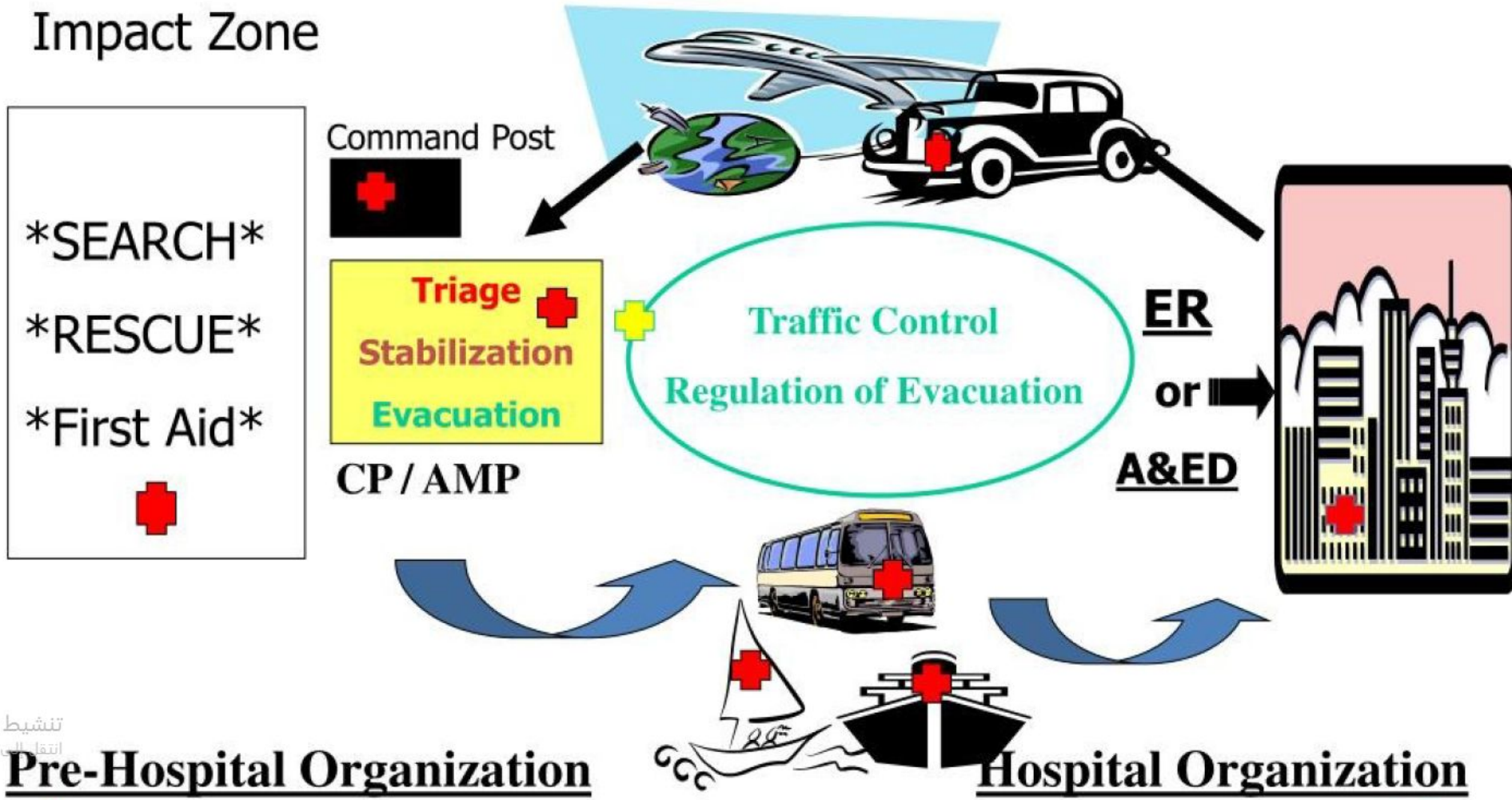
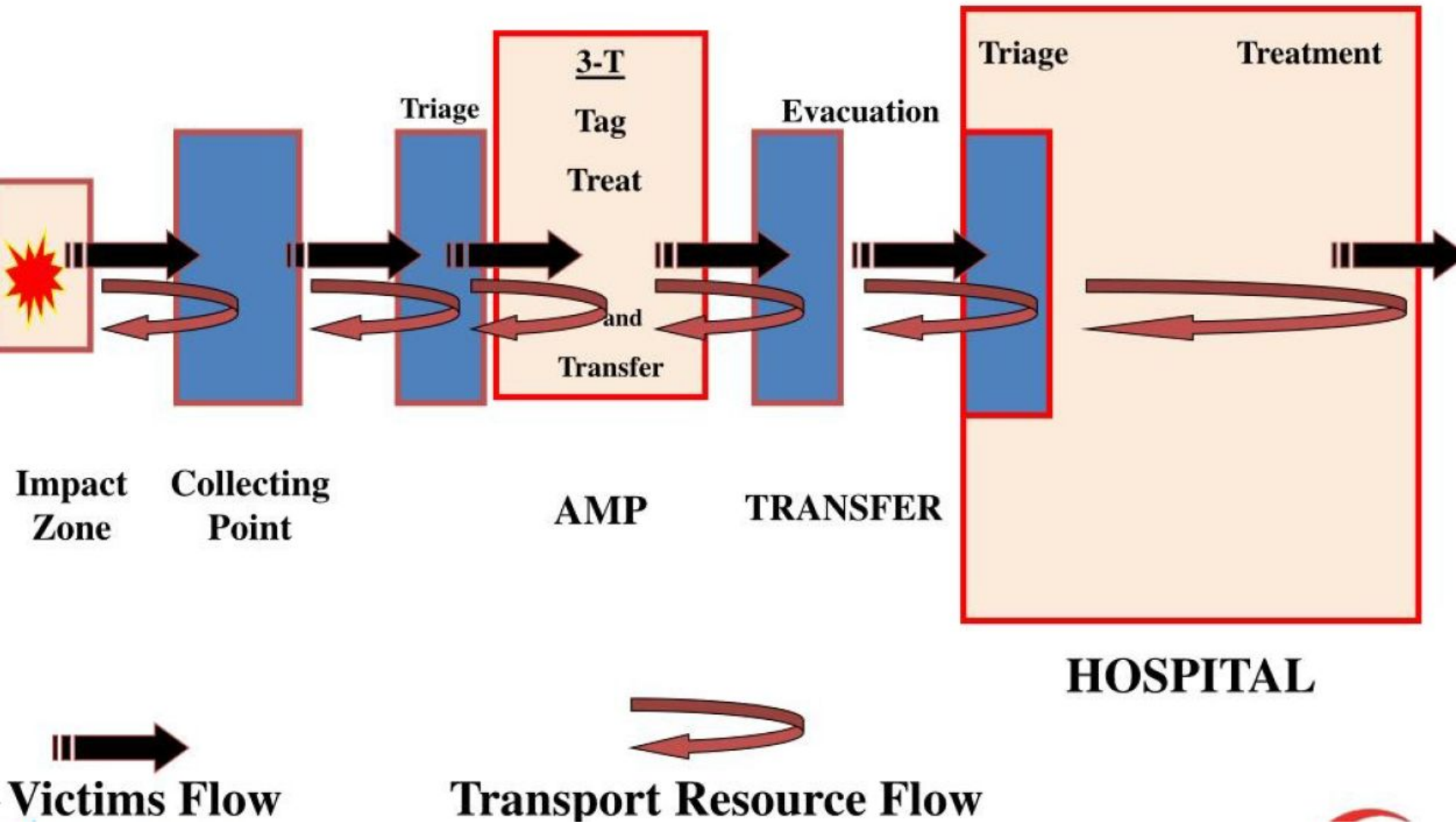
Response Categories for Mass Casualties

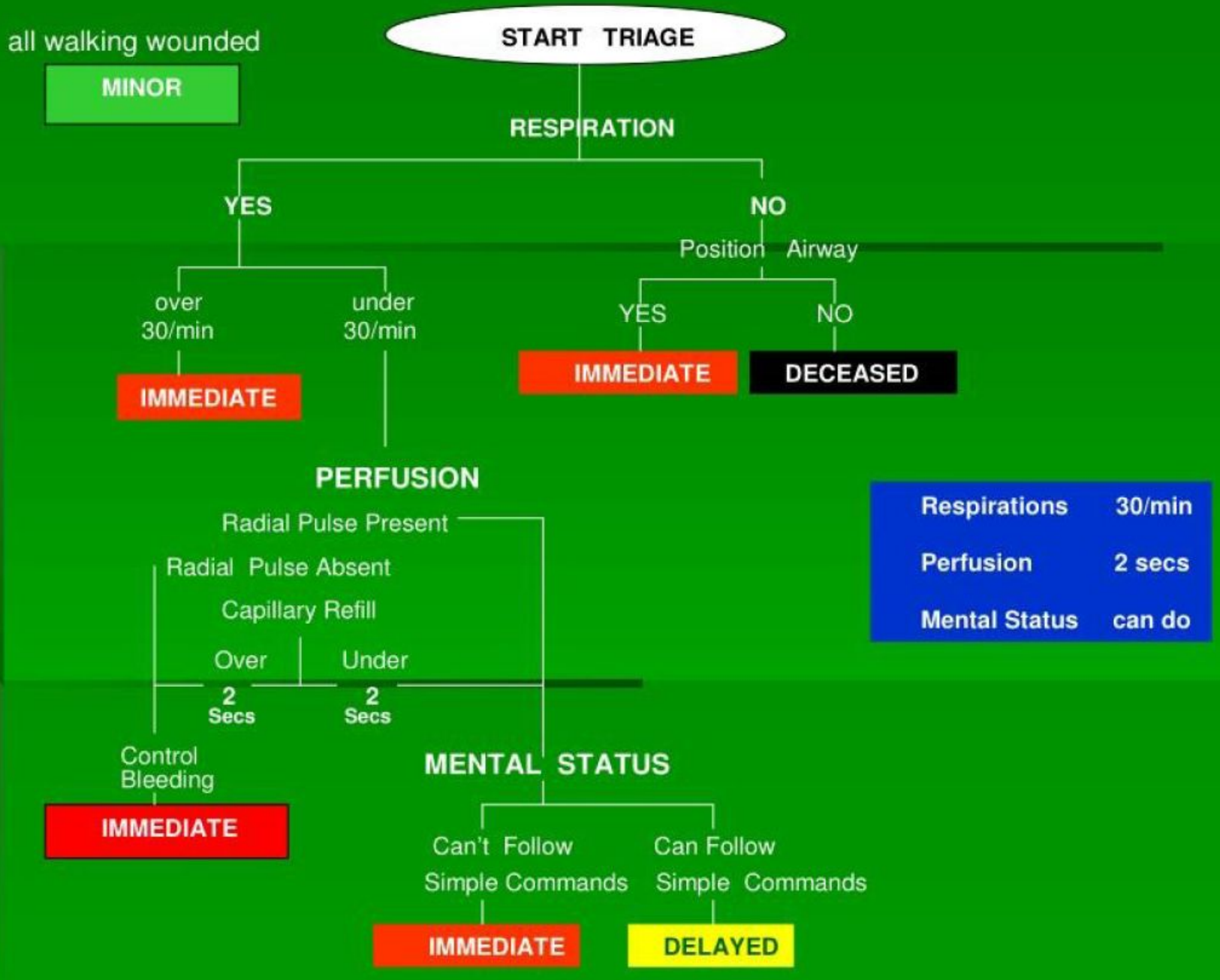
- Mass Casualties can occur in a variety of ways
- Effect on emergency response and community impact
- Include transportation, violent crimes and building collapse

RESCUE CHAIN---SECTORAL



Victim Flow : "*Conveyor Belt*" Management *Diagram*




all walking wounded
MINOR
START TRIAGE
RESPIRATION
YES
NO
over 30/min
under 30/min
IMMEDIATE
Position Airway
YES
NO
IMMEDIATE
DECEASED
PERFUSION
Radial Pulse Present
Radial Pulse Absent
Capillary Refill
Over 2 Secs
Under 2 Secs
Control Bleeding
IMMEDIATE
MENTAL STATUS
Can't Follow Simple Commands
Can Follow Simple Commands
IMMEDIATE
DELAYED
Respirations 30/min
Perfusion 2 secs
Mental Status can do

WHAT IS TRIAGE?

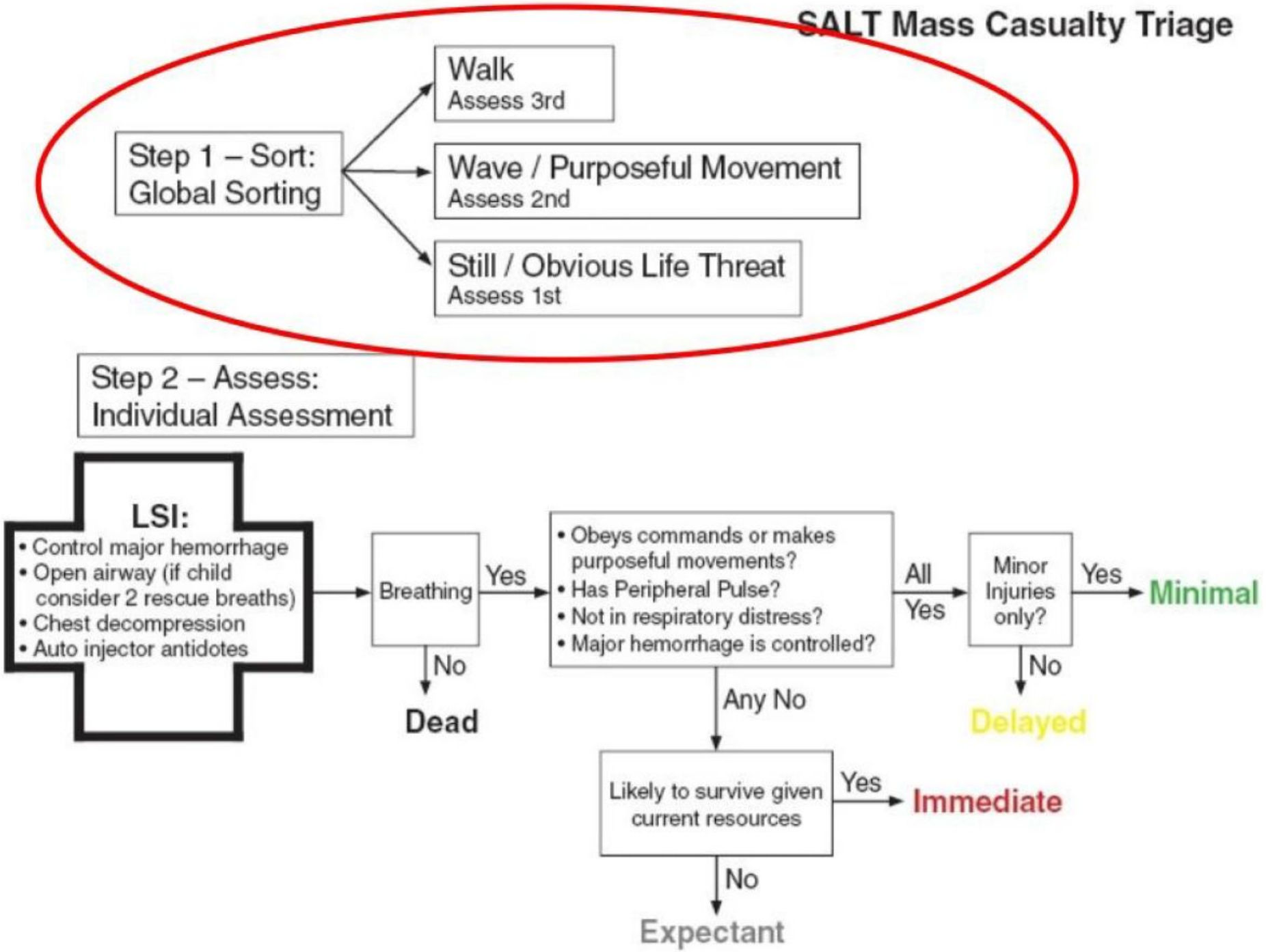
- French verb “trier” meaning “to sort”
- Assign priority when resources limited
  - Someone has to go last
- Greatest good for greatest number

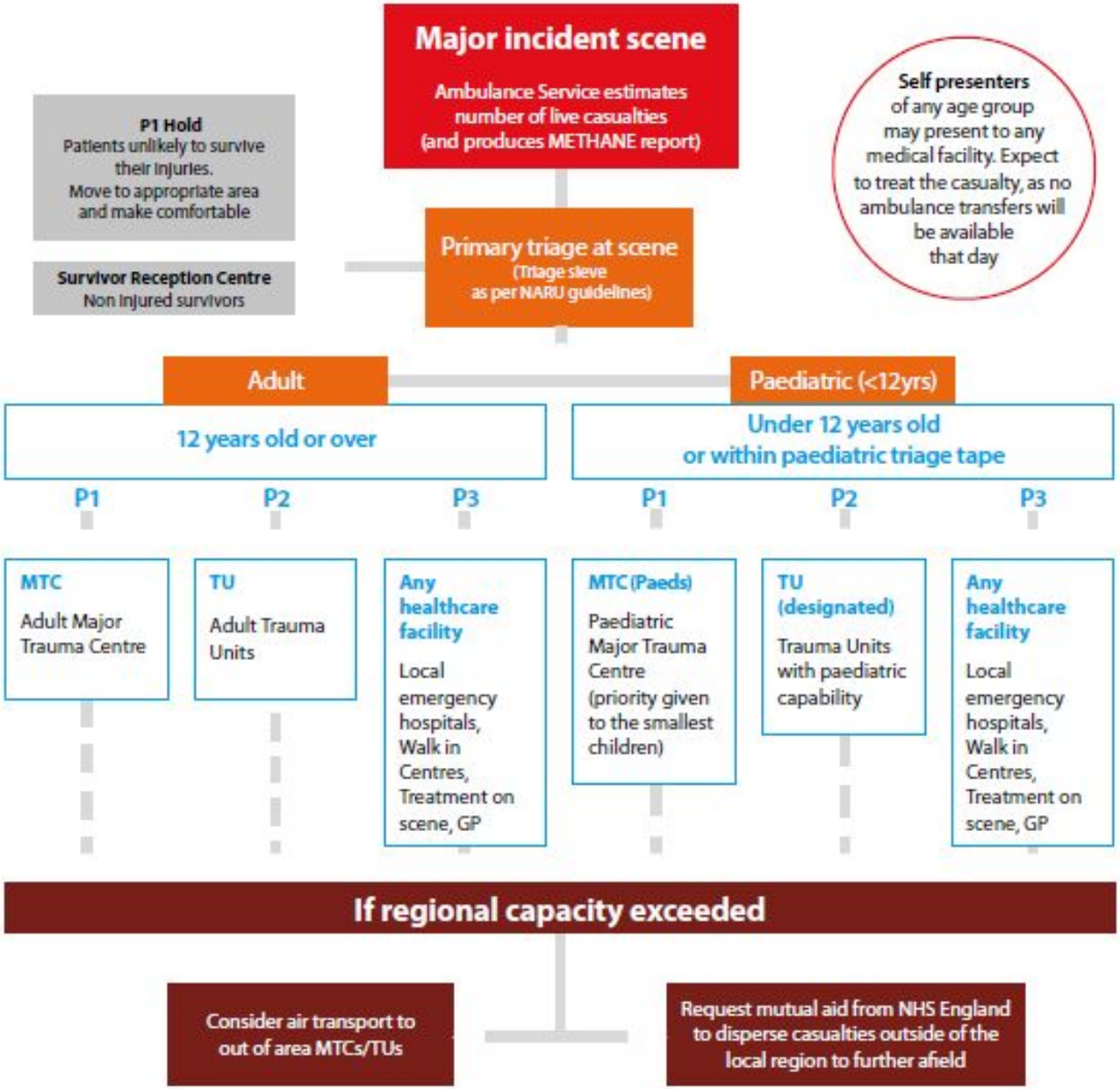
Source: DoD Photo Library, Public Domain

WHAT'S UNIQUE ABOUT MASS CASUALTY TRIAGE?

- Number of patients
- Infrastructure limitations
  - Providers
  - Equipment
  - Transport capabilities
  - Hospital resources
- Scene hazards
  - Threats to providers
  - Decontamination issues
  - Secondary devices, unsafe structures

SALT Mass Casualty Triage




Major incident scene
Ambulance Service estimates number of live casualties (and produces METHANE report)
Self presenters of any age group may present to any medical facility. Expect to treat the casualty, as no ambulance transfers will be available that day
P1 Hold
Patients unlikely to survive their injuries. Move to appropriate area and make comfortable
Survivor Reception Centre
Non injured survivors
Primary triage at scene
(Triage sieve as per NARU guidelines)
Adult
Paediatric (<12yrs)
12 years old or over
Under 12 years old or within paediatric triage tape
P1
P2
P3
P1
P2
P3
MTC
Adult Major Trauma Centre
TU
Adult Trauma Units
Any healthcare facility
Local emergency hospitals, Walk in Centres, Treatment on scene, GP
MTC (Paeds)
Paediatric Major Trauma Centre (priority given to the smallest children)
TU (designated)
Trauma Units with paediatric capability
Any healthcare facility
Local emergency hospitals, Walk in Centres, Treatment on scene, GP
If regional capacity exceeded
Consider air transport to out of area MTCs/TUs
Request mutual aid from NHS England to disperse casualties outside of the local region to further afield

Ballistic injury

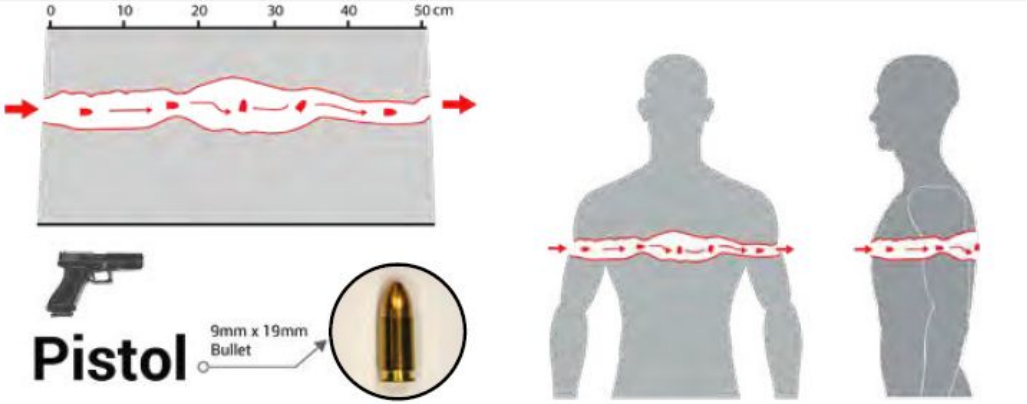
Introduction

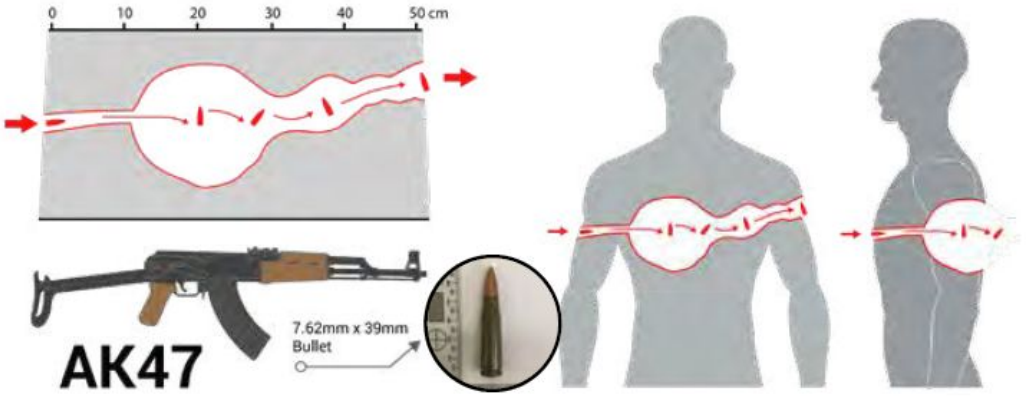
Bullets cause injury by two main mechanisms:

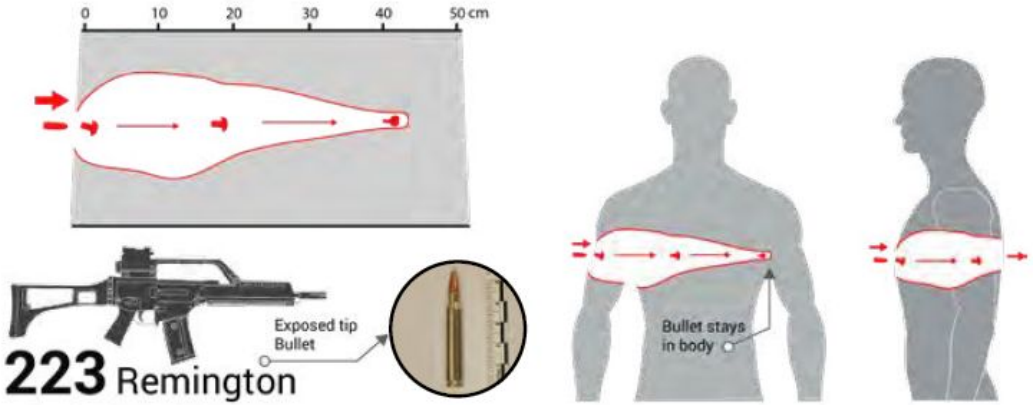
1. Tissue being crushed and lacerated along the bullet path.
2. Tissue being stretched and displaced by the temporary cavity.

Catastrophic haemorrhage

- Non-compressible? → Does patient need to go direct to theatre?
- Compressible? → Apply direct pressure/junctional techniques/ tourniquets. See immediate wound management IMED 8


0 10 20 30 40 50 cm
Pistol
9mm x 19mm
Bullet

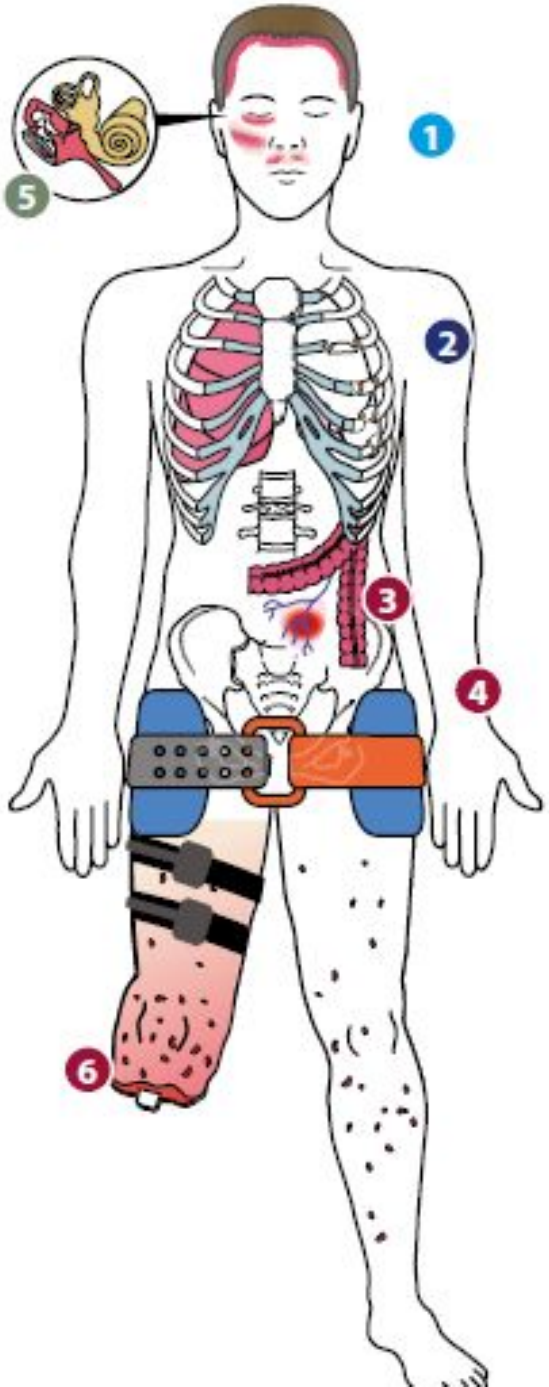

0 10 20 30 40 50 cm
AK47
7.62mm x 39mm
Bullet


0 10 20 30 40 50 cm
223 Remington
Exposed tip
Bullet
Bullet stays
in body

Catastrophic haemorrhage

Does patient have a traumatic amputation or is this an isolated injury? Look for other associated injuries:

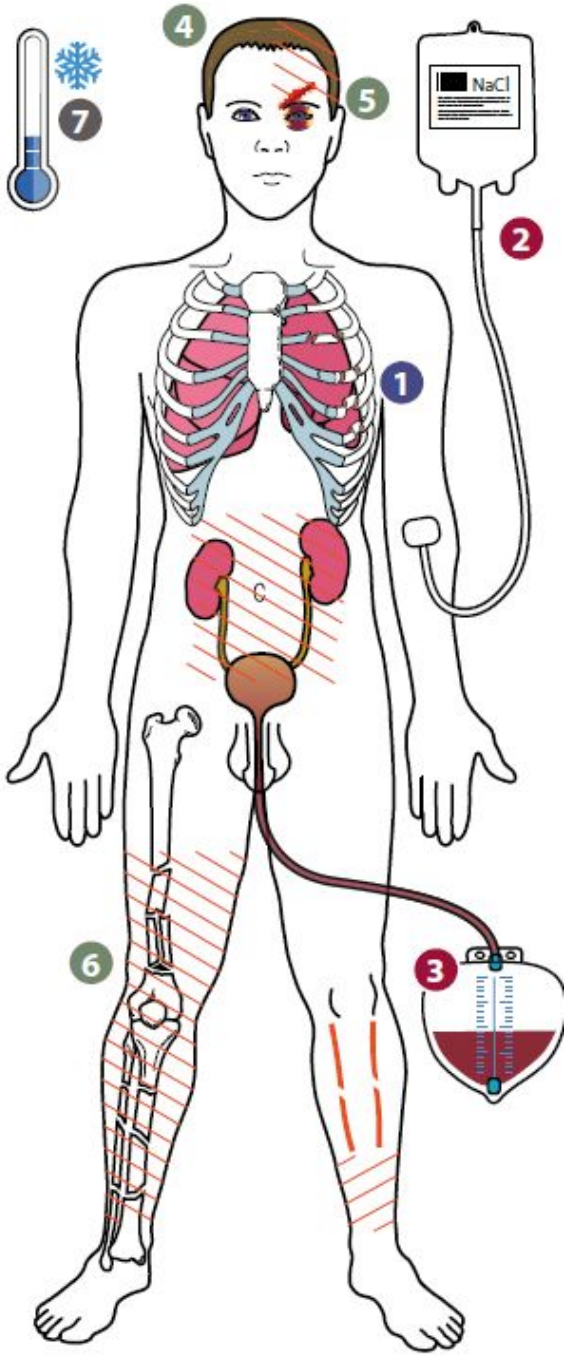
- **Blast Thorax** – High risk of catastrophic great vessel and aortic disruption – seek early cardiothoracic opinion.
- **Blast Lung** – early intubation, lung protective ventilation from outset and through to ICU care.
- **Blast Abdomen** – risk of significant intra-abdominal bleeding and late bowel perforation, even if abdominal wall is not breached.
- **Blast Pelvis** – High mortality rate from exsanguination, especially if SI joints are open (of relevance for landmines, IEDs and floor-based devices).
  - → Apply pelvic binder, gain proximal control and resuscitate. Surgery may be required at any time to assist resuscitation. CT imaging is desirable as soon as possible, if the patient is stable enough.


1
2
3
4
5
6

Crush injury

Summary

- Patients may have multiple injuries affecting different tissues and organs and are at risk of crush syndrome.
- In explosions, additional injury types such as blast and fragment injury should also be considered.
- Prolonged entrapment may occur.
- Extrication after a long period of entrapment is associated with a high risk of cardiovascular collapse; may lead to worsened renal failure or cardiac arrest.


4
5
7
NaCl
2
1
6
3

Crush injury and crush syndrome

Pre-hospital, the patient may have had the following management:

- Intravenous fluids may have been given prior to releasing the crushed body to prevent systemic reperfusion injury. This is especially important in cases of prolonged crush (>4 hours), however may occur after as little as 1 hour entrapment.
- A tourniquet may have been used on the affected limb – slow release of tourniquet is required to prevent distal limb reperfusion injury.

⚠ **Observe all crush casualties, even those who look well**

Penetrating knife injury

Terror related stab wounds differ from inter personal and non-terror related penetrating blade injuries.
There are usually a greater number of wounds with more body regions injured, particularly of the upper body and neck.

Terror related stab injuries (TRS)

- Usually inflicted by a powerful overhand grip, with the intention to kill.

Interpersonal stab injuries

- Most likely to be caused by an underhand grip, with the intention to threaten the victim.

The management of penetrating trauma is likely to involve:

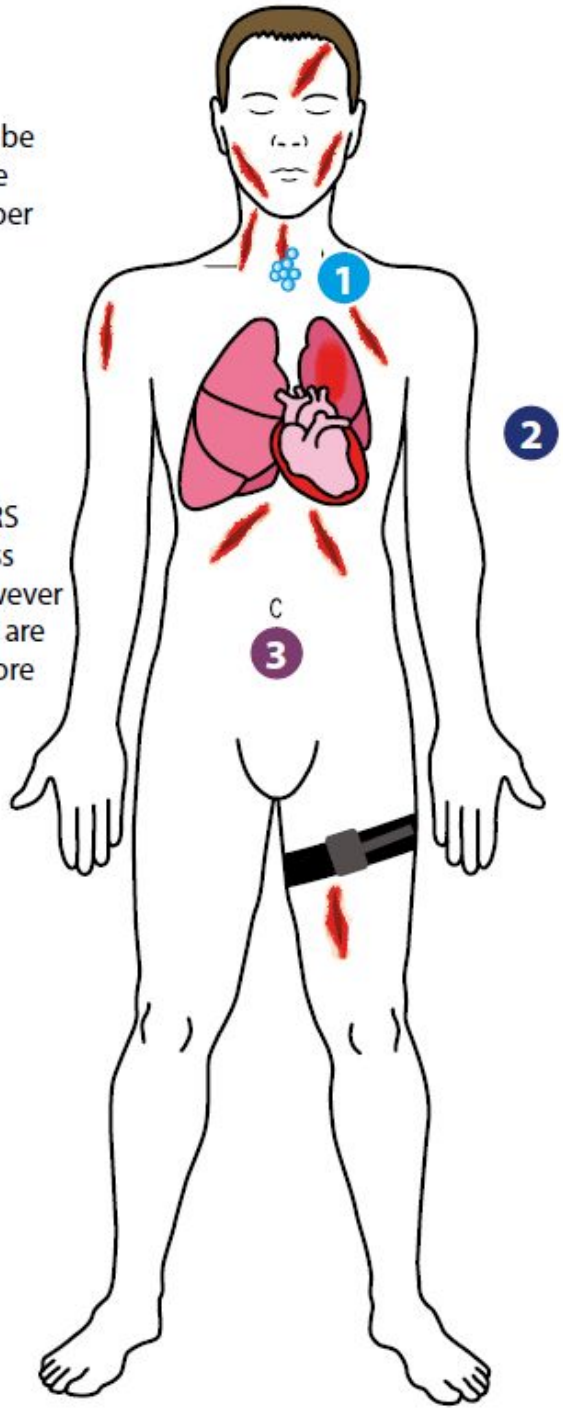
- endotracheal intubation
- chest drain insertion
- IR (if available) and/or surgery

Catastrophic haemorrhage

- Non-compressible? → Does patient need to go direct to theatre?
- Compressible? → Apply direct pressure/junctional techniques/tourniquets. See immediate wound management IMED 8

TRS injuries more likely to be inflicted to the head and upper body

Abdominal TRS injuries are less common, however when present are likely to be more severe

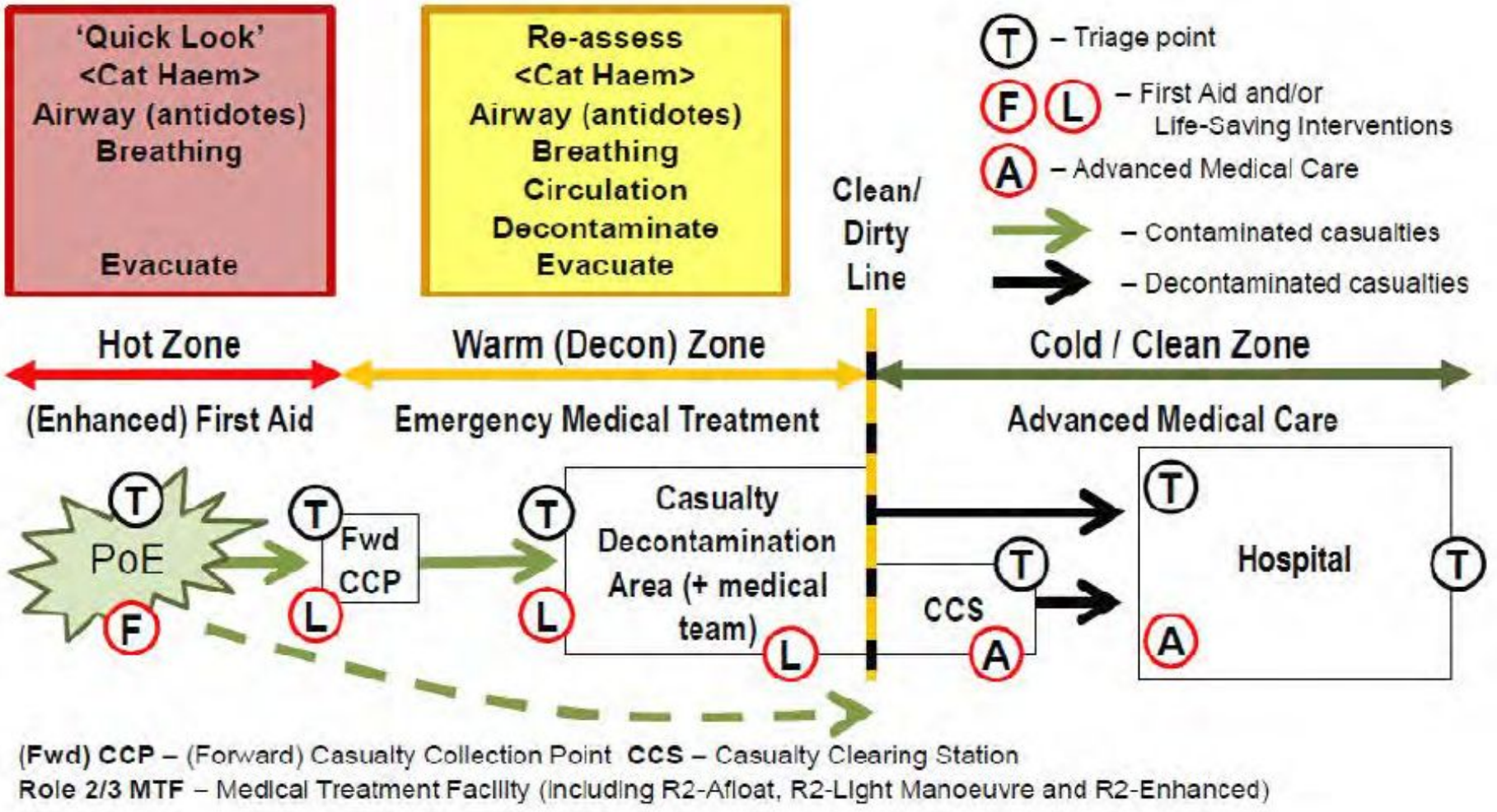


Hazardous Materials (HAZMAT) and Chemical, Biological, Radiological and Nuclear events (CBRN)

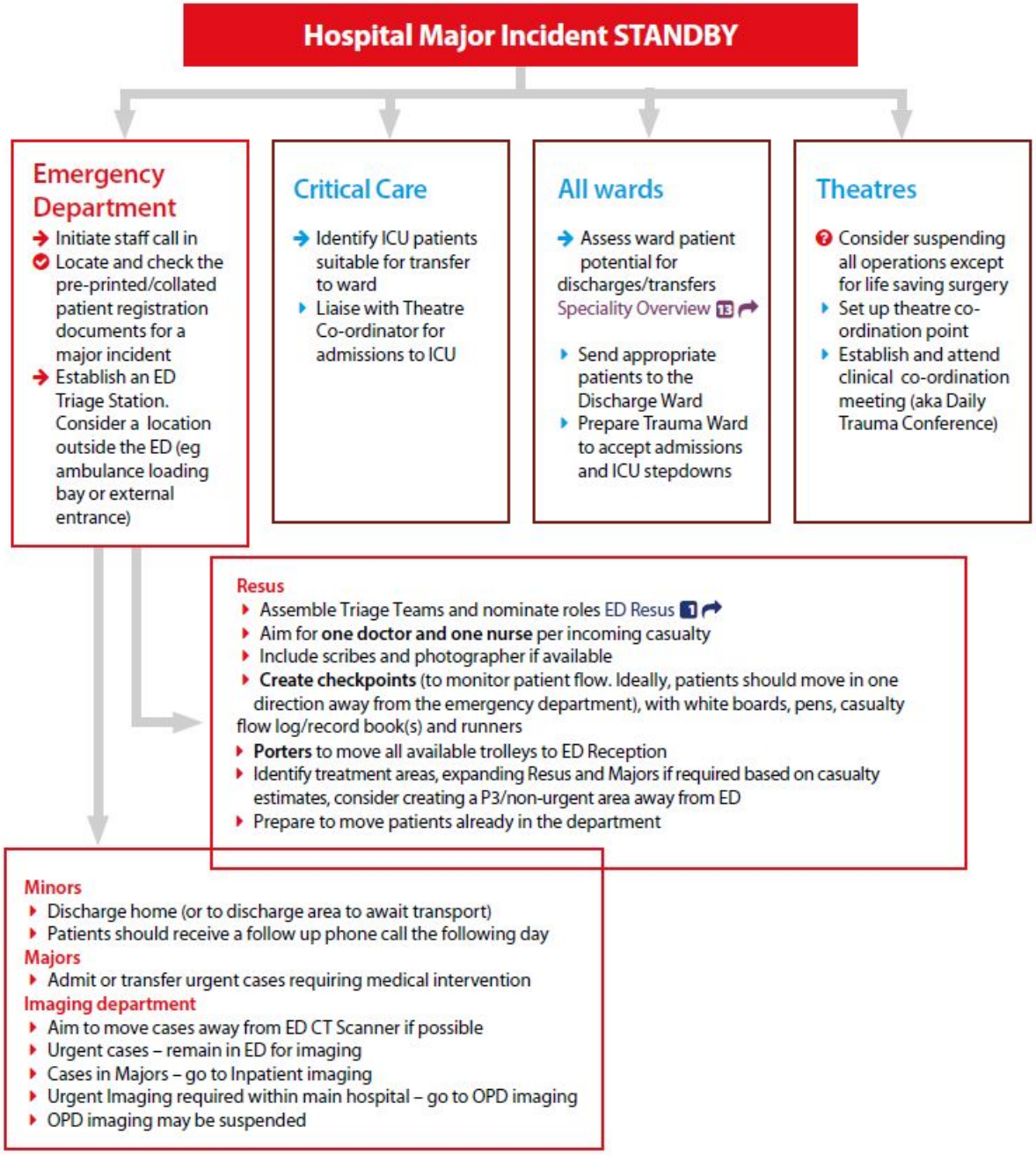
PRINCIPLES OF CBRN CASUALTY CARE

- RECOGNITION
- SAFETY
- SELF AID/FIRST AID
- TRIAGE — Emergency Medical Treatment
- QUICK LOOK
- LIFE SAVING INTERVENTIONS (T1 casualties)
- CASUALTY HAZARD MANAGEMENT
- SUPPORTIVE MANAGEMENT — Advanced Medical Care (including critical care)
- DEFINITIVE MANAGEMENT
- REHABILITATION

PRIORITIES FOR CASUALTY CARE



(Fwd) CCP – (Forward) Casualty Collection Point **CCS** – Casualty Clearing Station
Role 2/3 MTF – Medical Treatment Facility (including R2-Afloat, R2-Light Manoeuvre and R2-Enhanced)

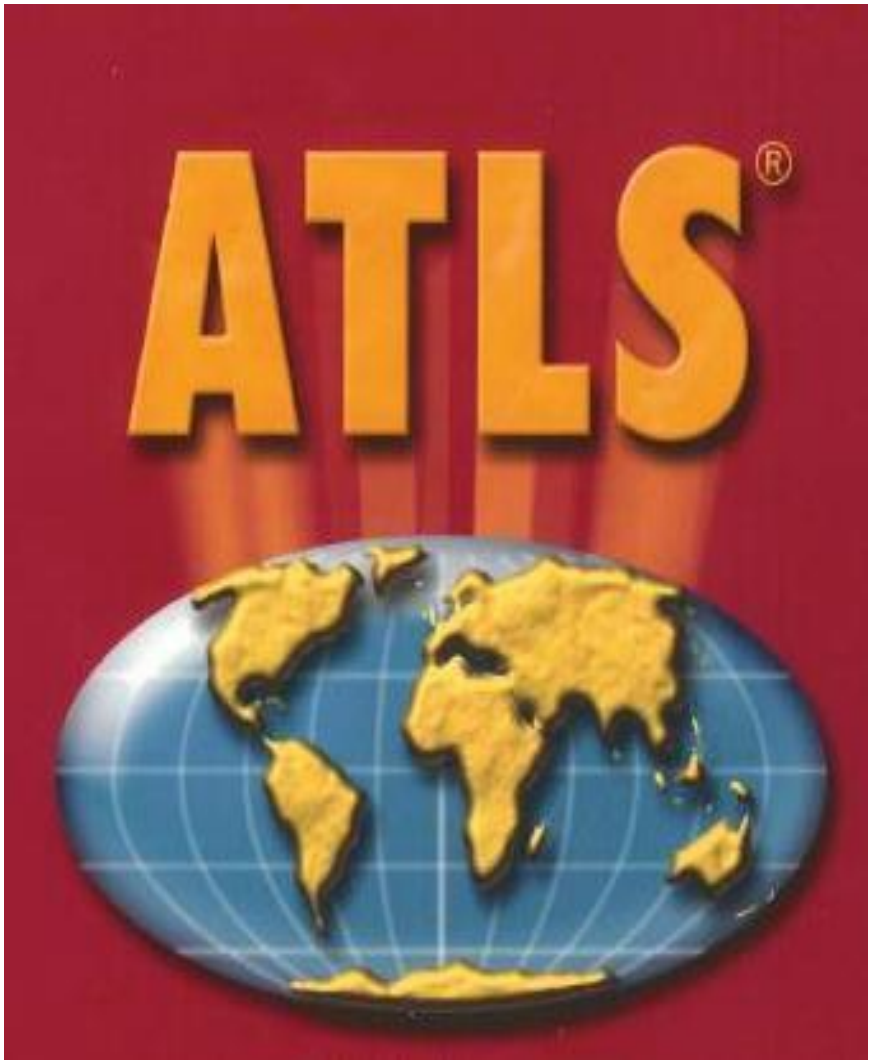

Hospital Major Incident STANDBY
Emergency Department
Initiate staff call in
Locate and check the pre-printed/collated patient registration documents for a major incident
Establish an ED Triage Station. Consider a location outside the ED (eg ambulance loading bay or external entrance)
Critical Care
Identify ICU patients suitable for transfer to ward
Liaise with Theatre Co-ordinator for admissions to ICU
All wards
Assess ward patient potential for discharges/transfers
Speciality Overview 13
Send appropriate patients to the Discharge Ward
Prepare Trauma Ward to accept admissions and ICU stepdowns
Theatres
Consider suspending all operations except for life saving surgery
Set up theatre co-ordination point
Establish and attend clinical co-ordination meeting (aka Daily Trauma Conference)
Resus
Assemble Triage Teams and nominate roles ED Resus 1
Aim for one doctor and one nurse per incoming casualty
Include scribes and photographer if available
Create checkpoints (to monitor patient flow. Ideally, patients should move in one direction away from the emergency department), with white boards, pens, casualty flow log/record book(s) and runners
Porters to move all available trolleys to ED Reception
Identify treatment areas, expanding Resus and Majors if required based on casualty estimates, consider creating a P3/non-urgent area away from ED
Prepare to move patients already in the department
Minors
Discharge home (or to discharge area to await transport)
Patients should receive a follow up phone call the following day
Majors
Admit or transfer urgent cases requiring medical intervention
Imaging department
Aim to move cases away from ED CT Scanner if possible
Urgent cases – remain in ED for imaging
Cases in Majors – go to Inpatient imaging
Urgent Imaging required within main hospital – go to OPD imaging
OPD imaging may be suspended

ATLS

ADVANCED TRAUMA LIFE SUPPORT

TRAUMA MANAGEMENT TRAINING PROGRAM

……..1970’s IN USA.


ATLS®

:BASIS IN ATLS

- TREAT LETHAL INJURY FIRST, THEN REASSESS AND TREAT AGAIN

:ATLS COMPONENET STEPS

- STEPS:
  - PRIMARY SURVEY:
    (Identify what is killing the patient)
  - RE SUSCITATION:
    (Treat what is killing the patient)

- SECONDARY SURVEY:

  (Proceed to identify all other injuries)
- DEFINITIVE CARE:

  (Develop a definitive management plan)

PRE HOSPITAL RETRIVAL AND MANAGEMENT:

RETRIVAL AND MANAGEMENT:

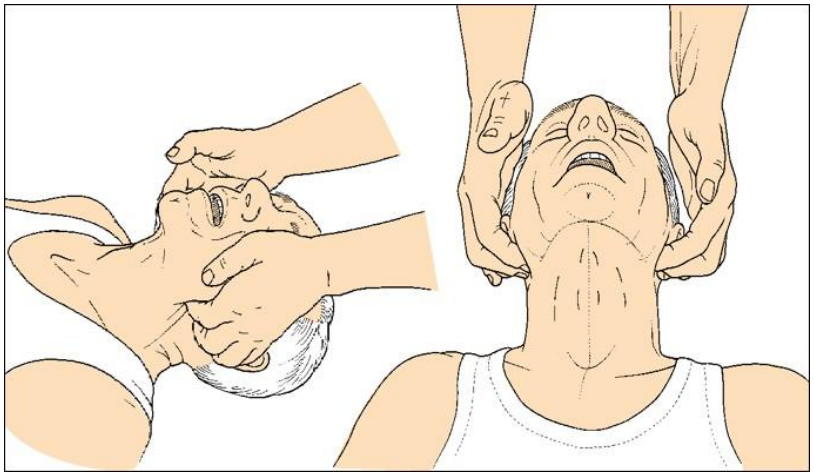
“Golden hour”

EMERGENCY SERVICES "911" WAS CALLED AND ARRIVED SHORTLY THEREAFTER. PARAMEDICS ARRIVE ON SCENE AND IMMEDIATELY GET TO WORK ,TO STABILIZE HARRY. THE "GOLDEN HOUR" IS THE FIRST AND MOST CRUCIAL HOUR AFTER A TRAUMATIC EVENT. DR.R.ADAMS COWLEY DEVELOPED AND DEFINED THIS TIME AS THE MOST IMPORTANT AND CRITICAL TIME FOR SURVIVAL OF THE TRAUMA PATIENT. ASSESSMENT AND MANAGEMENT OF THE TRAUMA PATIENT STARTS AT THE SCENE OF THE ACCIDENT. AIRWAY MANAGEMENT SHOULD BE THE FIRST PRIORITY.

POLICIES:

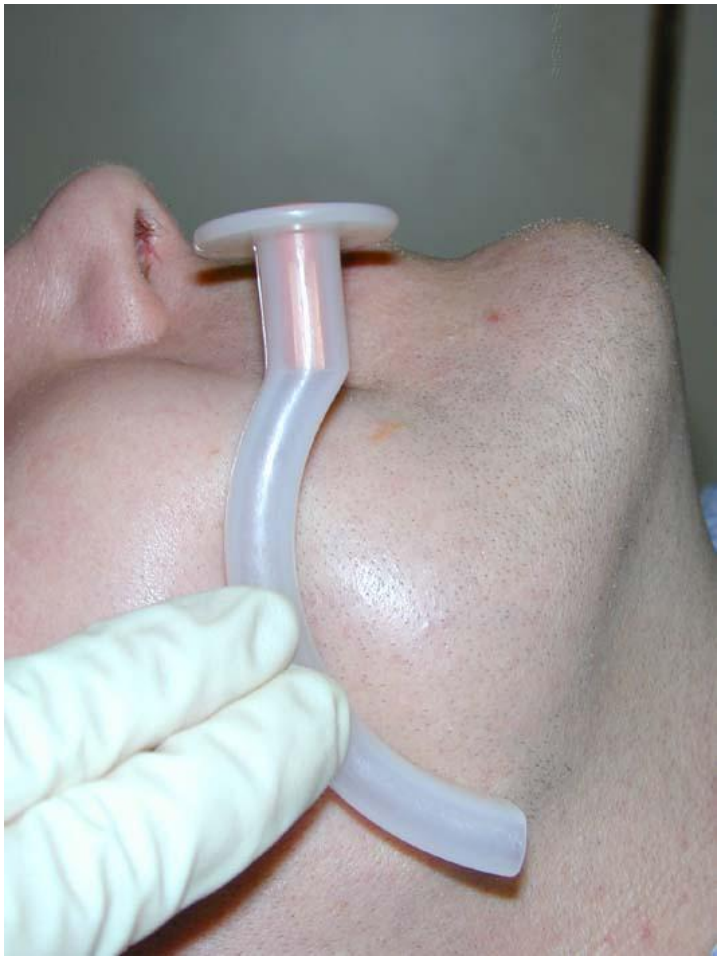
- Scoop and run
- Stay and play

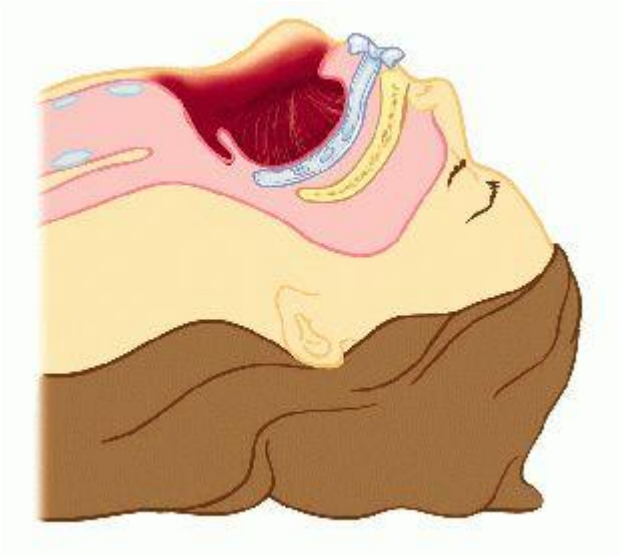
- Gloves
- Two finger sweep
- Suction
- Chin lift and jaw thurst



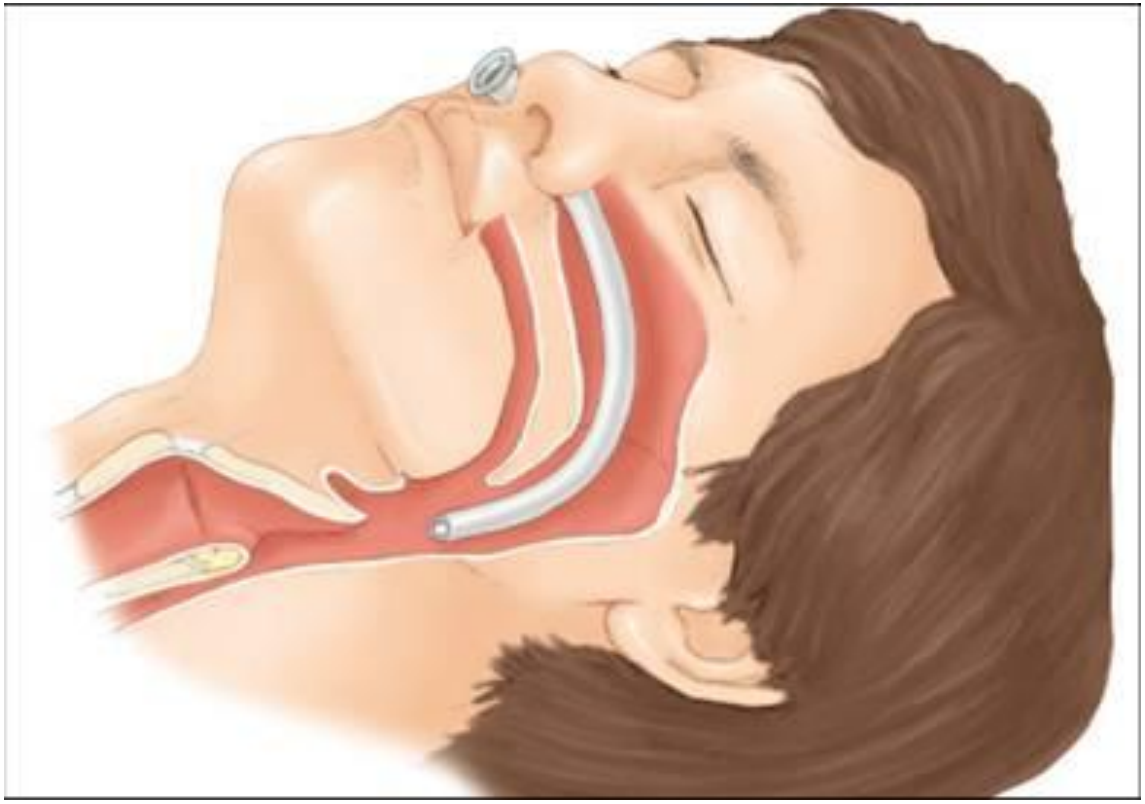
Airway patency:

- oropharyngeal

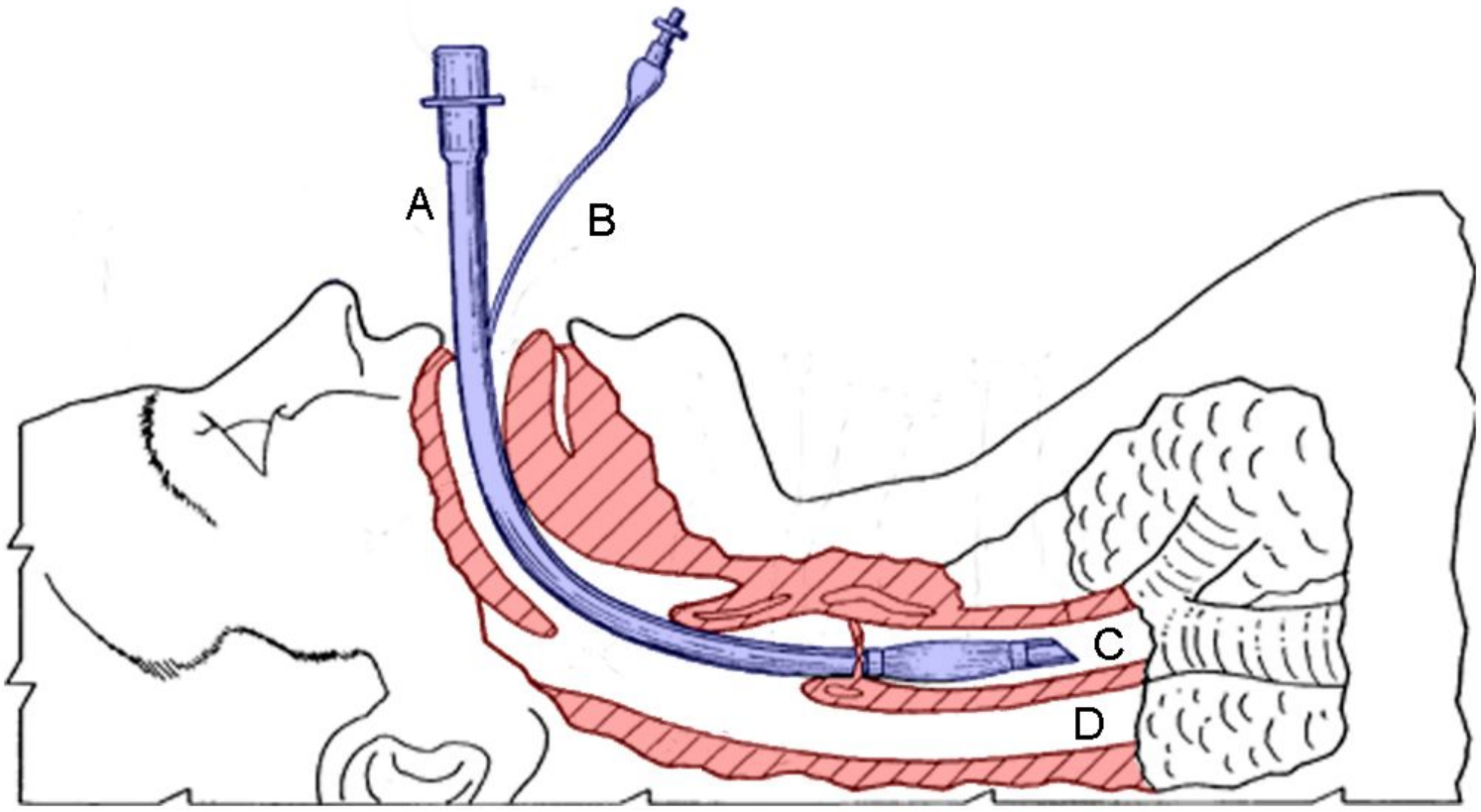




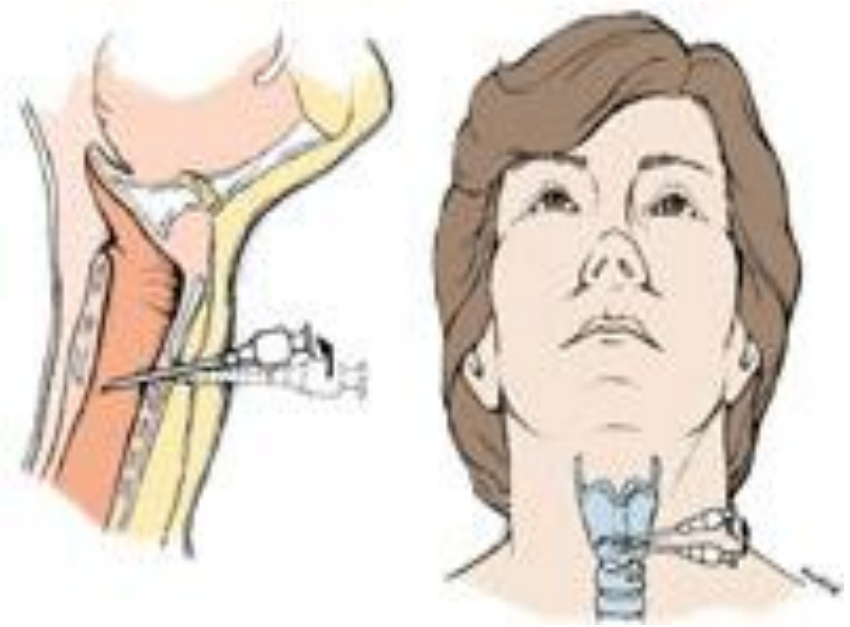
- Nasopharyngeal airway



:Endotracheal tube



:Cricithyroidotomy



- Stabilise cervical spine
- Oxygenation
- Covering and sealing of open chest wound
- Control of external bleeding by pressure
- Save IV access with two wide bore cannulas

- Neurological status:
- “AVPU” method
- A – alert
- V -- response to Voice
- P-- response to Pain
- U-- Unresponsive
- Pupils , size and reaction

- Obvious long bone fracture: alignment and traction splint

- MANAGEMENT IN HOSPITAL

PLANNING AND PREPARATION:

- PREPARATION:
  - Hospital should be informed early
  - Preparation of resuscitation area

:THE TRAUMA TEAM

- Multidisciplinary team approach
- Trauma team leader
- Additional physicians…. Airway management, primary and secondary survey
- Radiographers
- Neurosurgeon
- General surgeon
- Orthopedic surgeon
- Spokes person

- Handing over the patient:
- “MIST”
- M.. Mechanism of injury
- I…. Injuries identified
- S…vital Signs at the scene
- T…Treatment given

- PRIMARY SURVEY AND RECUSCITATION :

ABCDE of trauma management:

- management
  - A- Airway maintenance and cervical spine protection
  - B- Breathing and ventilation
  - C- Circulation with haemorrhage control
  - D- Disability: neurological status
  - E - Exposure, completely undress the patient and assess of other injuries

:AIRWAY AND CERVICAL SPINE PROTECTION

- CERVICAL SPINE PROTECTION:

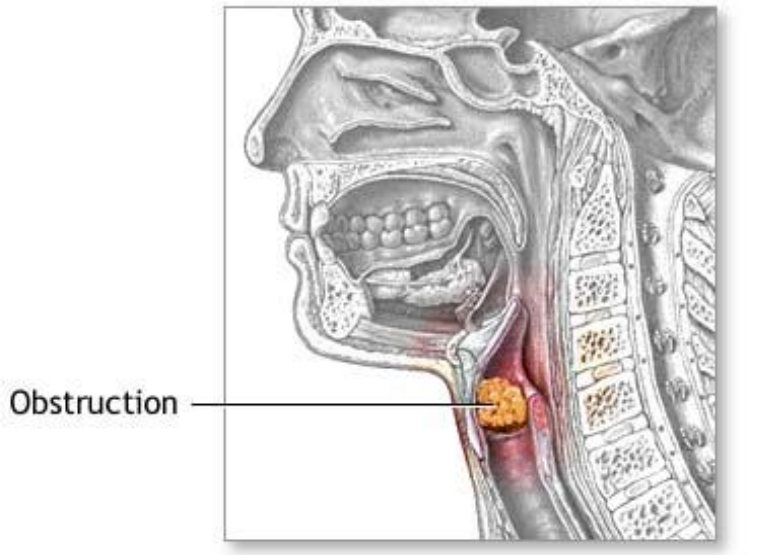
  - Check verbal response
  - Inspection :foreign bodies
    fractures :maxilla,
    mandible
    injury: trachea, larynx
    edema

- GCS: < 8 …..definitive airway
- Oxygen supplementation
- Injury to cervical spine:
    - injury above clavicle
    - loss or alteration of consiousness
    -history of neck pain

AIRWAY AND BREATHING:

- Exposure
- Examination
  - -inspection
  - -palpation
  - - percussion
  - -auscultation

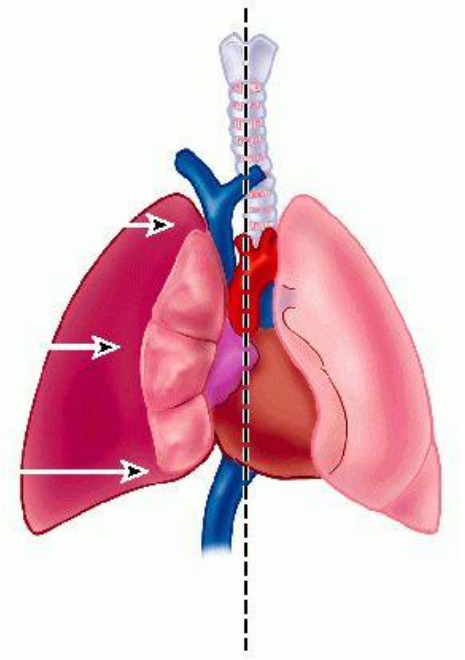
- Immediately life threatening thoracic conditions:
  - 1: Aairway obstruction

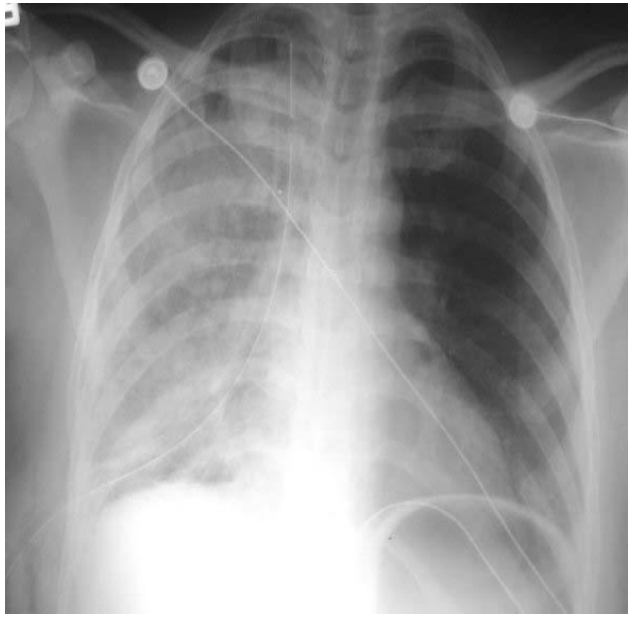


– 2: Tension pneumothorax

T/M: (needle thoracocentesis ,

tube thoracostomy)






Needle thoracocentesis
Emergency decompression of
clinical tension pneumothorax

- 3: Open pneumothorax:

  (sucking wound)

  T/m: 3 sided dressing,

  tube thoracostomy

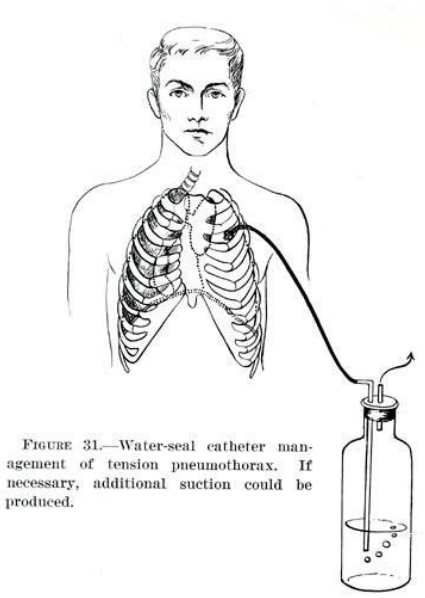
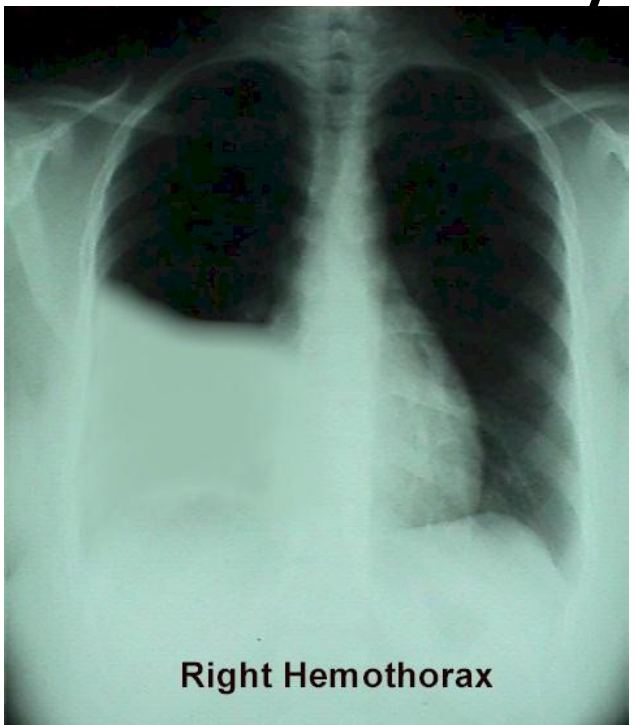
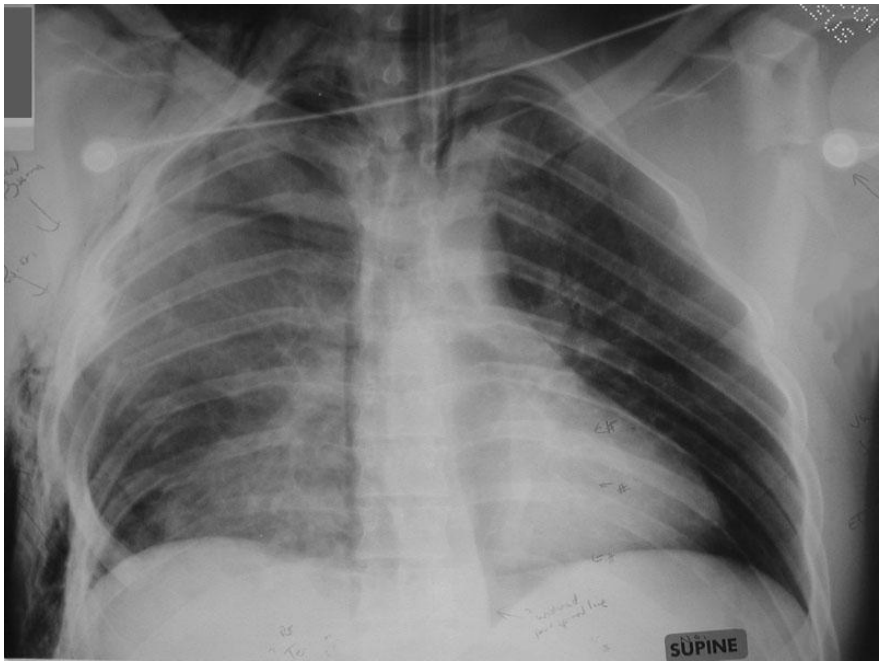


FIGURE 31.—Water-seal catheter management of tension pneumothorax. If necessary, additional suction could be produced.

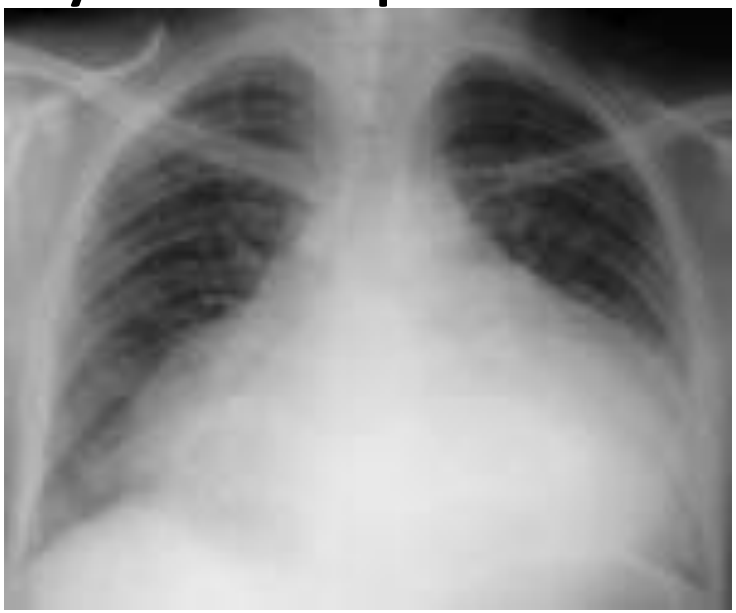
- Massive hemothorax
- (>1500 cc blood)
- T/m : active resuscitation followed by tube thoracostomy)



- Flail segment with pulmonary contusion
- T/m: endotracheal tube with mechanical ventilation



- Cardiac temponade
- T/m: needle percardioncentesis followed by thoracotomy and repair



CIRCULATION AND CONTROL OF BLEEDING:

- CONSIOUS LEVEL
- SKIN COLOUR
- PULSE

- IV assess:
- 2 wide bore cannulas
- Venous cut down
- Blood grouping and cross matching
- Fluids given
- 20 ml/kg body weight

- Responces :
- 1: immediate and sustained return
- 2: transient response with later
- deterioration
- 3: no improvement

:DISABILITY

- Glascow coma scale
- Hypoglycemia, alcohol and drug abuse

EXPOSURE:
Log roll:

- Log roll:

Spinal allinment

Hypothermia -> warming air blankets

ADJUNCTS TO PRIMARY SURVEY:

- ECG
- Urinary catheter
- Gastric catheter
- Radiograph of cervical spine and chest and pelvis
- Specialised imaging: ultrasound, CT scan, angiography, diagnostic peritoneal lavage

- SECONDARY SURVEY:

- Patient’s history: “AMPLE”
- A: allergy
- M: medication including tetanus
- P : past medical history
- L: last meal
- E: events of the incident

HEAD TO TOE EXAMINATION:

- Head and face:
- Open head fracture
- Ocular injury
- Facial fracture
- Bleeding or discharge from ear

NECK:

- Inspect and palpate
- Cervical spine stabilisation
- Wound exploration if platysma deep

CHEST:

- Inspection (log roll)
- Palpation
- percussion
- auscultation

NEUROLOGICAL:

- GCS re- evaluation after every 15 min
- Full neurological examination

:ABDOMEN AND PELVIS

- Inspection: abdomen, prenium
- Palpation
- Rectal examination


R

:EXTREMITIES

- Obviously deformed limbs
- Document neurovascular status
- Movements of joints

:RE- EVALUATION

- Vital signs
- Urinary out put (0.5 ml/kg)
- Pulse oximetery
- Details examination of hands, feet and ankels

:ANALGESIA

- Pain and anxiety can change vitals
- Titrated intravenous dose of opiate

DOCUMENTATION AND LEGAL CONSIDERATION:

- AND LEGAL CONSIDERATION:

  - Time documentation
  - Consent
  - Forensic evidence

:DEFINITIVE CARE AND TRANSFER

- AND TRANSFER:
  - Transfer of the patient to respective department for further management

TAKE HOME MESSEGE:

- MESSEGE:
  - “EARLY TRANSFER OF INJURED PATIENT AFTER EFFECTIVE AND AGGRESSIVE INITIAL RECUSITATION IS THE MOST IMPORTANT CONTRIBUTOR OF SUCCESSFUL OUTCOME”


Adam Michael
Thank You