bacterial endocarditis
- uncontrolled hypertension
- Acute MI
- Drugs.

Emergency management of heart failure and pulmonary edema

- Ensure sane safety
- Stabilizing ABC's
- Give oxygen by non-breather mask with an oxygen flow of 10 to 15L/min.
- Elevate head of bed, Avoid IV fluids unless in shock
- Asses level of consciousness
- Be Reassuring because many patients with CHF are anxious of shortness of breath.
- Prompt transport to the hospital.

4.2.2.: Hypertensive Emergencies

The level of blood pressure at which the institution of therapy reduces blood pressure related morbidity and mortality. It has been defined as a blood pressure $\geq 140/90$ mm Hg on two different visits.

Hypertensive emergency and **urgency** are common presentations of hypertension in our emergency departments.

For practical purposes the following definitions are used for the hypertensive crises

Hypertensive urgency (severe asymptomatic hypertension) is defined as Blood pressure measurement $\geq 180/120$ mmHg without any evidence of **end organ damage**.

- **Hypertensive emergency: blood pressure $\geq 180/120$ mm Hg with evidence of end organ damage.** It must be noted that in some patients with newly diagnosed hypertension, end organ damage can even be present at diastolic pressure as low as 100 mm Hg

Table 2.1: Terms in Hypertension

Terminology	Systolic Pressure (mm Hg)	Diastolic Pressure (mm Hg)
Normal	< 120	< 80
Pre-hypertension	120-139	80-89
Hypertension stage 1	140-159	90-99
Hypertension stage 2	≥ 160	≥ 100
Hypertensive emergency	≥ 180	≥ 120

Symptoms of a hypertensive emergency include are:

- Headache or blurred vision,
- Increasing confusion, Seizure,
- Chest pain with shortness of breath,
- Swelling or edema (fluid buildup in the tissues)

Emergency care for patient with hypertensive emergency

- Reassure the victim if conscious.
- Maintain ABC
- Provide oxygen as needed.
- Protect the patient from harm

- Proper positioning of the patient.
- If the patient is unresponsive, you may consider the recovery position to protect the airway. Protect patient's paralyzed extremities.
- Prompt transfer to the hospital is important.

Stroke

A **cerebrovascular accident (CVA)** is an interruption of blood flow to the brain that results in the loss of brain function. **Stroke** is the loss of brain function that results from a CVA. **Interruption of cerebral blood flow may result from :-**

- **Thrombosis**—Clotting of cerebral arteries
- **Arterial rupture**—Rupture of a cerebral artery
- **Cerebral embolism**—Obstruction of a cerebral artery caused by a clot that was formed elsewhere and traveled to the brain.

Types of Stroke

Hemorrhagic stroke

*This occurs as a result of **bleeding inside the brain**. Blood forms a clot, which squeezes the brain tissue next to it. At highest risk are patients with very high or long-term elevated blood pressure that is not treated. Blood vessels in the brain weaken, one of the vessels may rupture and Blood spurts out of the hole and into the brain.*

Transient ischemic attack (TIA)

Transient ischemic attack (TIA) refers to an attack in which, stroke symptoms go away on their own in less than 24 hours, it is often called a mini-stroke.

Signs and symptoms of stroke

- **Aphasia:** Inability to produce or understand speech

- **Receptive aphasia:** Ability to speak clearly but inability to understand speech
- **Expressive aphasia:** Ability to understand the question but inability to produce the right sounds in order to answer

Causes Bleeding in the brain

- Cerebral hemorrhage
- Can be caused by high blood pressure
- Can result weaken blood vessels in the brain associated with stress.

Emergency care for stroke

- Scene safety
- PPE
- Asses responsiveness
- Support the patient as needed
- Maintain ABC
- Consider the use of oxygen
- Proper positioning of the patient. If the patient is unresponsive, you may consider the recovery position to protect the airway.
- Protect patient's paralyzed extremities.
- Prompt removal to the hospital is important.

4.2.3: Heart attack/ Myocardial Infarction.

Heart attack is also called myocardial infarction result when one or more of the coronary arteries is completely blocked.

Acute chest pain; Is the recent onset of pain, pressure, or tightness in the anterior thorax between the xiphoid, suprasternal notch, and both maxillary lines.

The two primary cause of coronary artery blockage are severing atherosclerosis and a blood clot from somewhere else in the circulatory system.

Acute coronary syndrome: Includes **acute myocardial infarction** and unstable angina.

Unstable angina: Is considered to be an ACS in which there is myocardial ischemia without detectable myocardial necrosis.

Acute myocardial infarction: Is defined by myocardial necrosis with elevation of cardiac biomarkers and is classified by ECG findings as;

ST-segment elevation myocardial infarction with Chest pain >20 to 30 min occurring at rest and **Non-ST-segment elevation myocardial infarction: Unstable Angina with evidence of myocardial necrosis**

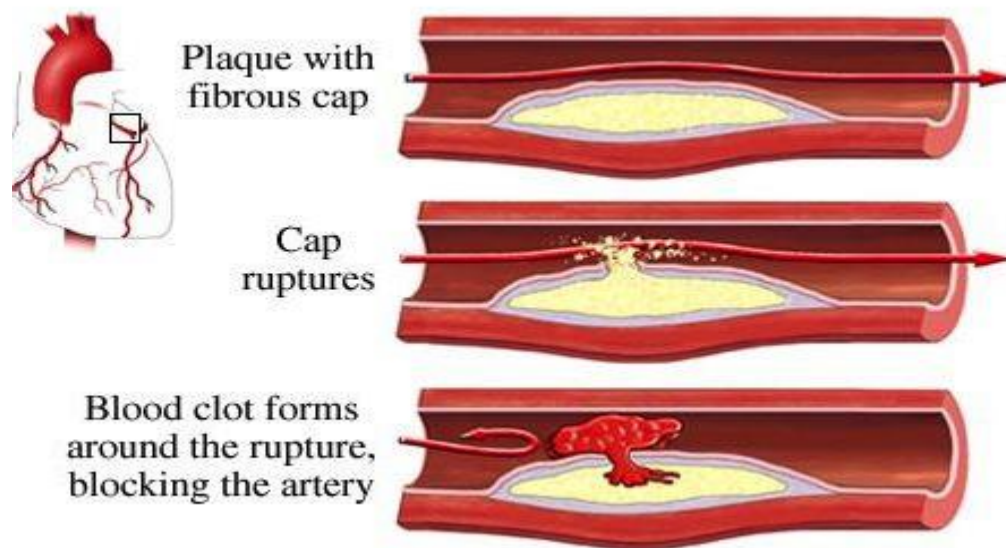


Fig. 5.4. Development of coronary artery ischemia

Sign and symptoms of Heart attack/ Myocardial infarction/Angina

- Chest pressure, tightness or crushing feeling in the chest
- Chest pain lasts longer than 15 minutes
- Respiratory Distress. Diaphoresis and mottled skin
- Nausea or vomiting
- Signs of heart failure, hypotension and signs of shock
- History of smoking, cardiac disease, hypertension, diabetes, high cholesterol, family history of heart problem.

Risk Factors

- Smoking, Age-- ≥ 45 for male/55 for female, hypertension,
- Diabetes mellitus, obesity, smoking
- Family History.

Emergency Care of suspected heart attack/ Myocardial infarction/Angina:

- Asses ABCD and manage accordingly
- Give ASPIRIN
- With symptoms of shock or difficulty breathing give OXYGEN
- If patient has NITROGLYCERIN, assist them in taking it
- Request ALS ambulance as soon as possible.

4.2.4: Cardiac arrest

Is a condition in which the heart stops beating and pumping effectively The damage

caused by a heart attack may cause abnormal rhythms (ventricular fibrillation) which

results in cardiac arrest. Some abnormal rhythms can be reversed by an AED.

Fainting: it is a sudden brief loss of consciousness caused by lack of blood flow to the brain with full recovery. It often occurs in hot conditions with long periods of standing.

Chain of survival

- **OHCA-Out of Hospital cardiac arrest**
 - **Immediate recognition and activation of EMS**
 - **Early high quality CPR**
 - **Early defibrillation**
 - **Call for Advanced Cardiac Life Support.**
 - **We need a system , system minimizes delay in chain of survival.**
- **IHCA-In health organizations/ hospital cardiac arrest**

- Surveillance and monitoring
- Activation of Code team
- Early high quality CPR
- **Advanced cardiac resuscitation**
- Early defibrillation
- Post cardiac arrest care



Fig 5.4 IHCA

Core Advanced cardiac resuscitation Concepts

- The BRAIN must be kept perfused
- The PATIENT requires frequent reassessment
- BLS to post-resuscitation care important
- Survival decreases as arrest time prolonged
- Timely treatment of underlying cause is key

What has led to increased survival?

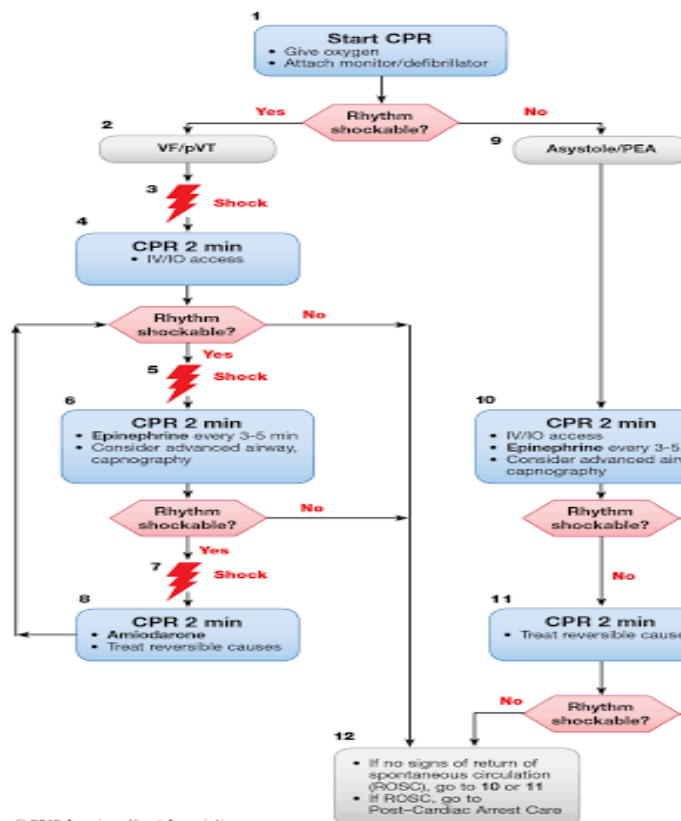
- Training of rescuers
- Planned and practiced response
- Prompt recognition of cardiac arrest
- Prompt provision of CPR
- Early defibrillation (within 5 minutes)

Cardiac arrest algorithms are

- VF/, pulseless VT-SHOCK ABLE
- Pulseless electrical activity (PEA)
- Asystole-NON SHOCKABL
- CPR should be a continuation of BLS. The ACLS ambulance will have more advanced in a team approach supported DIFIBRIL with INTERPRETATION OF ECG, AWITH MEDICATIONS and ADVANCED AIRWAY MANAGEMENT.
- Then perform primary and secondary assessment and look for possible other courses

Fig. 5.5 Cardiac arrest rhythm.

Adult Cardiac Arrest Algorithm—2015 Update



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CPR Quality
<ul style="list-style-type: none"> • Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow 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 <ul style="list-style-type: none"> – If P_{ETCO₂} <10 mm Hg, attempt to improve CPR quality. • Intra-arterial pressure <ul style="list-style-type: none"> – If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality.
Shock Energy for Defibrillation
<ul style="list-style-type: none"> • Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered. • Monophasic: 360 J
Drug Therapy
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • Endotracheal intubation or supraglottic advanced airway • Waveform capnography or capnometry to confirm and monitor ET tube placement • Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions
Return of Spontaneous Circulation (ROSC)
<ul style="list-style-type: none"> • Pulse and blood pressure • Abrupt sustained increase in P_{ETCO₂} (typically >40 mm Hg) • Spontaneous arterial pressure waves with intra-arterial monitoring
Reversible Causes
<ul style="list-style-type: none"> • Hypovolemia • Hypoxia • Hydrogen ion (acidosis) • Hypo-/hyperkalemia • Hypothermia • Tension pneumothorax • Tamponade, cardiac • Toxins • Thrombosis, pulmonary • Thrombosis, coronary

PEA-Pulse less electrical activity

- Any organized rhythm without pulse is PEA
- Non shockable rhythm
- High Quality CPR, followed by Adrenaline

Asystole:

- Cardiac arrest rhythm without discernible cardiac electrical activity
- Also known as flat line
- You should validate flat line is not operator error(missing leads,no power)

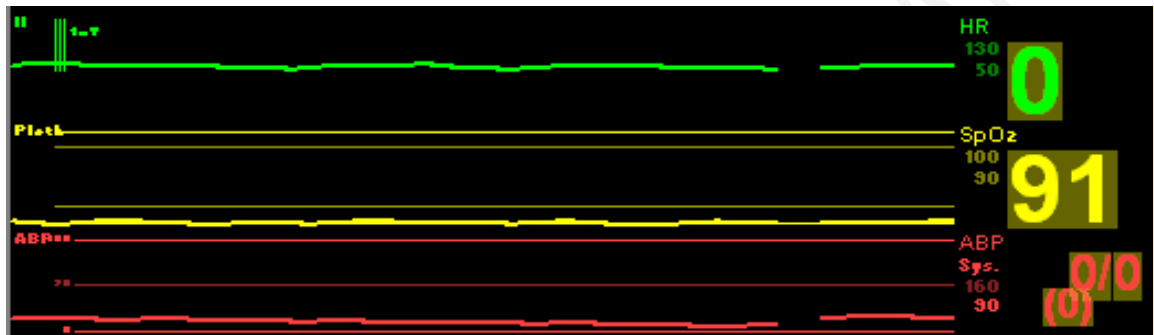


Fig 5.6 Asystole

Signs and Symptoms

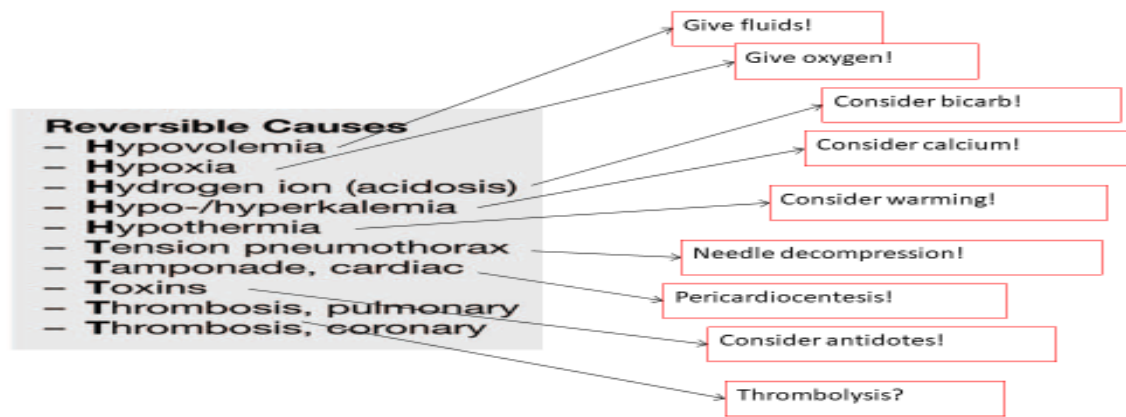
- **No pulse**
- **Unconscious**
- **Not breathing**

Management

- Effective CPR
- Early Defibrillation
- Most important contributor to increased survival is time to defibrillation

Systematic approach

- BLS Assessment
- Primary Assessment –ABCDE
- Secondary Assessment (SAMPLE history, H’s and T’s)



Team Dynamics

- Team with team leader, Clear roles and responsibilities, Mutual respect, Knowledge sharing, Closed loop communication, Clear message

Terminating resuscitation: Consider factors:

- Time from collapse to CPR, Time from collapse to first defibrillation, Co-morbid condition, Pre-arrest state, Initial arrest rhythm
- Stop when your team determine higher certainty that the patient will not respond for further resuscitation

Session 4.3:

4.3. Diabetic Emergencies

Session 4.3.1: Diabetes ketoacidosis (DKA)

Introduction

Diabetes mellitus is a condition in which the level of glucose (the simplest type of sugar) in the blood is poorly controlled, so that sometimes it rises too high and at other times it falls too low.

Glucose is one of the basic sugars in the body, Along with oxygen, it is a primary fuel for cellular metabolism. **Insulin** has many functions, but its main role is to help glucose enter into the body's cells, so they can use it as a fuel for all the processes that need energy.

Diabetes ketoacidosis (DKA)/Diabetic coma: DKA is a metabolic disorder characterized by the triad of hyperglycemia, anion gap metabolic acidosis (increased anion gap), and ketonemia. Occurs when the body has too much blood glucose and not enough insulin. For example, a person with diabetes may fail to take insulin for several days result in blood glucose levels that build higher and higher levels. The patient may be unresponsive or unconscious.

Precipitating factors

- ✓ The most common precipitating factors are infection and discontinuation of insulin treatment. Other less common factors include:
 - Acute major illnesses such as MI, CVA, or pancreatitis, infections..
 - New onset type 1 diabetes
 - Drugs (glucocorticoids, higher dose thiazide diuretics, sympathomimetic agents (e.g., dobutamine and terbutaline).
 - Cocaine use
 - Poor compliance with the insulin regimen.

Sign and symptoms of Diabetic Ketoacidosis (DKA)Diabetic coma.

- Nausea/vomiting, poly symptoms (polydipsia, Polyphagia, Polyuria),
- Abdominal pain, Shortness of breath
- Tachycardia
- Dehydration/hypotension
- Tachypnea / Kussmaul respirations/respiratory distress

Immediate detections

- History of DM
- RBS

- Urine ketone positive.

Emergency management

- Scene safe
- PPE
- Stabilize ABC of life
- Administer oxygen
- Fluid management
- Monitoring RBS every hour ,urine ketone every 2-4 hrs
- Transfer to hospital

4.3.2: Hypoglycemia/Insulin shock

- Hypoglycemia is a clinical syndrome with diverse causes in which low serum (or plasma) glucose concentrations lead to symptoms and signs.
- In patients with diabetes, hypoglycemia symptoms and signs occur as a consequence of therapy. A diabetic may take insulin in the morning and then alter his/her usual routine by not eating or exercise vigorously;

Causes of Hypoglycemia

- Drugs (Insulin or insulin secretagogue, Alcohol, quinine)
- Critical illness (Hepatic, renal or cardiac failure, Sepsis, severe malaria, Inanition)
- Hormone deficiency (Cortisol, Glucagon and epinephrine (in insulin-deficient diabetes).
- Non-islet cell tumor

Sign and symptoms of hypoglycemia

- Hypoglycemia causes neurogenic
- confusion, fatigue, seizure, loss of consciousness
- Sweating (diaphoresis), Hunger
- Pale, moist, cool skin.
- Low blood glucose (<3.5mmol/L)

- History of diabetes, malaria or severe infection

Assessment and treatment

- Ensure scene safety
- Maintain open air way and assist ventilations
- Administer oxygen
- Check glucose
- Oral treatment with glucose tablets or glucose-containing fluids, candy, or food is appropriate if the patient is able
- If hypoglycemia and un responsive, give iv glucose, if conscious give sugar by mouth
- ✓ If hyper glycaemia:
 - Give IV FLUIDS
 - Plan for rapid TRANSFER as these patients can become extremely ill
- ✓ If no glucometer to determine RBS, give sugar if conscious or glucose iv if not conscious.
- ✓ If not conscious transfer patient on left lateral position:

Session 4. 4 :

4.4. Poisoning Emergencies

Poison is any substance which causes harm to body tissues. Atoxin is a poison made by a living organism.(eg.animal,plant,micro-organism).

Avenom is a toxin which is injected by a fang or sting (eg.snake, spider,and fish)

Poisons can be injected (swallowed ,observed, inhaled, or injected. The effect of a poison will vary depending on what the substance actually is and how much has been absorbed.

How Poisons Get into the Body

1. Inhaled poisons:

Toxic fumes from gas; burning solids. Inhaled poisons include; **carbon monoxide**, **methane** (mine) **chlorine**(cleaning products) ;**fumes** from paintings; glues and industrial materials.

Sign and symptoms are very irritating and cause airway obstruction and pulmonary edema; head ache; nausea; confusion.

Emergency care for patients who have inhaled poisons:

- a. Scene safe,
- b. Apply PPE
- c. Move patients into fresh air immediately.
- d. Provide supplemental oxygen (when available) and basic life support, if necessary
- e. All patients who have inhaled poison require immediate transport.
- f. Make sure a suctioning unit is available in case the patient vomits.
- g. *Remove rings, watches, and bracelets from areas around the injection site if swelling occurs.*
- h. Decontamination

2. Absorbed (surface contact) poisons:

Chemical splash from **pesticide** or **weed killer**. Many **corrosive substances** will damage the skin, mucous membranes, or eyes, causing chemical burns, telltale rashes, or lesions. Acids, alkalis, and some petroleum (hydrocarbon) products are very destructive.

Signs and symptoms of absorbed poisoning include:

Liquid or powder on a patient's skin, Burns, Itching, Irritation, Redness of the skin in light-skinned individuals and odors of the substance.

Pre hospital care: Assess the area; do not contaminate yourself, apply PPE; Remove all contaminated clothes; decontaminate with flushing water

3. Ingested poisons:

Most of the ingested poisons approximately 80% of are by mouth. Ingested poisoning is usually accidental in children and, except for contaminated food, deliberate in adults.

*Swallowed substances are classified into **corrosive** and **non-corrosive***

Corrosive: Burning substances **Examples** : Household cleaners; caustics, toilet or bath room

Cleaners

Non corrosives: Are non-burning substances .Example ; medications (tablets/liquids)

and plants

S/S of corrosive substance: Pain in the mouth ,burns to the lips/mouth, nausea/vomiting, difficulty breathing, sweating, unconscious.

Pre hospital care: Identify type and quantity of poisoning? from container or bottle; establish the time of poisoning.

Pre hospital care: Do not induce vomiting, do not give anything by mouth.

Treatment goal is to remove as much of the poison as possible from the gastrointestinal tract

Many EMS systems allow EMT IIs to carry activated charcoal. It binds to the poison in the stomach and carries it out of the system. Always assess the ABCs of every patient who has been poisoned.

4. Injected poisons:

Almost always the result of a deliberate drug administration. the most common injected sites are hands, feet, between toes and fingers.

The most common drug overdose via injection are narcotics which cause respiratory depressions/respiratory arrest or loss of consciousness.

Signs and symptoms

Injected poisons are impossible to dilute or remove. They usually absorbed quickly into the body or cause intense local tissue destruction.

The Emergency management for patients who have injected poisons

- Scene safety
- PPE
- Assess ABCD
- Monitor the patient's airway.
- Provide high-flow oxygen (when available).
- Be alert for nausea and vomiting.

- Remove rings, watches, and bracelets from areas around the injection site if swelling occurs.
- Provide prompt transport to the hospital for further and better

Assessment of the Poisoned Patient

Ask the following questions in these cases:

- What substances did you take?
- When did you take it (or become exposed to it)?
- How much did you ingest?
- What actions have been taken? and
- How much do you weigh?

Emergency management for all poisons

- Air way stabilization, intubation in severe overdose before GI decontamination.
- Volume expansion by rapid infusion of 1-2 L of isotonic fluid
- Gastric lavage if within 1hr of ingestion.
- Activated charcoal in multiple doses to reduce serum concentration
- Send any container and or suicide notes with casualties to hospitals.

Bites and stings

- People are bitten and stung every day by insects, spiders, snakes and animals.
 - Most of the time, these bites and stings do not cause serious problems.
 - However, in rare circumstances, certain bites and stings can cause serious illness or even death in people who are sensitive to the venom
- **Insect Stings:**
- Most of the time, insect stings are harmless

- If the person is allergic, an insect sting can lead to anaphylaxis, a life-threatening condition
- Signals of an insect sting include: - Presence of a stinger, Pain, Swelling, Signals of an allergic reaction.
- Remove any visible stinger, Scrape it away from the skin with a clean fingernail or a plastic card, such as a credit card.
 - In the case of a bee stings, if you use tweezers, grasp the stinger, not the venom sac.
 - Wash the site with soap and water
 - Apply a cold pack to the area to reduce pain and swelling.

✓ **Spider Bites and Scorpion Stings**

spider.

- Widow spiders can be black, red or brown. The black widow spider is black with a reddish hourglass shape on the underside of its body and is the most venomous of the widow spiders.



Pic.5.7. Window spider.

- Most spider bites heal with no adverse effects or scarring. The bite usually causes an immediate sharp pinprick pain, followed by a dull pain in the area of the bite

✓ **Scorpions**

Scorpions live in dry regions such as the southwestern United States and Mexico. They live under rocks, logs and the bark of certain trees



Pic. 5.8..Scorpion

Venomous Snake Bites

EAMT re,

A. Rattle Snake



B, Cooper Head



C. Cotton

mouth



D. Corral Snake



Pic.5.9. A-D different types of poisons snakes

- Most snakebite occurs near the home, not in the wild.
- **Rattlesnakes** account for most snakebites, Most deaths occur because the bitten person has an allergic reaction, is in poor health or because too much time passes before he or she receives medical care.

➤ **Signals of a possibly venomous snakebite include:**

- A bite mark.
- Pain.
- Swelling

Emergency Management

- Wash the wound.
- Apply an elastic (pressure immobilization) bandage
- Check for feeling, warmth and color of the limb and note changes in skin color and temperature.
- Place the end of the bandage against the skin and use overlapping turns.
- The wrap should cover a long body section, such as an arm or a calf, beginning at the point farthest from the heart.
- Check above and below the injury for feeling, warmth and color, especially fingers and toes, after you have applied an elastic roller bandage.
- Keep the injured area still and lower than the heart. The person should walk only if absolutely necessary.
 - Do not apply ice and do not apply suction
 - Do not cut the wound.

➤ **Animal Bites**

- The bite of a **domestic or wild animal** can cause infection and soft tissue injury.
- The most serious possible result is **rabies**.
- Rabies is transmitted through the saliva of diseased animals such as; skunks, bats, raccoons, cats, dogs, cattle and foxes.
- Rabid animals may drool, appear to be partially paralyzed, or act aggressively or quiet

- If not treated, rabies is fatal. Anyone bitten by an animal that might have rabies must get medical attention.

Emergency Management for an animal bite:

- Scene safe & ABCD
- **Control bleeding first; if the wound is bleeding seriously.**
- **Do not clean serious wounds.** The wound will be cleaned at a medical facility.
- If bleeding is minor, wash the wound with soap and water then irrigate with clean running tap water.
- If an animal bites someone, try to get the person away from the animal without putting yourself in danger.
- Do not try to stop, hold or catch the animal.
- Do not touch a pet that may have come in contact with the animal's saliva without using or wearing some form of protection like disposable gloves.
- Transfer patient in serious conditions.

➤ **Food Poisoning**

Almost always caused by eating food that is contaminated by bacteria, even though food may appear perfectly good, with little or no decay or odor to suggest danger.

Two main types of food poisoning

1. An organism, itself, causes disease. For example, Salmonella bacterium is one organism that produces direct effects.

Common symptoms of salmonellosis are:

Severe gastrointestinal symptoms within 72 hours of ingestion, Nausea, Vomiting, Abdominal pain, and diarrhea

2. Plant Poisoning:

Many household plants are poisonous if ingested. Some poisons plants cause local irritation of the skin; other can affect circulatory system, gastrointestinal tract, and the central nervous system.

Emergency medical care:

- Check scene is safe
- Wear personal protectives
- Asses ABC of life
- Assess level of consciousness
- **Give** oxygen if patient
- Rehydrate patient
- Transport the patient on time to the hospital or health center for further investigation and treatment. Gather as much history as possible.

Session 4.5:

4.5. NEUROLOGIC EMERGENCY

4.5.1. Coma

Introduction

Is a state of unresponsiveness where the causality is un aware of their surroundings and purposeful response can be obtained.

Is a failure of both arousal and content functions. It is a state of reduced alertness and responsiveness from which the patient cannot be aroused. The Glasgow coma scale is widely used and also the FOUR (Full Outline of Unresponsiveness) score is used widel

In other words can be defined as a state of reduced alertness and responsiveness from which the patient cannot be aroused. The Glasgow coma scale is widely used and also the FOUR (Full Outline of Unresponsiveness) score is used widely.

Commonly used terms

- **Confusion**- a reduced mental clarity, coherence, comprehension and reasoning
- **Drowsiness**- patient cannot be easily aroused by noise or touch and cannot maintain alertness for some time

- **Lethargy**- depressed mental status in which the patient may appear wakeful but has depressed awareness of the self and environment globally
- **Stupor**: the patient can be awakened only by vigorous stimuli

Based on the clinical findings the cause of coma can be categorized in to two

1. **Toxic-Metabolic coma (outside the nervous system)** – characterized by **diffuse CNS dysfunction** and no focal neurologic findings
Organ system failure (hepatic encephalopathy, uremia/renal failure, endocrine (Addison disease, hypothyroidism), hypoxia, carbon dioxide narcosis)
 - **Drug reactions**
 - **Sepsis**
2. **Structural Coma**- characterized by **focal CNS dysfunction** further classified to
 - **Trauma**
 - Subdural hematoma, epidural hematoma and Cerebral concussion or contusion
 - **Stroke Syndromes**
 - Embolism, thrombosis, hemorrhage, subarachnoid hemorrhage (SAH)
 - **Tumor**
 - Brainstem tumors or metastatic disease
 - **Brain Abscess**

Coma grading

AVPU

- **A**: Alert
- **V**: Responds to Voice
- **P**: Responds to Pain
- **U**: Unresponsive

Glasgow Coma Score

- Eye opening response

- Verbal response from patient
- Response to pain.

Pic 5.14. Glasgow coma scale		
1	Eye opening	
	Spontaneous	4
	Response to verbal command	3
	Response to pain	2
	No eye opening	1
2	Best verbal response	
	Oriented	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No verbal response	1
3	Best motor response	
	Obeys commands	6
	Localizing response to pain	5
	Withdrawal response to pain	4
	Flexion to pain	3
	Extension to pain	2

Use the **AEIOUS-TIPS** mnemonic for Causes of coma

A=Acidosis

T=Trauma

E=Epilepsy

I=Insulin

I=Infection

P=Psychosis

O=Overdose

S=Shock, stroke.

U=Uremia

Emergency Management of coma

- Protect Airway, suck for any secretions
- P assessment using glasco coma score
- Assist breathing by providing high concentration oxygen via non rebreather mask.
- Avoid pressure on the chest.
- Asses for signs of shock and perfuse patient
- Check his glucose and give 40% glucose if low.
- Monitor vital signs frequently.
- Put patient in left lateral recovery position if no any trauma.

- Do not harm the patient
- Transport patient to the nearby hospital.
- Coma /recovery position ;

Advantages:

- Maintain clear air way
- Facilitate drainage
- Permits good observation
- Avoid pressure on the chest
- Provides a stable position.

4.5.2: Seizure.

Seizures is caused by abnormal electrical activity in the brain. Seizure vary from the briefest lapses of attention to prolonged convulsions. A seizure can occur in a person with Epilepsy; Head injury; Stroke; fever; Hypoglycemia; Poisoning; Alcohol and many other causes.

Epilepsy is defined as recurrent unprovoked seizures caused by a genetically determined or acquired brain disorder

Classification of seizures

1.Generalized seizures: involves brain diffusely

- a. Tonic-clonic (grand mal)
- b. Absence seizures (petit mal)
- c. Others (myoclonic, tonic, clonic, or atonic seizures)

5. **Partial or focal seizures:** electrical discharges begin in a localized region of the cortex. The previous term partial is now being replaced with focal.

- a. Simple Focal: without impairment of Cognition
- b. Complex Focal: with impairment of Cognition.

Convulsive and non-convulsive seizures

- **Convulsive seizures** are characterized by uncontrolled, rhythmic motor movements and can affect part or all of the body.
- **Non convulsive seizures** do not result in abnormal motor activity; patients may display confusion, altered mental status, abnormal behavior, or coma.

Signs and Symptoms of seizure

- *Patient may experience **an aura**: sudden loss of consciousness, chaotic muscle movement and tone, apnea.*
- ***Tonic phase** : usually lasting only seconds, in which there will be a period of extensor muscle activities , **tongue biting** , **bladder or bowel incontinence**(unable to control)*
- ***Tonic-clonic phase**: patient exhibit **bilateral movement** characterized by **muscle rigidity and relaxation** usually lasting **1 to 3 minutes**. The patient exhibits **tachycardia, hyperventilation, and intense salivation**.*

5.12.1; Status Epilepticus

Status epilepticus is **continuous or intermittent seizures for more than 5 minutes without recovery** of consciousness. The most common causes of status epilepticus include sub therapeutic antiepileptic levels; preexisting neurologic conditions such as prior CNS infection, trauma, hemorrhage, or stroke; acute stroke; hypoxia; metabolic abnormalities; and alcohol or drug withdrawal.

Types of Seizure Activity

Seizure activity may be **generalized tonic clonic** type which is associated with **higher mortality and complications**. In non-convulsive status epilepticus, the patient is comatose or has fluctuating abnormal mental status or confusion,

Epilepsia partials continua is a focal tonic-clonic seizure activity with normal alertness and responsiveness.

Emergency Treatment

The goal of treatment is seizure control as soon as possible and within 30 minutes of presentation. With application of the ABCs and treatment begin simultaneously.

Approach to the patient

- ABC of life
- Place the patient in semi prone or lateral position to decrease risk of aspiration.
- Large bore IV line should be established and RBS should be determined
- Protect casualty
 - Try to ease the casualty's fall. Talk to him calmly and reassuringly. Clear away any Potentially dangerous objects to prevent injury to the casualty. Ask bystanders to keep clear.
 - If possible, cushion the casualty's head with soft material until the seizure ceases.
 - Place, padding to protect him from objects that cannot be moved. Loosen any tight clothing around the casualty's neck
- Protect the head and loosen thigh clothing
- Dextrose 50g IV push.
- Administration of anticonvulsant as of the protocol.
 - If IV line is difficult to establish give diazepam 5 to 10 mg (0.15 mg/kg) diluted in 10 ml NS per rectum.
- Place casualty in recovery position.
 - Once the seizure has stopped the casualty may fall into a deep sleep. Assess for normal breathing; if present, place him in the recovery position
- Monitor casualty's recovery

- Monitor and record vital signs level of response, breathing, and pulse until he recovers.
- Note the duration of the seizure
- Transfer patient if seizure persists.

Summary of Medical Emergencies

- The respiratory system is situated in the thorax, and is responsible for gaseous exchange between the circulatory system and the outside world. The respiratory system is responsible for delivering oxygen to the tissues and removing carbon dioxide from the tissues. Some of the Common medical respiratory problem causing severe difficulty of breathing are ;*Acute Asthma and chronic obstructive Disease, Pulmonary Embolism, Pneumonia, Pulmonary Embolism .etc.*

Asthma is an acute spasm of the bronchioles where a mucus plug has formed and particularly obstructed the bronchiole and leads to dyspnea. In case of severe respiratory asthmatic condition, you are expected to administer oxygen, allow patient to sit in upright position, Suction of mucus, assist with inhaler if patient has one, and transport promptly.

- Cardiovascular Emergencies are a major cause of death and morbidity all over the world. The heart and blood vessels (arteries, arterioles, capillaries, venules and veins) form the cardiovascular system. Some of the Common cardiac emergencies are *Heart Failure & Pulmonary Edema, Hypertensive Emergencies, Heart attack/Acute Myocardial Infraction, Cardiac arrest.etc.*
- Congestive Heart Failure occurs when the ventricular heart muscle is so damaged that it can no longer keep up with the return flow of blood from the atria. When the muscle can no longer contract effectively, the heart tries other ways to maintain an adequate cardiac output. Cardiac arrest a state in which the heart fails to generate an effective and detectable blood flow; requires immediate emergency response in order to prevent permanent damage to

organs. Stroke occurs when a part the blood flow to the brain is suddenly cut off; with in minutes the brain cells begin to die. Sign and symptoms of stoke includes receptive or expressive aphasia, dysarthria, muscle weakness or numbness on one side, facial drop and sometimes high blood pressure. Cardiopulmonary Resuscitation (CPR) is a technique of basic life support for the purpose of oxygenating the brain and the heart until appropriate, definitive medical treatment can restore normal heart and ventilator action.

- DKA is a metabolic disorder characterized by the triad of hyperglycemia, anion gap metabolic acidosis (increased anion gap), and ketonemia. The most common precipitating factors for DKA are infection and discontinuation of insulin treatment. The main principles of DKA management are fluid replacement, correction of electrolyte abnormalities, Insulin administration and treating the precipitating factors
- Hypoglycemia is a clinical syndrome with diverse causes in which low serum (or plasma) glucose concentrations lead to symptoms and signs; It should be considered in any patient with episodes of confusion, an altered level of consciousness, or a seizure. PO glucose or glucose containing food is reasonable in conscious patient and IV 40% or 50 % glucose.
- Poisons act as acutely or chronically to destroy or impair body cells. A poisons can be introduced in to the body in one of the four ways .ingestion, inhalation, injection, and surface contact(absorption). Move patients who have inhaled poisons in to the fresh air : be prepared to use supplemental oxygen via nose breathing oxygen or ventilator support via a BVM device. Two main types of poisoning cause gastrointestinal symptoms. Bacteria in the food directly cause disease and the most severe form of toxin ingestion is botulism, which can produce the first neurologic symptoms as late as 4 days after ingestion. The causes of seizure are related to congenital and acquired. Congenital like epilepsy, the acquired ones are metabolic (hypoxia, hypoglycemia, poisoning), and sudden high fever.
- **Coma** is a state of unresponsiveness where the causality is un aware of their surroundings and purposeful response can be obtained. Is a failure of both arousal and content functions.It is a state of reduced alertness and responsiveness from which the patient cannot be aroused. The Glasgow coma scale is widely used and also the FOUR (Full Outline of Unresponsiveness) score is used widely

- Seizures are characterized by unconscious and generalized twitching of all of part of the body. There are types of seizures that you should learn to recognize .those are generalized seizure, absence seizure, and febrile convulsion. Most seizures lasts between 3 and 5 minutes and are followed by postictal state in which the patient may be unresponsive, have labored breathing, and hemi paresis and may have urinated on himself or herself.

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CHAPTER FIVE:

5. Mass Casualty Incident

Learning objective

At the end of this training, trainees are expected to: -

- Define mass casualty incident
- Perform brief triage assessment during a mass casualty incident
- Make appropriate triage decisions in a mass casualty incident

Introduction

Mass casualty incident is any single event that impacts negatively on a community, causing a number of casualties that outstrips that community's ability to respond in an abnormal way. The point at which a community becomes overwhelmed is highly variable and entirely dependent on the size of the pre-hospital workforce, the available emergency room(s), the number of responders, and available supplies. Mass casualty management is aimed at minimizing death and disabilities. In small isolated communities, limited resources, the scarcity of materials, poor communication, and lack of preparedness can pose serious obstacles to the management of victims in these incidents.

The MCI system incorporates the mobilization of trained persons and the required physical resources to the site of the incident, to stabilize victims prior to their transport. This model uses a multi-sectoral approach in the form of a strongly linked rescue chain of responders (police, fire, search and rescue, Marine Police/Coast Guard, pre-hospital team, ambulance, etc.). It supports the launching of an Advanced Medical Post (AMP), a field treatment area that functions as an extension of a hospital emergency room, where victims are sorted, stabilized and where evacuation is coordinated. The AMP uses pre-established, flexible procedures and organized field care that is aimed at saving as many victims as possible, with as little disability as possible, given the circumstances. The caveat is to do the greatest good for the greatest number of injured. It also allows emergency and health care services to return to routine operations as quickly as possible.

Types of disaster

- Natural disaster
- Civil Disobedience
- Criminal or Terrorist Incidents
- Technical Hazards
- Transportation Crashes

5.1. Roles of Major Responding Agencies

S.N	EMS Actors	Role and responsibility
1	Dispatch centre (939 or Local emergency number)	<input type="checkbox"/> Receiving and dissemination of alert message. <input type="checkbox"/> Dispatch/mobilization of appropriate resources. <input type="checkbox"/> Receiving situation updates.
2	Police	<input type="checkbox"/> Possible confirmation of event. <input type="checkbox"/> Security at disaster site and hospital. <input type="checkbox"/> Traffic control. <input type="checkbox"/> Crowd control. <input type="checkbox"/> Incident Command, if no fire or hazmat is present. <input type="checkbox"/> Incident investigation. <input type="checkbox"/> Provision of basic first aid, if trained.
3	Fire Service	<input type="checkbox"/> Possible confirmation of event. <input type="checkbox"/> Search and rescue. <input type="checkbox"/> Fire control and prevention. <input type="checkbox"/> Safety assessment and advice to other responders. <input type="checkbox"/> Management of hazardous materials (hazmat). <input type="checkbox"/> Perform first triage and first aid, if trained. <input type="checkbox"/> Assist with movement of victims from impact zone. <input type="checkbox"/> Incident command, if fire of hazardous material (hazmat) is present.
4	Ambulance Service / EMS	<input type="checkbox"/> Possible confirmation of event. <input type="checkbox"/> Perform first triage and medical care, if trained. <input type="checkbox"/> Assist with setting up and manning the AMP. <input type="checkbox"/> Provide pre-hospital care.

		<input type="checkbox"/> Transportation of victims to healthcare facility.
5	Non-Governmental Organizations (NGOs)	<input type="checkbox"/> Perform first triage and first aid, if trained. <input type="checkbox"/> Supplies management. <input type="checkbox"/> Assist with transport. <input type="checkbox"/> Communications. <input type="checkbox"/> Psychological support to victims, rescuers, relatives of victims.
6	Hospital	<input type="checkbox"/> Reception and treatment of victims. <input type="checkbox"/> Psychological support to victims, rescuers, relatives of victims.
7	Emergency Room	<input type="checkbox"/> Provide personnel at disaster site (AMP). <input type="checkbox"/> Control of the AMP, where indicated. <input type="checkbox"/> May assist staff at health centers/clinics. <input type="checkbox"/> Initial stabilization of victims on the field and on arrival to the hospital. <input type="checkbox"/> Reception of victims at the hospital.
8	Military/Defiance Force	<input type="checkbox"/> Possible confirmation of event. <input type="checkbox"/> Security at disaster site and hospital. <input type="checkbox"/> Advance medical care/first aid, if trained. <input type="checkbox"/> Assist with the setting up and manning the AMP. <input type="checkbox"/> providing support services at event.

5.2. Initiating the Alert during MCI

A prompt and appropriate response to a mass casualty situation begins with a good alert. This is a sequence of activities implemented to efficiently mobilize adequate resources. It includes an initial warning that may come (a) directly to the Emergency Department; (b) via the police Communication Operations Centre; (c) the Fire Service; or (d) the Dispatch System (939), depending on the current system. An appropriate assessment of the situation and prompt dissemination of the alert message is important.

Key components of the alert message

- Record time call received

- Confirm who is calling
- Caller's phone number/name
- Precise location of event
- Time of event, or closest approximation
- Type of incident
- Estimated number of casualties
- Potential risk to victim, rescuers and exposed population
- Safest approach route
- Disaster scenario



Case discussion

At the scene of the accident you found 5 pts

- 1ST pt = 35ys female, screaming for help, restless, complaining for pain urging for help, has lacerations on the head and extremities
- 2nd pt = 20 year old man has some breathing difficulties, chest injury
- 3rd pt = 40yrs old man unresponsive, snoring, has facial lacerations

- 4th pt= 5 years old child no visible wound looks conscious but sleepy
- 5th a women with big belly has big wound on the lower extremities and bleeding from the wound
- 6th a 20 years old female screaming running here and there calming her mother is died

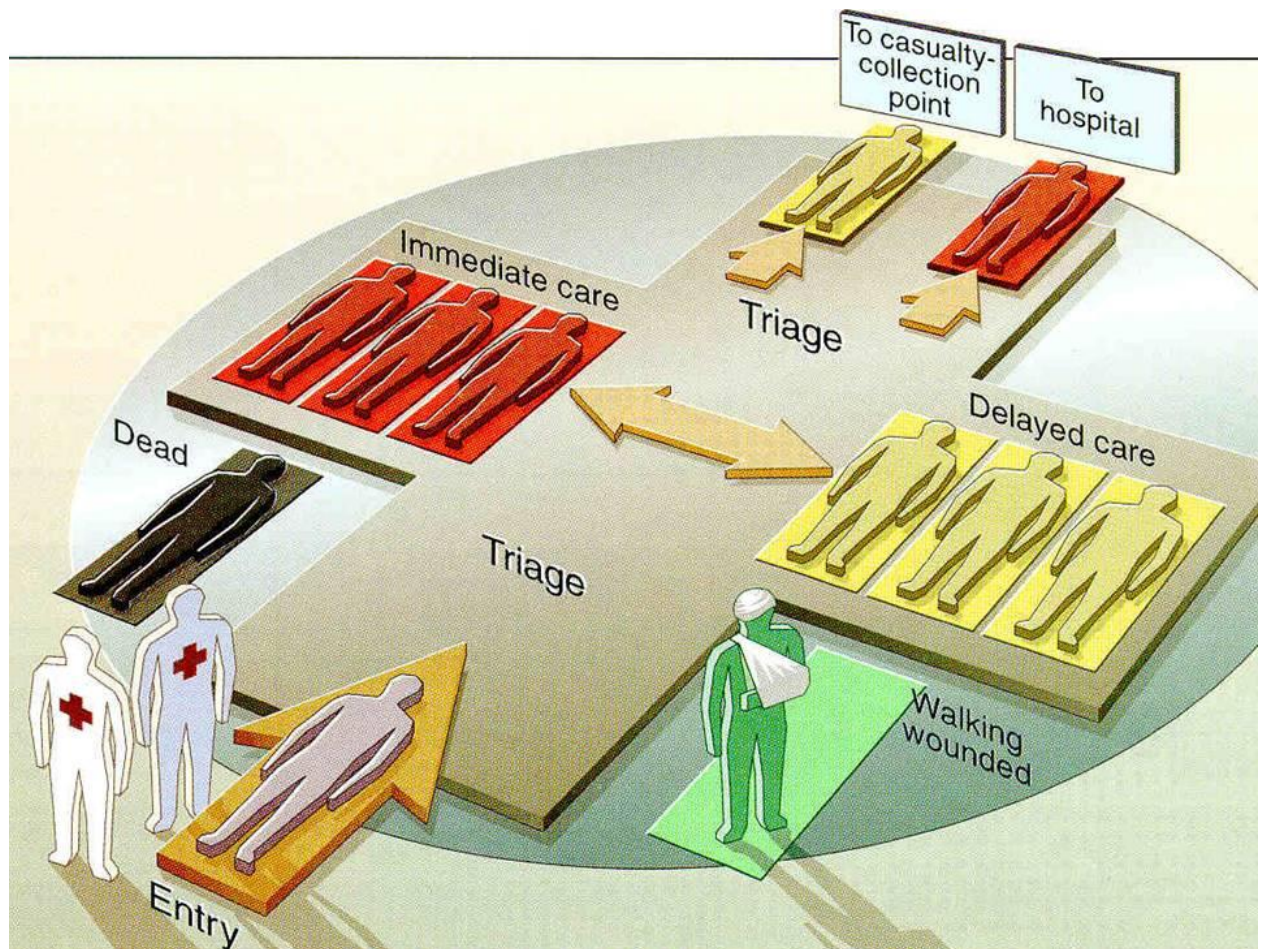
How do you start your job at the scene?

5.3. Scene Assessment and Triage in MCI

Scene assessment is a sequence of activities, conducted by first responders, to determine the full extent of the incident and its possible complications, before reporting back to home base/ headquarters. As they approach the scene, responders must keep scene safety foremost on their minds. All attempts must be made to gather information from the dispatcher, the person reporting the incident, and any available bystander(s).

The Initial Assessment Team will play a key role in the assessment process. Their observations and deductions will be used to:

1. Ensure that what is observed at the scene matches the initial report.
2. Heighten awareness of potential risks to rescuers.
3. Get the appropriate of response personnel to the scene (numbers and skills).
4. Activate key agencies that may be needed at the scene.
5. Advise other responders on the safest approach route.
6. Initiate mobilization of appropriate equipment and supplies to the scene.
7. Determine safe working zones for the response efforts.
8. Assess the safety of the surrounding population.
9. Be aware of any potential for escalation, secondary explosions, toxic exposures, signs and symptoms of suspicious of biological, chemical, or radiological (BCR) exposure.
10. Give prompt feedback to base.



Principles of MCI Triage

Triage is the process of determining the priority of patients based on the severity of their conditions, in order of priority, for immediate movement and treatment. Triage is used in hospital emergency rooms and at incident sites. In the mass casualty setting, it is based on urgency, the likelihood of survival and the care resources that are available. It is an ongoing process along the rescue chain. Remember that the medical condition of trauma victims is not static and may change from instant to instant. Frequent reassessment is needed. Likewise, triage is not static and must be revised from time to time.

Triage involves a dynamic balance between needs and resources.

- **Needs** – number of injured and types of injuries.
- **Resources** – infrastructure and equipment at hand and competent personnel

Triage activity involves:

- **Obtaining** a focused history of the mechanism of injury (what happened?)
- **Performing** a limited initial assessment on victims (how unstable are the injuries?)
- **Classifying** the patients problems according to urgency (two levels in impact area; four levels at AMP).
- **Reassuring** patients that they will receive medical care as soon as possible and guiding their movement from the impact zone, through the AMP, to the receiving medical facility.

First Triage

The initial survey of a patient considers the “A2BC3”:

Ambulating * Airway * Breathing * Circulation * Consciousness level *

Cervical spine

Criteria for First Triage include:

- A = Airway
- B = Breathing
- C = Circulation
- D = Doubt
- E = Exceptions – potential problems
- F = Foreign bodies

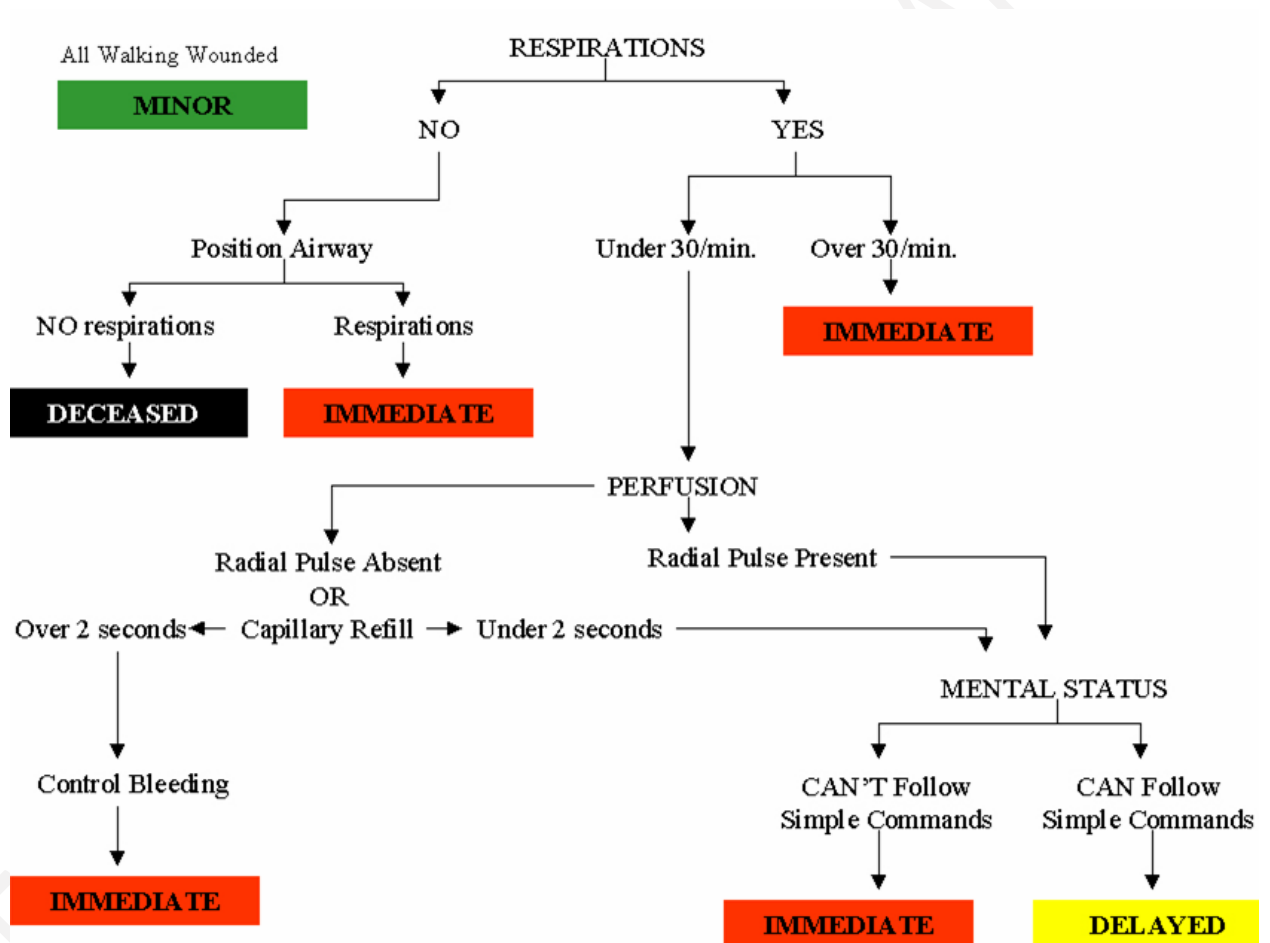
Patients should be coded early; those in dangerous areas should be removed to a non hazardous environment before triage. First level triage focuses on identifying threats to life, limb or sight and is performed at the impact zone. In First level triage, patients are classified as **ACUTE** (red) or **NONACUTE** (green) and prioritized for movement to the entrance of the AMP. Red level patients need prompt care and are moved as first priority. Green level patients are comparatively less urgent and are moved secondarily.

RED denotes **critical** cases, which require intervention within 5–30 minutes to prevent serious compromise.

YELLOW denotes **urgent** cases that are likely to remain stable for up to two hours.

GREEN denotes **non-urgent** cases that are likely to remain stable for up to six hours.

BLACK denotes **dead**, patients who are clinically dead. Below are examples of different tags that can be used for the second triage.



The Principle of the ‘3-Ts’:

- Tag
- Treat
- Transfer to hospital

Goals of Mass Casualty Incident triaging

- Do the Greatest Good for the Greatest Number
- Manage scarce resources
- Do not relocate the disaster

Mass Casualty Incident triaging challenges

- ✓ Mixed casualties
- ✓ Responder protection and safety
- ✓ Crime scene management and evidence preservation

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CHAPTER SIX:

6. Trauma Management In Pre Hospital Setting

Learning Objectives: at the end of this training participants will be able to: -

- Identify the causes of trauma
- Properly assess trauma victims
- Recognize key findings suggestive of high-risk trauma
- Perform lifesaving actions for high-risk traumatic conditions

Introduction

Trauma is a disease; it can be prevented and treated. Currently, at global level, life threatening traffic accidents are the first in top worldwide on the list of causes of violent death. surprisingly up to 75% of the number of traffic accidents are reported in developing/ transition countries, although only around 30% of the total percentages of vehicles are owned by them.

6.1 Approach to Trauma Assessment

Trauma assessment involves

1. Primary Survey (ABCDE)
2. SAMPLE history
3. Secondary Survey (Head to Toe Examination)

1. Trauma primary survey/ The ABCDE Assessment approach

The ABCDE approach is vital to detect life threatening injuries early. In trauma assessment there are some unique features of ABCD assessment: -

- ✓ Always suspect head and spine injury in a patient with altered mental status
- ✓ People who initially appear uninjured may have hidden life-threatening injuries, such as internal bleeding. Therefore it is very important to re-assess trauma patients multiple times and, in particular, any time the patient's condition worsens.
- ✓ ABCDE Approach should be done within the first 5 minutes and repeated anytime the patient's condition worsens

I. Airway maintenance with restriction of cervical spine motion

Use the 5L while assessing the airway

Look for vomit, tongue or other objects obstructing the airway

Look for burned nasal hairs or soot around the nose or mouth

Look for head or neck trauma

Look for expanding neck haematoma (bleeding under the skin)

Assess for altered mental status

Listen for abnormal airway sounds

- Gurgling
- Snoring
- Stridor
- Noisy breathing

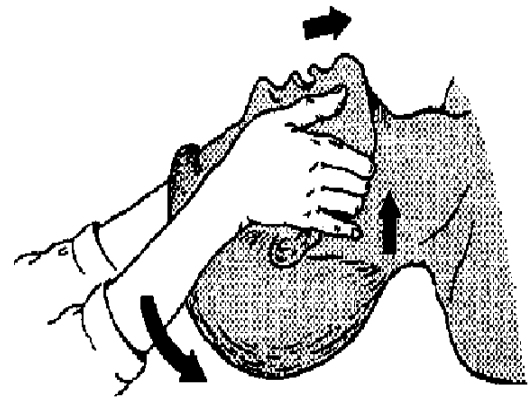
Critical AIRWAY Conditions:

✓ **Airway Obstruction: Signalled by**

- Visible blood, secretions, vomit, tongue, foreign body in airway
- Changes in voice
- Abnormal airway sounds (stridor, snoring, gurgling)
- Neck haematoma
- Burns to head and neck
- Mental status changes
- Poor chest rise
- Injury causing airway swelling

MANAGEMENT

- Monitor altered patients for potential aspiration
 - SUCTION airways as needed



- Open the airway using JAW THRUST
- Insert OPA/NPA
- Prevent excessive movement of the CERVICAL SPINE
- Rapid HANDOVER/TRANSFER for advanced airway management

II. Breathing and Ventilation Assessment and Management

Look for increased work of breathing

Look for abnormal chest wall movement

Look for tracheal shift

Look for sucking chest wounds

Look for cyanosis

Look for abrasions, bruising or other signs of injury to chest

Look for circumferential burns to chest or abdomen

Listen for absent/decreased breath sounds

Listen for dull sounds or hyperresonance with percussion

Feel for crepitus, cracking and popping with palpation

Injuries that should be identify during primary survey include tension pneumothorax, massive hemothorax, open pneumothorax, and tracheal or bronchial injuries.

A. Tension Pneumothorax/TNP

TNP occurs when excessive air is accumulated in the lung parenchyma (a “one-way valve” air leak occurs from the lung or through the chest wall)

S/S

- low BP **with** difficulty breathing and any of the following:
 - Distended neck veins
 - Absent breath sounds on affected side
 - May have tracheal shift away from affected side

Management

- Give OXYGEN and IV FLUIDS
- placing the large, over-the-needle catheter at the fifth interspace, slightly anterior to the midaxillary line
- Plan for HANDOVER/TRANSFER
 - Patient needs chest tube

B. Sucking Chest Wound (Open Pneumothorax)

It refers to a condition where air enters into the chest cavity through the wound.

Large Defects to the chest wall that remain open can result in an open pneumothorax

s/s

- Open wound to chest wall with air passing through.
- Bubbling or sucking noises
- Difficulty in breathing
- Chest pain

Management

- Give OXYGEN
- Place a THREE-SIDED DRESSING
- Any occlusive dressing (e.g. plastic wrap or petrolatum gauze)
- Observe continuously to prevent dressing occlusion (tension pneumothorax)
- Plan for rapid HANDOVER/TRANSFER for placement of a chest tube

C. Massive Hemothorax

The accumulation of >1500 ml of blood in one side of the chest

S/S

- Difficulty in breathing
- Decreased breath sounds on affected side
- Dull sounds with percussion on affected side

- Large haemothorax may cause shock

Management

- Give oxygen and IV fluids.
- Rapid handover/transfer

III. Circulation Assessment

Look for capillary refill greater than 3 seconds

Look for pale extremities

Look for distended neck veins

Look for external and internal bleeding

Common sites: chest, abdomen, pelvis, femur, amputations, large external wounds, burns

Look for burns (size and depth)

Feel for cold extremities

Feel for weak pulse or tachycardia

Critical CIRCULATORY compromise Conditions is shock.

Shock:- refers to the lack of perfusion to vital organs and is manifested by

- Tachycardia
- Tachypnoea
- Pale skin
- Cold extremities
- Slow capillary refill
- May have dizziness/confusion/ altered mental status
- External or internal bleeding (chest, abdomen, pelvis, femur, blood vessels)

Management

- CONTROL BLEEDING
 - Direct pressure
 - Deep wound packing if wound is deep, open (gaping wound)

- Splint fractures, bind pelvis as needed
- Start 2 large IVs, give IV FLUIDS
- Plan for rapid HANDOVER/TRANSFER if large haemothorax/internal haemorrhage

IV. Disability Assessment

Look for confusion, lethargy or agitation

Look for seizures/convulsions

Look for unequal or poorly reactive pupils

Look for deformities of the skull

Look for blood or fluid from ears or nose

Check AVPU or GCS

Check movement and sensation in all extremities

Check blood glucose in the confused or unconscious patient

Critical DISABILITY Conditions is severe head injury

Severe Head Injury is manifested by:-

- Visual changes
- Memory loss
- Seizures/convulsions
- Vomiting
- Headaches
- Altered mental status or other neurologic deficit
- Scalp wound and/or skull deformity
- Bruising to head (especially around eyes or behind ears)
- Blood or fluid from ears or nose
- Unequal pupils

Management

- IMMOBILIZE the spine, use LOG-ROLL technique to examine the back



- Frequently reassess ABCDE
- Use GCS (AVPU) to assess and monitor patients with head injury
- CHECK glucose, give as needed
- Do not give food/drink by mouth
- Plan for rapid HANDOVER/TRANSFER

V. Exposure Assessment

Exposure enables you to examine different parts of a victim's body

Remove all clothing and examine the entire body for evidence of injury

Including back, groin and underarms

Assess the patient's back and spine using the log-roll manoeuvre



Preparing for log roll

Exposure Management

If spinal injury is suspected, perform log roll manoeuvre to examine the back

Remove restrictive clothing and all jewelry

Remove any wet clothes and dry patient thoroughly

Cover the patient as soon as possible to prevent hypothermia

Respect the patient and protect modesty during exposure

6.2. The SAMPLE History

SAMPLE history components	Ask the patient	Think this
S: Signs and Symptoms	<ul style="list-style-type: none"> • Are there changes in the person's voice such as a hoarse or raspy voice? • Does the person have any difficulty with breathing? 	<ul style="list-style-type: none"> • Changes in voice in association with injury to the head, neck or with burns may suggest airway swelling • may develop over time and may not be obvious in the ABCDE survey • May suggest injury to lungs, ribs, muscle, chest wall or spinal injury
	<ul style="list-style-type: none"> • About any previous bleeding before arrival • How long has there been bleeding? • How many bandages have been soaked? • Is the bleeding getting better or worse? 	<ul style="list-style-type: none"> • Patients may have a difficulty estimating blood loss so using length of time or bandages soaked may be useful
	<ul style="list-style-type: none"> • Is there any pain? • Where is the pain? • What does it feel like and how severe is it? 	<ul style="list-style-type: none"> • Pain is a sign of underlying injury • Headache may suggest the person has injury to the skull or brain • Pain along the spine may suggest injury that could damage the spinal cord • Pain in the pelvis or hips may suggest fracture (bleeding) • Pain may be the first suggestion of internal injury even if there is no external sign
	<ul style="list-style-type: none"> • Is there nausea or vomiting? • Is there reported numbness or weakness? • Any vision changes? 	<ul style="list-style-type: none"> • Nausea and vomiting may indicate a head or abdominal injury • Numbness and weakness may indicate spinal injury • Vision changes can be caused by head trauma to the eye, fractures around the eye or head injuries
A: Allergies	<ul style="list-style-type: none"> • Are there any allergies to medications? 	<ul style="list-style-type: none"> • Patient may require medications

<p>M: Medications</p>	<p>Currently taking any meds? Any new medications or recent dose changes? Obtain a full list of medications</p>	<p>Medications that affect blood clotting make bleeding more difficult to control increase the risk of delayed bleeding Blood pressure medications can make it difficult to manage shock</p>
<p>P: Past Medical History</p>	<ul style="list-style-type: none"> • Is the patient pregnant? • The date of their LMP • Past diseases 	<ul style="list-style-type: none"> • Pregnancy moves some organs out of their usual position • Pregnancy changes body's response to trauma
<p>L: Last Oral Intake</p>	<ul style="list-style-type: none"> • When did the patient last eat or drink? 	<ul style="list-style-type: none"> • A full stomach increases the risk of vomiting and possible choking
<p>E: Events Surrounding Illness</p>	<ul style="list-style-type: none"> • About mechanism of injury • seatbelts in RTA • Type of weapon(s) • drugs or alcohol involved? • type of burn (fire, scalding, chemical...) • 	<p>Certain mechanisms are a high risk even if the patient does not appear to be significantly injured or ill; consider hidden injuries</p> <ul style="list-style-type: none"> •

6.3. Trauma Secondary Survey

Remember: - you should have ALREADY completed the ABCDE Exam and treated life-threatening conditions BEFORE doing this extensive examination

*Perform a detailed head-to-toe examination of the patient

*Remember that very painful or frightening injuries may distract from others

*If the secondary exam identifies an ABCDE condition, STOP AND RETURN IMMEDIATELY TO ABCDE to manage it.

Head, ears, eyes, nose, and throat (HEENT)

LOOK

- Scalp wounds, bruising and deformities
- Unequal or unresponsive pupils
- Blood or fluid from ear or nose

LISTEN

- Stridor, Gurgling and Changes in voice

Feel

- Tenderness, Loose teeth, crepitus in the skull

Neck

Look

- Reduced ability to move neck or pain on movement
- Bruising, bleeding or swelling
- Haematoma
- Penetrating neck wounds
- Distended neck veins

Feel

- subcutaneous emphysema

- Tenderness or deformity along the spine

CHEST

Look

- Bruising, deformity, wounds
- Unequal chest movement
- Burns around the entire chest

Listen

- Breath sounds
- Muffled heart sounds

Feel

- Tenderness, Crepitus

ABDOMEN

Look

- Abdominal distension
- Visible wounds, bruising or abrasions
- Bruising on back or abdomen
- Circumferential burns to the abdomen

Feel

- rebound tenderness or guarding

PELVICE AND GENITALS

Look

- Bruising/lacerations to pelvis
- Blood at the opening of the penis, vagina or rectum.
- Penile lacerations
- Priapism
- Urine colour changes

Feel

- Tenderness or abnormal movement in pelvis

EXTREMITIES

Look

- Swelling, bruising and Deformity
- Open fractures
- Amputation
- Circumferential burns
- Pale skin

Feel

- Absent or weak pulses
- Cold skin
- Tenderness
- Abnormally firm, painful muscular compartments in the extremities.

SPINE/BACK

- Log roll the person
 - Look
 - Bruising and Deformity
 - Feel
 - Tenderness, crepitus and alignment along the entire spine (upper neck to lower back)
 - Tenderness, crepitus or misalignment over any other areas with visible evidence of trauma

SKIN

Look

- Bruising, Abrasions, Lacerations

Feel

- peripheral pulses in all extremities
- Burns

NEUROLOGIC

Check

- Decreased level of consciousness (using AVPU or GCS) and seizures/convulsions,
- Movement and strength in each limb

- Sensation on face, chest, abdomen, limbs
- Priapism (persistent penile erection)

CONDITIONS IDENTIFIED AND MANAGE DURING SECONDARY SURVEY

✓ **Penetrating Eye Injury**

s/s

- Object stuck in the eye
- Painful red eye or a reported feeling of something in eye
- Problems with vision
- Abnormally shaped pupil
- Clear liquid draining from the eye
- Signs of trauma around the eye

Management

- Do **not** push on the eye
- Do **not** remove objects penetrating the eye
- Give ANTIBIOTICS
- Elevate the head of the bed and place a patch over **both** eyes
- Plan for HANDOVER/TRANSFER
- **Penetrating Neck Wound**

Signs and Symptoms

- Lacerations or punctures to the neck
- Swelling (suggesting haematoma)
- Look carefully

Management

- Maintain CERVICAL SPINE PRECAUTIONS
- Stabilize but do **not** remove object
- APPLY firm pressure to bleeding sites (do not block airway)
- Do **not** insert anything into the wound

- Plan for rapid HANDBOVER/TRANSFER to a centre with advanced airway management and surgical capabilities
 - ❖ Patients with penetrating neck wounds are at risk of airway obstruction
 - ❖ Neck wounds may cause significant bleeding

✓ **Chest injury**

s/s

- Difficulty in breathing
- Crepitus or tenderness with palpation to the ribs
- Uneven chest wall movements or unequal breath sounds

Management

- For patients with pneumothorax, give OXYGEN and monitor for signs of tension pneumothorax
- If suspected rib fractures (crepitus or tenderness), consider underlying chest or abdominal injury
- Plan for rapid HANDBOVER/TRANSFER for chest tube in pneumothorax or advanced airway and breathing management
 - ❖ Difficulty in breathing due to lung injury can develop over time, monitor closely
 - ❖ Simple pneumothorax can develop into a tension pneumothorax over time

✓ **Abdominal injury**

s/s

- Abdominal pain or vomiting
- Tender, firm or distended abdomen
- Strong abdominal wall muscle contractions when touched (guarding)
- Few or no bowel sounds
- Rectal bleeding
- Obvious injury or exposed bowel
- Bruising around umbilicus or over flanks (suggest internal bleeding)

Management

- If you suspect abdominal injury, give IV FLUIDS
- Do **not** give food or drink
- If bowel is visible
 - Leave outside the body
 - Cover with STERILE GAUZE soaked in sterile saline
 - Give ANTIBIOTICS
- If there is concern for any abdominal injury plan for HANDOVER/TRANSFER to surgical centre

✓ **Spinal Cord Injury**

s/s

- Midline spinal pain/tenderness
- Movement problems
 - Paralysis
 - Weakness
 - Decreased reflexes
- Sensation problems “pins and needles”
- Loss of control of urine or stool
- Priapism
- May have hypotension or bradycardia
- Crepitus to spinal bones
- Spinal bones not aligned
- Difficulty in breathing (upper c-spine injury)

Management

- provide SPINAL IMMOBILIZATION if there is a history of trauma and the patient is unconscious or is conscious and has neck pain, cervical spine tenderness, numbness or weakness
 - Use a rolled sheet or neck collar to IMMOBILIZE the cervical spine
- Keep the patient lying flat
- Use LOG-ROLL MANOEUVRE when examining or moving
- Give IV FLUIDS

- Plan for rapid HANDOVER/TRANSFER
- ✓ **Internal Bleeding (not seen on primary survey)**
s/s
- Bruising around umbilicus or over flanks
- Pelvic fracture
- Femur fracture
- Decreased breath sounds on one side of the chest
- Signs of poor perfusion
 - Hypotension, Tachycardia, Pale skin, Diaphoresis

Management

- STOP THE BLEEDING if possible
- BIND pelvis fracture
- SPLINT femur fracture
- Give IV FLUIDS
- Plan for rapid HANDOVER/TRANSFER for ongoing surgical management and blood transfusion if needed

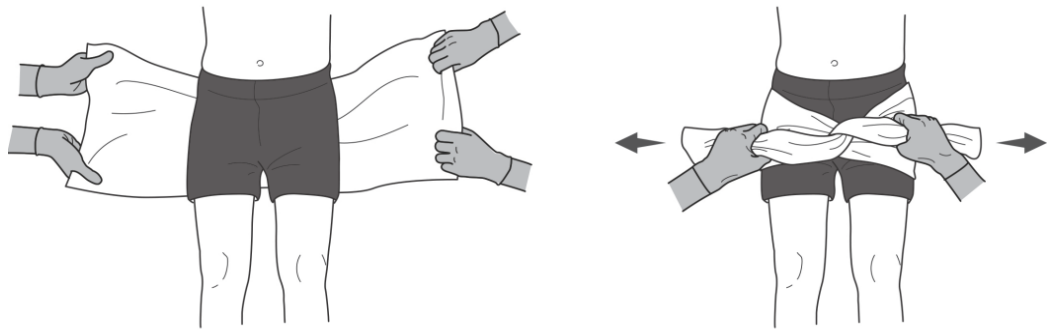
✓ **Fracture**

Pelvic Fracture

- Pain with palpation of the pelvis
- Instability or abnormal movement of the bones in the pelvis
- Blood at the opening of the penis or rectum

Management

- Give IV FLUIDS, Give PAIN CONTROL
- COMPRESS pelvis gently to check for stability
- Do not open and rock the pelvis or perform repeat exams on pelvis
- STABILIZE the pelvis with a sheet or binder
- Plan for rapid HANDOVER/TRANSFER for blood transfusions



Pelvic immobilization

✓ **Open Fracture**

s/s

- Deformity or crepitus of the bone with overlying laceration or abrasion

Management

- Control bleeding with DIRECT PRESSURE
- Perform immediate REDUCTION and SPLINTING if there is poor perfusion
- IRRIGATE the wound well
- Dress the wound
- Give ANTIBIOTICS and TETANUS vaccination
- SPLINT the wound
- Plan for rapid HANDOVER/TRANSFER to a specialized unit

✓ **Open Wound**

s/s

- Lacerations
- Abrasions
- Check for blood pooling under patient around axillae, genital area, buttocks or back
- Pumping or squirting blood suggests arterial bleeding

Management

- Control bleeding with DIRECT PRESSURE

- CLEAN wounds with soap and water or antiseptic
 - Remove any debris
- DRESS wounds with sterile gauze
- **Check** perfusion beyond the wound before and after dressing wounds
- SPLINT large lacerations to help with healing
- Stabilize but do **not** remove penetrating objects
- For snake bites, IMMOBILIZE extremity
- For animal bites, consult expert for risk of infection and rabies exposure
- Give TETANUS vaccination if needed

✓ **Blast Injury**

s/s

- Injuries to gas-filled organs
- Lung, stomach and bowel
- Delayed symptoms of cough (with or without blood), tachypnoea, hypoxia or chest pain
- Abdominal pain, nausea or vomiting (with or without blood)
- Tympanic membrane rupture, hearing loss, ringing in ears, pain or ear bleeding
- Burns
- Exposure to toxins
- Other injuries

Management

- Examine carefully for pneumothorax
- Give OXYGEN if there is difficulty breathing
- Manage IV FLUIDS for burns by calculating burn area
- Dress burns
- If the patient has abdominal pain, consider bowel perforation
 - Give IV FLUIDS
 - Plan for rapid HANDOVER/TRANSFER for surgery

✓ **Burn**

- Burn is destruction of a tissue by extremes of temperature

Causes of Burn injury

Thermal burn

- ✓ *Scalds—About 70% of burns in children are caused by scalds*
- ✓ *Flame—Flame burns comprise 50% of adult burns*
- ✓ *Contact—children and elderly. Work related*

Electrical burn

- ✓ *Domestic electricity—Low voltages tend to cause small, deep contact burns at the exit and entry sites. Giving rise to arrhythmias.*
- ✓ *Contact with voltage greater than 70 000 V is invariably fatal.*
- A particular concern after an electrical injury is the need for cardiac monitoring

Chemical burn

- Alkalis tend to penetrate deeper and cause worse burns than acids.

Burn Depth

- Depending on the depth of the injury burn is divided into 4 degrees

Superficial/First degree Burn: is limited to epidermis, Red or pink, painful, skin intact, no blisters When pressed, skin is pink with quick capillary refill

Partial thickness/Second-degree burn: - Point of injury **extends into the dermis**, with some residual dermis remaining viable. Characterised by Red or mottled red, Intact or broken blisters, wet, Painful, May temporarily turn white when pressed then red colour returns.

Full thickness/Third-degree burns: - involves **destruction of the entire dermis**, extending through the entire skin thickness and exposing the subcutaneous tissue. Characterized by White or black, Leathery and dry, No sensation, When pressed, no change in colour.



Classification of burn based on its depth

Management

The aims of burn management include:

Stop the burning process, Cool the burn, provide pain relief, Cover the burn and compensate for fluid loss

Stop the burning process: turns the burning source off

- Tell the victim NOT TO RUN instead Stop, drop and roll him/her.
- Smother with blanket or douse with water but take off blanket used to smother fire
- But adherent material such as nylon clothing should be left on
- Remove clothing and jewellery

Cooling the burn: Cooling removes noxious agents and reduces pain

- Done by tap water and is effective if performed within 20 minutes of the injury
- Do NOT use ice for cooling
- Cooling large areas of skin can lead to hypothermia, *be cautious*

Analgesia:

- *Opoids* or non-steroidal anti-inflammatory drugs such as ibuprofen

Covering the burn:

- Polyvinyl chloride film (cling film) is an ideal first aid cover
- This dressing is pliable, non-adherent, impermeable, acts as a barrier, transparent for inspection

- Avoid using wet dressings, as heat loss during transfer

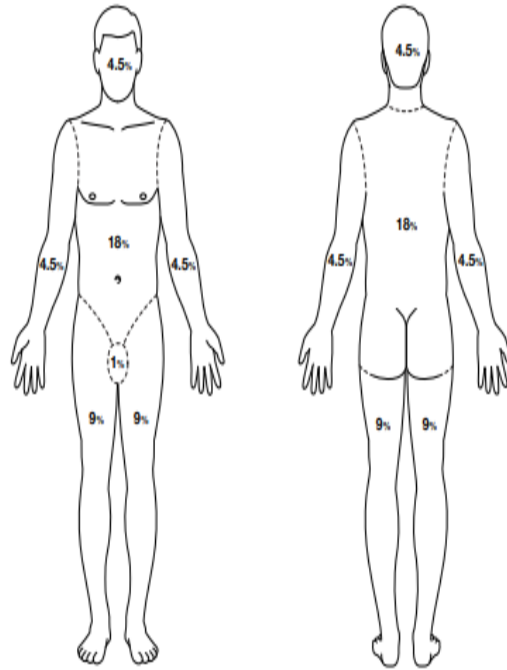
Compensate for fluid loss:

It is crucial to replace fluid loss and anticipate ongoing losses.

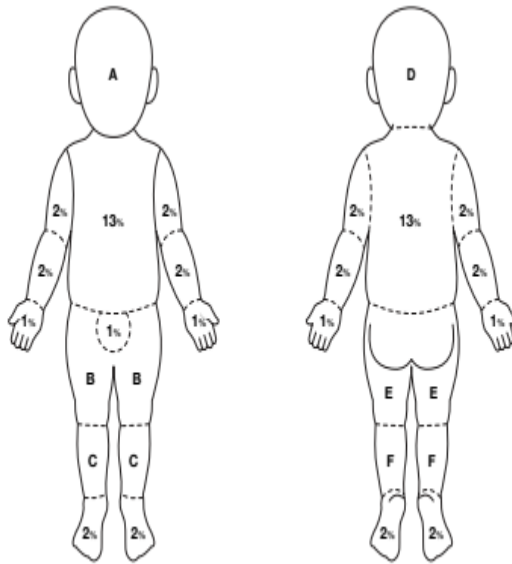
In order to calculate the IV fluid requirements, it is important to determine the depth of the burn and the percentage of body surface area (BSA) that is burned.

using the Parkland Formula. Use the Rule of Nines body chart for adults and modified chart for children and infants.

EMT refreshement DRAFT



Burn surface area in adults



Burn surface area in children

FLUID RESUSCITATION IN BURN INJURY

Start fluid resuscitation in the following cases:

- Full or partial thickness burns greater than or equal to 15% total burn surface area in adults.

- Full or partial thickness burns greater than or equal to 10% total burn surface area in children.

4 ml IV fluid X weight in kilograms X % total burn surface area*

*% total burn surface area = % partial thickness burn area + % full thickness burn area
(% superficial burn area is NOT used in the calculation)

The Parkland Formula is a fluid resuscitation management strategy for the initial 24 hours following a burn.

Patients presenting beyond 24 hours after the initial burn will also need fluid resuscitation, but the Parkland Formula is not used beyond 24 hours.

- The first half of the fluid should be given within the first 8 hours after the burn (NOT after arrival to care).
- The second half is to be given over the subsequent 16 hours.
- For adults, give normal saline or Ringer's Lactate.
- For children, use a dextrose-containing fluid (Ringer's Lactate with 5% dextrose or normal saline with 5% dextrose for initial resuscitation). If no dextrose-containing fluids are available, give an additional dose of dextrose (either IV or orally) with IV fluids.

Always Plan for rapid HANDOVER/TRANSFER of a burned victim early if the following:-

- Serious burns to >15% of body
- Burns involving the hands, face, groin area, joints, or circumferential burns.
- Inhalation injury.
- Burns with other associated trauma.
- Any burn in very young or elderly people.
- Significant pre-burn illness (such as diabetes).

The don't do of burn

- ✓ Use ice.

- ✓ Apply butter/ ointments to the burn
- ✓ Break/ Rupture blisters.
- ✓ Put oil over the burn area
- ✓ Put fermented flour
- ✓ Put roasted and meshed coffee
- ✓ Keep hot foods near child's reach
- ✓ Carry hot liquids while holding child

6.4. Special Considerations

Trauma affects different populations in different ways and as a result the management approach to these populations has minor differences.

A. Trauma during pregnancy

Trauma is one of the leading causes of non-obstetric morbidity and mortality in pregnant women. It is evident that even minor trauma occurring during pregnancy results in harm to the mother and fetus and as a result it is likely to cost two precious lives: the mother and her fetus. Scientific evidence shows that in traumatic events (particularly minor ones), the severity of maternal injuries may be a poor predictor of fetal distress and outcome. In general; successful outcomes for both mother and fetus require a collaborative effort among the prehospital provider, emergency physician, trauma surgeon, obstetrician, and neonatologist.

There is a general consensus ,for an EMT, that any female trauma patient between the ages of 10-50 should have a pregnancy test and to ask about gestational age and any pregnancy complications when taking SAMPLE history. You should also pay particular attention to women in their third trimester as they are at risk for placental abruption, uterine rupture and premature labour

✎ **Keeping the mother alive is the best way to keep the baby alive**

Common conditions caused by trauma

- Preterm (early) labour

- With or without premature rupture of membranes (loss of fluid surrounding the baby)
- Placental abruption or uterine rupture causing blood loss and shock
- Seizures/convulsions

Things to consider during Primary Survey

- Airway: Pregnancy makes airway obstruction more likely
- Breathing: Diaphragm is pushed up by the uterus, leaving less lung space
- Circulation: **Check** vaginal bleeding. Place patient in LEFT LATERAL POSITION
If no spine injury
- Disability: Always consider eclampsia if seizures
- Exposure: Keep the patient warm
-

Emergency prehospital Care

As in the care of all trauma victims, initial priorities remain the ABCs of resuscitation directed at the mother.

- All pregnant trauma patients should receive supplemental oxygen, as the gravida becomes less able to compensate for hypoxia.
- Peripheral intravenous lines with crystalloid infusions should be initiated in the prehospital setting.
- For pregnant patients >20 weeks of gestation who must be transported in the supine position or in whom spinal immobilization is indicated, **a wedge should be placed under the right hip area, tilting the patient approximately 30 degrees toward her left side**, to avoid hypotension from inferior vena cava compression by the gravid uterus. Alternatively, the uterus may be manually maneuvered to the left side of the abdomen by transport personnel.
- Pneumatic antishock trousers can be considered in a pregnant patient, the abdominal compartment must not be inflated, because that may cause uteroplacental compression and impair venous return to the heart.

- Prepare for neonatal resuscitation as well when trauma occurs in late pregnancy. A rapid assessment of fetal condition should be initiated with auscultation of fetal heart tones to determine fetal viability and identify fetal distress. It has been suggested that fetal viability in the setting of trauma is directly related to the presence or absence of fetal heart tones on presentation, and that if these are confirmed absent, then the remainder of treatment efforts be directed solely at maternal resuscitation.
- Plan for early HANDOVER/TRANSFER to a specialist centre with good obstetric care and notify the receiving facility in advance to enable the assembly of the appropriate hospital personnel to continue the resuscitation and management efforts.

B. Paediatric Trauma

Because children have different anatomy and physiology, the management of injuries in children differs in some respects from that of adults. Knowledge of these differences is crucial for emergency professionals to provide expedient and effective care to injured children. Care of the an injured children requires prompt triage and transportation to a designated paediatric center.

Special Features of trauma in Paediatrics

- ✎ Children can look well for a long time before deteriorating quickly
- ✎ They have different injury patterns
- ✎ Can have serious internal organ injuries without overlying skull or rib fractures

Common management problems (Over- or under-resuscitation, Medication errors)

- ✎ Failure to recognize hypothermia or hypoglycemia leads to fatal consequences
- ✎ Estimate weight in children based on age (Weight in kilograms= [age in years + 4] x2)

Prehospital management

- The priorities in managing children with traumatic injuries do not differ from those of injured adults.
- Injuries and conditions that require immediate lifesaving intervention are treated during the primary survey.
- All other conditions are identified and managed during the secondary survey.

Paediatric AIRWAY Considerations

- The most important step in trauma care for children is airway intervention. Proficient management of a child's airway requires an understanding of the anatomy of children, basic airway techniques, and methods for establishing a definitive airway. The cervical spine must be immobilized for head injury and suspected spinal injury until it is excluded.
- When neck trauma or cervical spine injury is suspected, use JAW THRUST to manually open the airway while maintaining cervical spine immobilization
- Children have relatively big heads and large tongues and may obstruct their airways more easily
- Young children and infants may require a pad under their shoulders to align the airway and create a neutral position



Neutral position in infants

Paediatric BREATHING Considerations

Cyanosis, agitation, poor capillary refill, bradycardia, and desaturation on pulse oximetry are signs of hypoxemia. Signs of inadequate ventilation in the young child include tachypnea, nasal flaring, grunting, retractions, and stridor or wheezing. If signs of inadequate oxygenation do not improve rapidly with high-flow oxygen administration, then PPV(positive pressure ventilation) must be started.

- ✓ If the child is not breathing adequately after opening the airway, assist breathing with BAG-VALVE-MASK with OXYGEN if available
- ✓ Give a breath every 4 seconds in older children
- ✓ Give a breath every 3 seconds in infants

Paediatric CIRCULATORY Considerations

- For ongoing blood loss or evidence of poor perfusion in children with normal nutritional status
 - ✓ Establish IV ACCESS start IV fluids
 - ✓ Reassess immediately after fluids
 - ✓ If no improvement, repeat IV FLUIDS
 - ✓ For malnourished children fluids must be adjusted
 - ✓ For severe burn injury initial bolus is with dextrose-containing fluids
 - ✓ For significant haemorrhage plan for rapid HANDOVER TRANSFER to a specialized unit for possible blood transfusion

Paediatric DISABILITY Considerations

- Monitor a child's level of consciousness with the AVPU scale
 - Alert
 - Response to verbal stimuli
 - Response to painful stimuli
 - Unresponsive
- Assess for and manage convulsions/seizures
- Assess for and manage hypoglycaemia (low blood sugar)

Paediatric EXPOSURE Considerations

- Undress completely but watch for hypothermia
- Protect the child's modesty
- Use log-roll to assess remainder of child's back and head

Specific body injuries in paediatric trauma

Head injuries

- ✓ Common cause of death in children from trauma
- ✓ If a paediatric patient has signs of brain injury, plan for rapid HANDOVER/TRANSFER
- ✓ Commonly caused by Falls, motor vehicle crashes, sports injuries
- ✓ A child's head encompasses a relatively larger proportion of body mass and area. The bones of the neck are not fully developed, so the head is attached on a largely ligamentous connection. The incompletely myelinated brain is more susceptible to shear forces during trauma. Because of cartilage in the skull and the presence of open sutures, young children are better able to tolerate increased intracranial pressure than are adolescents and adults
- ✓ Most children will have suffered a mild head injury and present with no or few symptoms. Common symptoms associated with head injury include vomiting, headache, and lethargy.

Chest injuries

- ✓ Children require less force for more serious internal injuries
- ✓ Ribs are more flexible than in adults so there can be underlying trauma without fractures

- ✓ Children, with their relatively compliant chest walls, may not show external evidence of serious intrathoracic trauma. Blunt trauma occurs more frequently than penetrating trauma and may be equally as serious.

Abdominal injuries

- ✓ A child's abdomen is relatively larger and commonly injured
- ✓ Splenic injuries from blunt trauma and liver injuries from penetrating trauma are common
- ✓ Abdomen injuries should be considered in all paediatric traumas

CHAPTER SEVEN:

7. OBSTETRIC EMERGENCIES

Chapter Description

This chapter helps the trainees to acquire theoretical knowledge on emergency assessment and management of patients with obstetric emergencies. Besides, they develop good attitude through team work and effective communication among themselves and with emergency health facility professionals, and demonstrate the basic skills that enable them to provide emergency care before and post delivery at the scene and / while enroute

General Objective

At the end of this chapter, trainees will be able to

- ✓ Acquire knowledge and develop skills on the assessment and management of mothers with obstetric and gynaecologic emergencies

Enabling objectives

- ✓ Identify the common emergencies before deliveries
- ✓ Describe post delivery emergency
- ✓ Provide emergency care for obstetric and gynaecologic problems that happened before and after delivery

Session outline

This chapter has the following sessions

Session 7.1 EMERGENCIES BEFORE DELIVERIES

Session 7.2 POST-DELIVERY EMERGENCY

7.1. EMERGENCIES BEFORE DELIVERIES

7.1.1 Introduction

Anatomy and physiology female reproductive tract

The structures of reproductive tract includes vagina, cervix, uterus, fallopian tube and ovaries

Menses is periodic discharge of blood, mucus and cellular debris from the reproductive tract. The onset is 12-13 years old and its' cycle lasts 28 days. Menstrual flow lasts 4-6 days and menopause occurs between 35-60 years of age

At ovulation, an egg is released from the ovary and begins its journey through the fallopian tubes. While in the tube the egg is fertilized by the sperm. Once the egg reaches the uterus implantation will occur

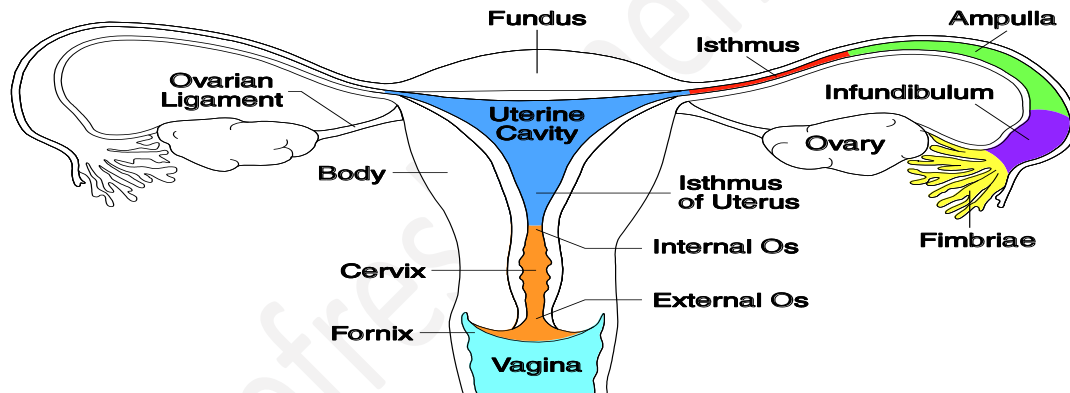


Figure 1 The female reproductive tract

6.1.2 Preeclampsia and Eclampsia

General objective

At the end of this session, trainees will be able to

- ✓ Acquire knowledge and develop skills on emergency management of women with preeclampsia and eclampsia

Enabling Objectives

- ✓ Describe preeclampsia and eclampsia
- ✓ List EMTs role on emergency management of pregnant women with pre eclampsia and eclampsia

Pre-eclampsia

- Is the development of hypertension (BP \geq 140/90 mm Hg) after 20 weeks of gestation and, protein uria with /without non dependent edema
- Mild or Severe

Eclampsia

- Is preeclampsia with generalized convulsion and/coma

Severe Preeclampsia

- Bp \geq 160/110 mm Hg
- Head ache , blurting of vision
- Oliguria
- Pulmonary edema
- Epigastric/RUQ pain
- Impaired liver function
- Thrombocytopenia
- HELLP syndrome
- IUGR

EMTs role on emergency management of preeclampsia

- Reassure the mother

- Check ABC
- Administer oxygen
- Elevate the foot to decrease swelling
- Provide quiet surrounding
- Continuous blood pressure monitoring
- Rapid transportation

EMTs role on emergency management of eclampsia

- Reassure the woman and her family that when she arrives at the health facility, the doctor will give her drugs to reduce her high blood pressure and to prevent her from developing convulsions
- Check ABC
- Provide adequate oxygen with face mask
- Monitor oxygen saturation
- Do not leave the patient alone
- Measure vital sign
- Put the patient in left lateral position
- Rapid transportation



Figure 2 It is safe to transport the mother to hospital lying on her left side

7.1.3 APH

General objective

At the end of this session, trainees will be able to

- ✓ Acquire knowledge and develop skills on the assessment and management of Anti Partum Hemorrhage (APH)

Enabling Objectives

- ✓ Describe APH
- ✓ Assess and manage APH

APH (Ante Partum Hemorrhage)

Bleeding from placenta site due to premature separation of placenta after 28 weeks of pregnancy or before the birth of baby

Causes

Placenta previa - when placenta is sited completely or partially in the lower part of the uterus and can overlie the cervix

-Bleeding is usually brighter and painless, can occur before or during labor

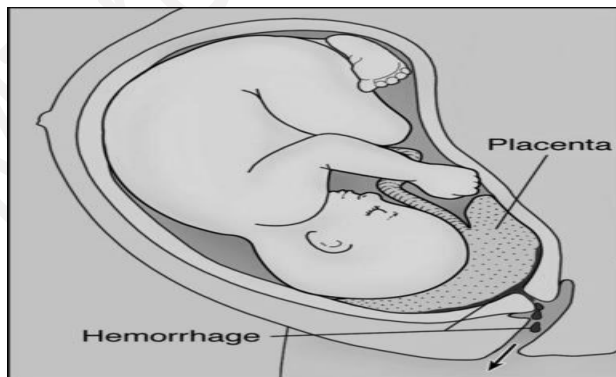


Figure 3 Placenta previa

Placenta abruptio - when a normally sited placenta separates from the uterine wall during late pregnancy or in labor

- Vaginal bleeding associated with abdominal pain, tender uterus sometimes fetal distress or fetal death

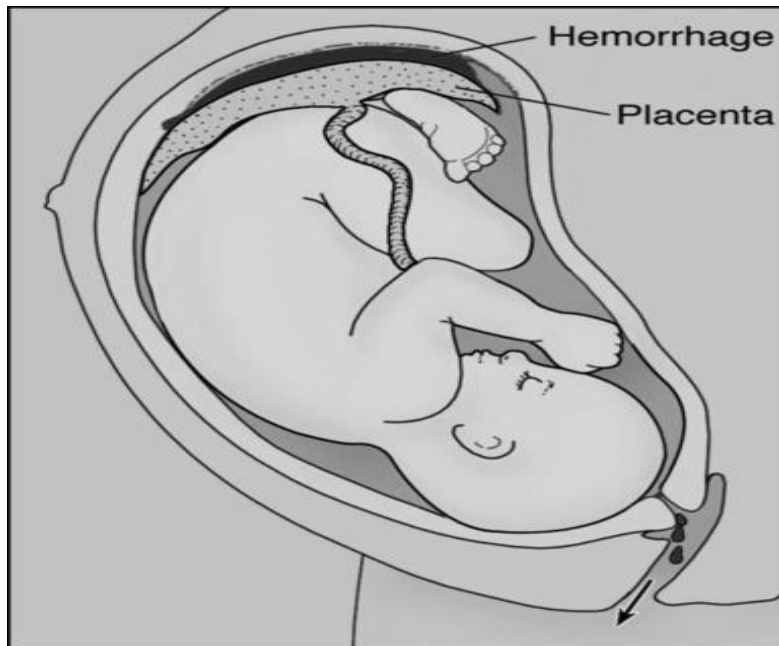


Figure 4 Placenta Abruptio

Uterine rupture - usually in multipara, associated with prolonged /obstructed labor

Local causes - from vagina, cervix...

EMTs role on emergency management

- Ensure scene safety
- Body substance isolation
- Check ABC and level of consciousness
- Vascular access and start crystalloid (N/S/ ringer lactate)
- Reassure the mother
- keep mother with trauma on shock position
- Give her two perineal pads and wrap a linen and plastic sheet around women hip

- Taking vital signs frequently
- Take the mother immediately to the hospital with high flow oxygen

7.1.4 Assessment of Labouring Mother

General objective

At the end of this session, trainees will be able to:

- ✓ Acquire knowledge on the assessment of laboring mother

Enabling objectives

- ✓ Define labour
- ✓ Identify stages of labour
- ✓ Assess labouring mother

Stage of Labour

Labour: It refers to a process of expelling the fetus, placenta, and membranes from the uterus. It has 3 stages

1. 1st stage of labour: refers to labor from the onset of regular contraction till fully dilatation of cervix
2. 2nd stage of labour: refers to labor from fully dilatation of the cervix until the expulsion of the fetus
3. 3rd stage of labour: Refers to labor from the expulsion of the fetus till full delivery of the placenta and membranes

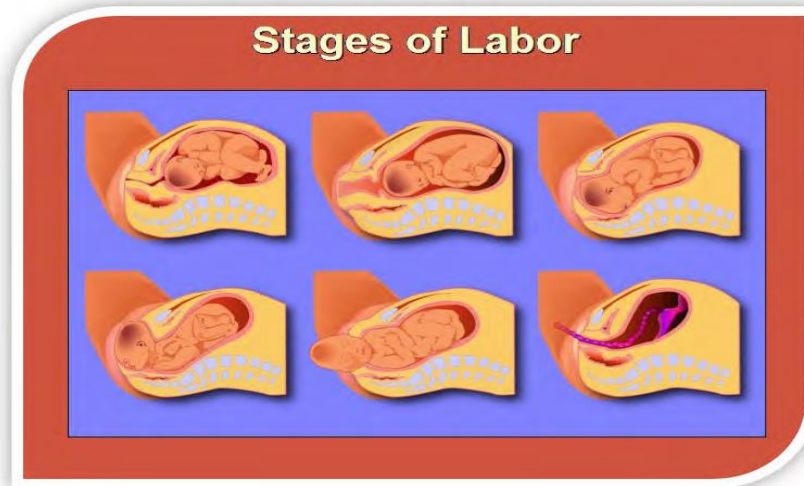


Figure 5 Stages of labor

Assessment of labor

- Ensure scene safety
- BSI precautions
- Identify when labour started and frequency of contraction.
- Distinguish if water is ruptured or not. If so, find out when it was ruptured
Ask the mother if she feels to clear her bowel
- Maintaining the women privacy during examination
- Check her vital sign
- Transport her as soon as possible to the health facility

7.1.5 Normal Labour and Delivery Emergency Management

General objective

At the end of this session, trainees will be able to:

- ✓ Develop skills on emergency care of normal labor and delivery

Enabling objectives

- ✓ Describe preparing for delivery during emergency
- ✓ State the steps to assist in the delivery
- ✓ Describe the measures during un ruptured amniotic sac
- ✓ State the steps of delivery of the placenta
- ✓ Perform assessment of APGAR score of a new born

Emergency care

- Use BSI protective materials
- Ensure scene safety
- When labour and delivery is not imminent, let the mother to lie down on left lateral position and facilitate transportation to the health facility
- If the delivery is imminent and decide to deliver on the scene,. Be calm, reassure and assist the mother
- When the condition is beyond your capacity, transport the mother even if delivery occurs on the way
- If delivery is imminent with crowning, contact the health facility for a decision to deliver on site or transport
- Position the mother for delivery in semi fowler position
- Puncture the amniotic membrane slowly if it is not ruptured, and record for any colour change and/ foul smelling of amniotic fluid



Figure 6 Positioning the mother and preparing the delivery field

- Preparing the delivery field



Figure 7 Use sterile sheet and towel from OB kit to make a clean delivery field.

- Delivering the baby

Steps to deliver the baby

1. Prepare the necessary equipment if the mother is on 2nd stage of labour.
2. Explain what you are going to do
3. Clean and drape the perineal area

4. Support the perineum with one hand firmly and place a piece of gauze on the anus to clean the stool it may be pushed out during delivery of the head.
5. Using the other hand apply mild pressure downward on the bony part of the fetal head that helps the head to be well flexed.(see the figure 7 below)

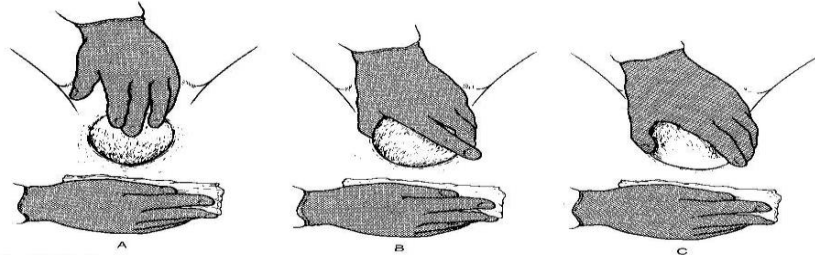


Fig. 24.6 Delivering the head. (A) Preventing too rapid extension. (B) Controlling the crowning. (C) Easing the perineum to release the face.

Figure 8 Delivering the head

6. After the head delivered carry it on the left hand and with dry swap wipe the eyes by the right hand
7. Suction fluid from the mouth, then the nostrils using bulb syringe. (see figure 8 below)



Figure 9 Support the bony parts of the head with your hand as it emerges

8. Look if the cord is tied around the neck. If it is there, clamp it and then cut
9. After the head delivered, deliver the anterior and posterior shoulders

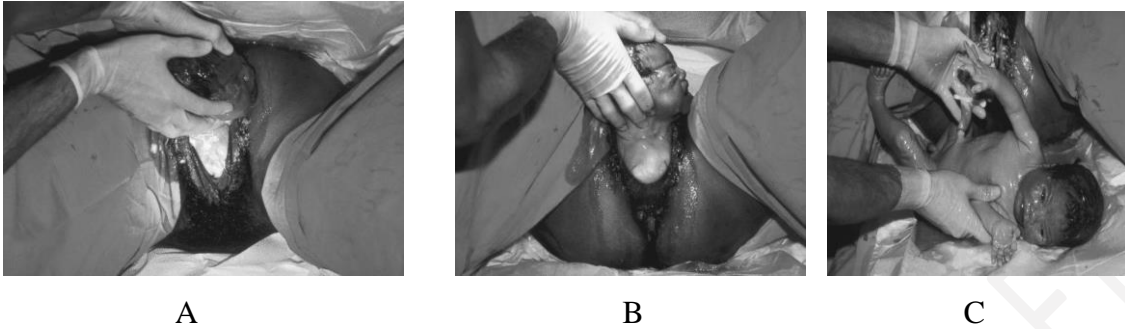


Figure 10 A. Down ward traction releases anterior shoulder B. An upward curve allows the posterior shoulder to escape C. Hold the baby safely and clamp the umbilical cord 2 to 4 inch apart and cut between them

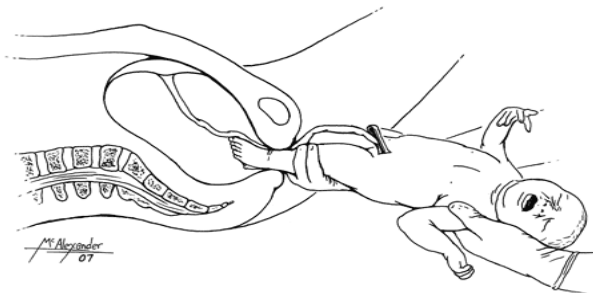


Figure 11 As the new born exists, grasp the lower leg firmly near the ankle to avoid dropping the slippery body

10. Put the baby on the mother's abdomen, clamp the cords in to two places 2 to 4 inch apart and
cut the cord between two clamps using sterile scissor or scalpel
11. Lay the baby down and clear the airway using bulb syringe.
12. Tie the cord (baby) label if necessary, and drape the baby in baby blanket.
13. Don't interfere and allow the placenta to complete its separation and descended to the lower segment .(Look for sign of separation)
14. Do not pull on the umbilical cord to speed delivery

15. Record everything especially time of delivery of the baby
16. Clean and return all equipment in to their proper place after sterilization if necessary



Figure 12 Delivering the Placenta

Neonatal Evaluation

Use the **APGAR scoring** system to evaluate the newborn at the 1st and 5th minutes of birth
 Normally, it should be greater than 7

Table 1 APGAR Scoring System

Area of Activity	Score		
	2	1	0
Appearance	Pink	Body pink, extremities blue	Blue or pale
Pulse	More than 100 beats/min	Less than 100beats/min	Absent pulse
Grimace or Irritability	Cries and tries to move foot away from finger snapped against its sole	Weak cry in response to stimulus	Does not cry or react to stimulus

Activity or muscle tone	Resists attempts to straighten hips and knees	Weak attempts to resist straightening	Completely limp, with no muscle tone
Respiration	Rapid respiration	Slow respiration	Absent respiration

7.1.6 Abnormal Labour and Delivery Emergency Management

General objective

At the end of this session, trainees will be able to:

- ✓ Acquire knowledge and develop skill on the emergency management of cord prolapse during labour

Enabling objectives

- ✓ Define cord prolapse
- ✓ Provide emergency care for laboring mother with cord prolapse

Cord Prolapse

Occurs when the cord slips down in to the vagina or presents when the amniotic membrane have ruptured

Fetal asphyxia may rapidly ensue if circulation through the cord is not established and maintained until delivery

Emergency Care

- If the umbilical cord is seen in the vagina
 - Position the mother in Trendelenberg or knee chest position to relieve pressure on the cord
 - Instruct the mother to “pant” with each contraction to prevent her from bearing down
 - Contact receiving health facility and explain the condition

- If you can't contact, feel the fetal heart beat and if it is with normal range, transport rapidly in knee-chest position. Explain to the mother why you are doing this and reassure
- If despite the knee chest position and still there is fetal distress
 - Administer oxygen
 - Confirm the mother is maintaining knee chest position
- If still no change and you have to go long distance
 - Insert two gloved fingers in to the vagina and gently elevate the presenting part to relieve pressure on the cord and restore umbilical pulse
 - Don't attempt to reposition or push the cord back into the uterus
- If assistance is available, apply moist sterile dressings to the exposed cord and rapidly transport to health facility

5.3. POST-DELIVERY EMERGENCY

General objective

At the end of this session, trainees will be able to

- ✓ Acquire knowledge and develop skill on the emergency management of PPH

Enabling objectives

- ✓ Define Post Partum Hemorrhage (PPH)
- ✓ List causes of Post Partum Hemorrhage (PPH)
- ✓ Explain emergency management of Post Partum Hemorrhage (PPH)

7.2.1 Post-Partum Hemorrhage (PPH)

PPH - is excessive bleeding after delivery of the fetus

Normal amount of blood after vaginal delivery is up to 500ml and caesarean delivery is up to 1000ml, without abnormality in vital sign or anemia

Causes

- Uterine atony - the most common cause
- Retained placenta
- Genital trauma
- Coagulation abnormalities

Emergency management

- Elevating the foot above the level of the heart
- Oxygen administration
- Vascular access and start isotonic fluid (normal saline /ringer lactate)
- Applying sterile vaginal pad and putting the soaked pad in bag and taking to health facility in order to determine the amount of bleeding
- Massaging around the external abdominal wall
- Reassuring her and urgent transportation to nearest health facility

Chapter Eight

8. Communication within Ambulance Service, Documentation, Monitoring & Evaluation

Chapter Description: this chapter will be describing about the communication process in emergency medical service system, barriers for EMS communication. Principle of EMT communication documentation, principle of documentation, monitoring and evaluation. The chapter have a brief summarized note, chapter objective, enabling objective and session outline. At the end summary question as part of formative assessment of trainees at the end of the chapter.

Chapter Objective

By the end of this chapter the participants will be able to:

- ✓ Discuss the process of communication
- ✓ Identify the principle of effective communication
- ✓ Explain proper documentation and principle
- ✓ Identify special reportable events

Enabling Objectives

- Create a conducive environment for effective communication
- Abide with the principle of documentation and communication
- Screen and communicate on reportable incidents and document immediately

Total time allotted: 1:30 hrs.

Teaching methods

- ✓ Interactive lecture
- ✓ Role paly

Session outline

This chapter has the following sessions:

- EMS communication
- Process and Barriers of communication
- Principle of and component of documentation
- Monitoring and evaluation

8.1. Communication

Communication (Latin word “**Communis**” which means to share) is defined as the process of creating and sharing ideas, information, facts, feelings, etc. between 2 parties to reach a common understanding. Communication is an integral part of emergency care professionals as they spend 80% of their time communicating with different actors (dispatch, colleagues, Clients, health facilities).

6.1.1 Communication and its process

Naturally communication is a dynamic process that begins with the conceptualizing of ideas by the sender who then transmits the message through a channel to the receiver, who in turn gives the feedback in the form of some message or signal within the given time frame. In this process, EMTs should make sure that the receiver understands their message in the same way as it was intended. This is called effective communication.

6.1.2 Barriers to Effective Communication

Communication barriers may prevent communication or carry incorrect meaning due to which misunderstandings can be created. Therefore, it is essential for an EMT to identify such barriers and respond appropriately to make the communication process effective. The common communication barriers include, but are not limited to: -

1. Social Factors– Culture, Religion, Social values, Education level, Social status and Age
2. Patient related factors- pain, level of consciousness, sensory deficit, Emotional and Psychological factors
3. Professional related factors- Language, jargons, Use of an inappropriate medium (channel), Words that conflict with body language, being judgmental
4. Environmental factors– external/ internal distractions, Noise

- 6.1.3 Principles of effective communication
- In order to communicate effectively, EMTs should -
- Establish TRUST with clients
- Speak clearly, calmly and confidently
- Consider the different needs of clients
- Use verbal and non-verbal systems
- Use clear, simple messages and clarify intent
- Implement appropriate body language, gestures, facial expression
- Avoid distracting behaviour's
- Avoid jargon, abbreviations, inflammatory words and False reassurance
- Use appropriate communication devices
- For an aggressive patient try to assess the cause, Call law enforcement and stay clear

Eg Radio, Telephone, Data systems

Progress Check: -

1. List down the common barriers of communication

- ✓ _____
- ✓ _____
- ✓ _____
- ✓ _____

2. Describe the principles of effective communication

8.2 Documentation

Reporting and record keeping duties are an essential aspect of patient care. As a result, emergency medical technicians are expected to complete a formal process of recording their activities via different methods and written report about a patient. Reporting may be started en route but should be completed before leaving the receiving health facility.

6.2.1 Significance of documentation

Documentation plays many purposes including: -

- ✓ Ensuring that the care delivered was within the scope & practice of care givers involved.
- ✓ Ensures the continuity of patient care.
- ✓ Serves Legal purpose
- ✓ For further Education, Administrative and Research purposes
- ✓ Guarantee proper transfer of responsibility
- ✓ Comply with the requirement of health department, law enforcement agency and fulfill administrative needs.
- ✓ Kept as patient's permanent record and
- ✓ Baseline for improving EMS quality of care

6.2.2 Methods of Documentation

The minimum data set includes both narrative component and check off box (patient information and administrative information): -

The **S- CHARTS** Pneumonic is used to summarize the documentation activities

- ✗ S = Subjective data collection (Age, Sex, History of the incident, pain ...)
- ✗ C= Chief complaint
- ✗ H= History (SAMPLE history)
- ✗ A= Assessment (Primary & secondary survey findings, V/S, P/E, ongoing assessment)
- ✗ R= Rx (*treatment*): - includes all interventions provided.
- ✗ T= Transport (describes how the patient was transported and any changes during transport)
- ✗ T= Time (Time that the incident was reported, arrival at the scene, EMTs left the scene, arrival at the receiving health facility and the time that patient care was transferred)
- ✗ S= Special reportable events ([see section 6.3](#))



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NB. What is not documented is not done

- ✗ It should be filled completely
- ✗ The report should be accurate, objective and submitted in a timely manner.
- ✗ Use only standard abbreviations.
- ✗ When information is of a sensitive nature note the source of the information.
- ✗ Be sure to spell words correctly, especially medical terms.
- ✗ Record the time with all assessment findings.

- ✗ Keep it confidential
- ✗ After completing a report, distribute the copies to receiving health facility and dispatch.
- ✗ If you discover errors in your documentation, draw a , initial it, date it and write the correct information next to it.

6.2.5 Documenting refusal of care

As the discipline dictates permission for treatment should be sought initially. But if the patient refuses try to persuade them. Also make sure that the patient is able to make a rational, informed decision and is not under the influence/effects of alcohol or other drugs or illness or injury. If s/he still refuses, document any assessment findings and emergency medical care given, and then have they sign a refusal form with a witness. If the patient refuses to sign the refusal form, have a family member, police officer, or bystander sign the form verifying that the patient refused to sign.

6.3 Special reportable situations

In some instances, you may be required to file special reports with appropriate authorities. failure to report them may have legal consequences. This may include

- Suspected Physical, Sexual, or Substance abuse
- Possible Infectious diseases
- Certain crimes
- Injury to the EMS provider
- Mass Casualty incidents
- Situations requiring additional documentation or notification of other agencies (car Accidents, gunshot wounds, animal bites)

Summary

Communication is an integral part of EMTs daily activity and it requires the ability to overcome different barriers to make it effective. The way how communicates with a patient reflects the way how we treat them. Any activity is not over until the paper work is completed.

6.4 Monitoring and Evaluation

Emergency and critical care directorate (Ministry of health) has to invest enough time and resources for implementation of monitoring and evaluation standards throughout the training. One means of such monitoring is going to be using tools and strategies for systematically conducting training reviews and documentation of lessons learned and best practices. Training reviews will be conducted at the end of each training. Data collection methods such as interviews, Group Discussions is also a good practice.

Checklists will also be used to make sure that the training is being conducted at a well-equipped training centre and by appropriate trainers (qualification). Likewise, efforts will also be made to ensure that at least 7 days is budgeted for the training in a conducive environment. The trainee's number per session will be kept according to the standard so that every trainee will have the chance to participate in demonstration. Besides, the validity, reliability, integrity, and timeliness of the training resources will be assessed regularly.

In addition to the aforementioned monitoring activities, emergency and critical care directorate will act on any anticipated or identified systemic problems that may arise and respond to any emerging issues on time and carry out monitoring visits.

Emergency and critical care directorate in collaboration with training centers will conduct the evaluation of this training regularly. The evaluation be conducted using the training objectives and major indicators.

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9. Annex

9.1. Ambulance Equipment

The BLS ambulance service shall include the following medical equipments and supplies:

a. Ventilation and Airway Equipment

- Oxygen cylinder(2)
- O2 Face Mask(Adult & Pedi)
- non- rebrether mask adult and pedi
- O2 Nasal Catheter adult and pedi
- Ambubag Adult and pedi
- Nasopharengial Air Way d/t size
- Oropharengial Air way(1-4)
- Suction Chateter adult and child

b. Immobilization Devices

Cervical collars large medium and small

Soft

Hard

Arm Splint Adult and pedi

Leg splint Adult and pedi

c. Hemorrhage Control/Trauma kit

- Cotton Roll 100gm
- Elastic Bandege small,medium & large
- Roll Bandege(Guaze Bandege)18cm x 5cm
- Sterile Guaze 10 x 10
- Adhesive Plaster
- Triangulare Bandege
- Scisores
- Arterial Tourniquet

d. Obstetrical Kit

- Kit (separate sterile kit) sterile scissors
- Towels Larg
- sterile gloves
- sterile gauze pads
- clamps for cord

- Shoes
- Reflective safety wear

h. Communication

- Cell Phone
- Radio phone

i. Emergency medicine and analgesics

- Adrenalin 1ml inj
- oral glucose
- Nitroglycerin sublingual tablet
- Asprine 300 mg tab
- Hydrochortison 100mg inj
- Tramadol 50mg inj
- Diclofinac 75 mg inj
- Diazepam 10mg in 2ml inj
- Panadol Po 1gm
- Diclofinac 50 mg po

j. IV Fluids

- R/L 1000ml
- N/S 1000ml
- D/W 1000ml
- 40% Glucose

Delivery Kit

S.N	Delivery set, clamps, scissors or scalpel, sterile towel, swabs
1	Umbilical cord tape
2	Sterile gloves
3	Small rubber bulb syringe
4	Towels
5	Infant blanket
6	Antiseptic solutions
7	Infant Ambu bag
8	Oxygen face masks
9	Full oxygen cylinder
10	Manual Suction

11	Labelling
12	Sanitary napkins
13	Plastic bag
14	BSI equipment (Apron, goggles, surgical mask...)
15	Crystalloids (IV fluids), IV canulas , IV sets

9.2. Skills list

- Cervical spine immobilization
- Spine immobilization and log-roll manoeuvre
- Jaw-thrust manoeuvre
- Airway suctioning
- Insertion of oropharyngeal and nasopharyngeal airway
- Recovery position
- Oxygen delivery
- Bag-valve-mask ventilation
- Needle decompression for tension pneumothorax
- Three-sided dressing for a sucking chest wound
- Direct pressure for haemorrhage control, including deep wound packing
- Tourniquet for haemorrhage control
- IV fluid resuscitation
- AVPU and GCS assessment
- Pelvic binding
- Basic fracture immobilization
- Trauma secondary survey
- Basic wound management, including irrigation (washing)
- Burn management

9.3. Pre-test and Post test

1. Which of the following is not component of EMSS

- A. Basic life support
- B. Patient rehabilitation
- C. Early incident recognition
- D. Advanced cardiac life support

2. which one is the best character of a good call taker

- A. High quality voice
- B. Dominating the caller
- C. confronting the caller to identify the reason of calling is emergency or non-emergency
- D. None

3. Which of the following **is** included in the legal responsibility of EMS provider

- A. Make emotional needs of the patient a priority
- B. Practice/maintenance of skills to the point of mastery.

C. Attend continuing education/refresher programs

D. All

1. Which of the following maneuvers may **not be** used in trauma patients with suspected C-spine

injury?

A. Jaw thrust

B. Head tilt chin lift

C. Oral airway insertion

D. Nasopharyngeal airway insertion

2. The **most** common cause of airway obstruction in adult patients with loss of consciousness is

A. Foreign body

B. Tongue

C. Anaphylaxis

D. Infection of upper airway

3. Signs of adequate breathing in emergency patients include (s)

A. A normal respiratory rate

B. A regular pattern of inhalation and exhalation

C. A regular and equal chest rise and fall

D. All of the above

4. Which of the following is the **late** manifestation of shock?

A. Tachycardia

B. Shallow and rapid breathing

C. Decreased blood pressure

D. Weakness at rest

5. A 35 years old male is hit by automobile to his right femur and has external bleeding from the

wound site. As an EMT, your priority of action to control the bleeding is

A. Direct digital pressure over the wound

B. Elevate the affected extremity

C. Apply pressure over pressure points

D. Apply splint

- 1, The role of EMT in the management of PPH (Post Partum Hemorrhage) include all **except**
- A. Prevent shock by elevating the legs above the level of the heart
 - B. External massage of the uterus if bleeding is severe
 - C. Oxygen administration
 - D. Oxytocin infusion**
2. Which of the following is the life threatening emergency associated with pregnancy?
- A. Anti-partum Haemorrhage (APH)
 - B. Eclampsia
 - C. Severe preeclampsia
 - D. All of the above**
3. A 24 years old lady, who is pregnant for the first time and has had head ache, blurring of vision and a blood pressure of 170/110 mm Hg, suddenly developed generalized convulsion followed by coma. Your role as EMT on managing the patient doesn't include
- A. Checking ABC
 - B. Administering high flow oxygen with face mask
 - C. Putting her in supine position**
 - D. Rapid transport to emergency facility

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