

# POLYTRAUMA



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## Lecture objectives:

1. Approach to a polytrauma Patients
2. Implement Management as per Advanced trauma life support (ATLS) protocol
3. Learn about in-line immobilization of cervical spine, in the context of managing the airway
4. Understand the function of spinal board as a transfer tool only
5. Review emergent orthopedic conditions that are critical, and their initial management; e.g. open book pelvic fracture, bilateral femur fractures

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**References:** Doctor slides and notes, 436 Team, F2 slides

# TERMINOLOGY

- **Injury** : the result of a harmful event that arises from the release of specific forms of energy.
- **Polytrauma** : Multisystem trauma = injury of two or more systems, or system with **deranged vital signs**.

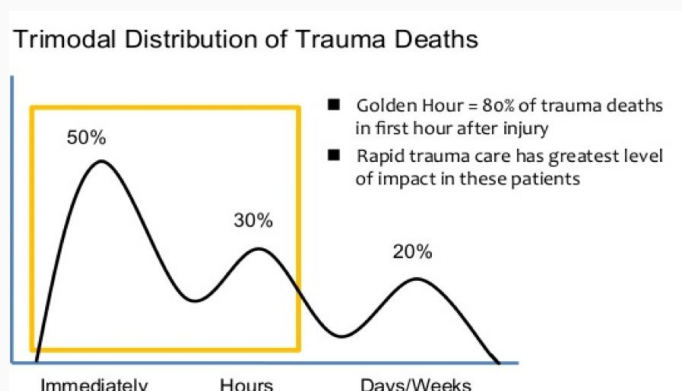
# MECHANISMS OF INJURY IN TRAUMA

<b>1. Penetrating</b>	Open injury, with direct injury to underlying structures (Liver Laceration).
<b>2. Blunt</b>	most common Closed injury Indirect injury to underlying structures (Spleen rupture) Transmission of energy into the body Example : Tearing of the muscles, vessels and bone, Rupture of solid organ, Organ injury: ligamentum teres.
<b>3. Blast</b>	Bombs
<b>4. Thermal</b>	(burns): heat or electrical
<b>5. Others</b>	Chemical or crush & barotrauma (e.g. Diving).

# TRIMODAL DEATH DISTRIBUTION

1st peak	2nd peak	3rd peak
<ul style="list-style-type: none"> <li>● Immediate death (0 to 1 Hour) occurs within minutes of injury</li> <li>● Account for 50% of death</li> <li>● Due to a major neurovascular injury like Aortic rupture.</li> <li>● Medical treatment can rarely improve outcome (die on scene)</li> </ul>	<ul style="list-style-type: none"> <li>● Early death (1 h to 3 h)</li> <li>● Account for 30% of deaths</li> <li>● Occurs during “<i>the golden hour</i>”</li> <li>● Due to intracranial hematoma, major thoracic or abdominal injury.</li> <li>● Primary focus of intervention for the ATLS methodology</li> </ul>	<ul style="list-style-type: none"> <li>● Late death (1 to 6 weeks) occurs after days or weeks</li> <li>● Accounts for 20% of death</li> <li>● Due to complication (infections and sepsis and multiple organ failure)</li> </ul>

- 1/3 of severe polytrauma patients die at the scene.
- Patient is having a trauma from 0 hour, if they survive to reach to the hospital so you got **70% a very high chance of survival** (even if they arrived hypotensive/bleed a lot). It's an exam question! You have to do your best in the emergency department to resuscitate them. ( most important point in the lecture )
- Patient who survived coming to the hospital and then get admitted to the ICU they have a chance of **30% mortality** in the ICU, so post trauma recovery for severe trauma patients is difficult (some of them take months for rehabilitation).
- Almost **half** of trauma patients arrived alive to the emergency department.
- There was a trauma patient away from Riyadh, unfortunately the CT scan was not working at that time! What shall we do? Shall we wait? You have a severe trauma patient > your scan is off > you resuscitate > **TRANSFER immediately** (within the first hour).
- **First 1 to 2 hours is the golden hours** Why is it called “the golden hour”? Hence death in this peak is mostly due to hypoxia and loss of blood (hypovolemic shock) which is **potentially preventable**. (80% of deaths happen here.)



# ATLS STEPS & PREHOSPITAL MANAGEMENT

- **Prehospital management:**

Goal: Gain access to the patient - Smooth transfer.

- **Approaches:**

1. **Scoop & Run policy:** Take patient to the hospital ASAP, you can give him oxygen mask but we don't do any major intervention here until patient reaches the hospital.
2. **Stay & Play policy:** Needs expert EMS to do this, full management on scene like intubation etc

- **Component steps:**

1. **Primary survey:** Identify what is killing the patient
2. **Resuscitation:** Treat what is killing the patient
3. **Secondary survey:** Proceed to identify other injuries
4. **Definitive care:** Develop a definitive management plan

(1): Started with volume support of the patient and then control if there's any blood loss. It includes everything you do to the patient (fluid-intubation-drugs).

**Stepwise approach:**

**Treat lethal injuries first**

**Reassess<sup>1</sup>**

**Treat again/Transfer**

## THE TRAUMA TEAM

- **4 Doctors:** EM physician, Anesthetist, Orthopedic surgeon, General surgeon.
- **5 Nurses**
- **1 Radiographer**
- **The Team Leader:**
  - Most experienced **ER consultant**
  - Preferably a **TRAUMA surgeon**
  - Takes all triage decisions.
  - Should be familiar with each member's skills and names.
  - Prioritizes procedures
  - Communicate with consultants and family members



# ATLS STEPS AND ASSESSMENT OF AN INJURED PATIENT

## 1. Primary survey & resuscitation: (ABCDE)

**A**irway and securing cervical spine

**B**reathing

**C**irculation and haemorrhage control

**D**ysfunction of the central nervous system

**E**xposure

## 2. Adjunct to primary survey (Only imaging permitted during this phase is):

- **X-ray:**

AP supine chest -AP plain pelvic -Cross table lateral C- spine X-ray (outdated).

- **CT scanning:**

is the method of choice for pts with acute major trauma; it should be obtained at the earliest opportunity.

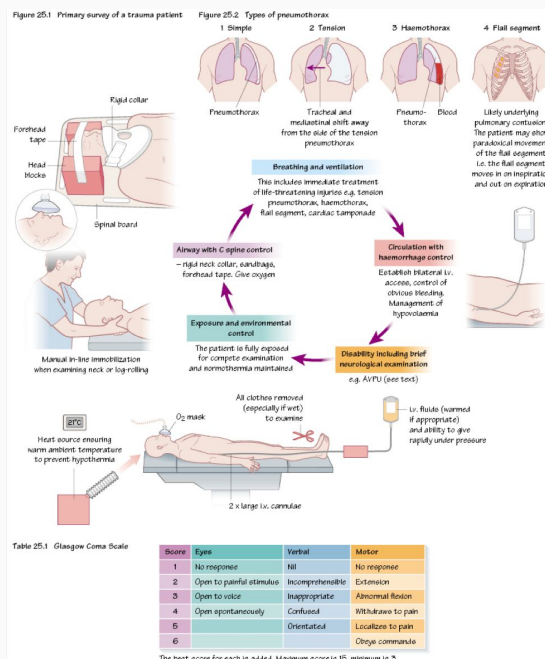
If the pt's not stable enough for CT, X-ray chest, pelvis, spine and limbs is obtained. After we finish the primary assessment we will not go to the next step until we are sure everything is Ok and we fixed any problem in ABCD, after that we go to "adjunct to primary survey": X-ray for chest and pelvis, US using fast, inserting IV line and draw blood to send it to the lab, ECG, inserting foley catheter if needed then we go to secondary assessment)

- **Ultrasound:** FAST has replaced peritoneal lavage for detecting intraperitoneal fluid of blood.

## 3. Secondary survey (Full physical examination to identify any missed injuries)

## 4. Definitive treatment (In most cases surgical management)

## 5. Tertiary survey (Another full examination just to be safe)



# ATLS PRIMARY SURVEY

## AIRWAY

- Look for airway obstruction or disruption. **So look for broken teeth or foreign bodies or blood inside the mouth.**
- **If patient can talk** then he is able to maintain own airway
- If airway compromised initially attempt a **jaw thrust** and clear airway of foreign bodies, suction, adjuncts to open airways. Remember to avoid causing harm eg NP tube, nasopharyngeal airway in base skull fracture
- Give 100% Oxygen (face mask, bag valve)
- Assist airway & breathing including "definitive airways" (endotracheal tube/cricothyroidotomy)
- **Cervical spine**
  1. Always assume that patient has cervical spine injury
  2. Applying cervical collar (vid)
  3. If **conscious**- Ask the pt's name
  4. If **unconscious**-Look for added sounds (stridor,cyanosis etc)
  5. If the pt **does not respond to any questions**- resuscitate

## BREATHING

**437 A SLIDES**

### Assessment

- Respiratory rate and SpO2
- Exposure and inspection: external signs of trauma, asymmetrical chest
- Palpation over entire chest wall looking for : crepitus / surgical emphysema.
- Percussion difficult in a noisy trauma bay
- Auscultation
- Trachea – palpate to see if deviated

### Management

- Oxygen.
- Patients requiring respiratory support are usually intubated and mechanically ventilated.
- Needle thoracostomy, finger thoracostomy or intercostal catheter insertion may be required urgently.

Chin Lift (If No C Spine Concern)

Jaw thrust

Suction

Oropharyngeal/  
Orotrachial Tube

Endotracheal  
Intubation

Cricothyroidotomy

## Tension Pneumothorax

### symptoms :

1. Diminished breath sounds
2. Distended neck veins
3. Hypotension
4. Respiratory distress
5. Tracheal deviation
7. distended neck veins

### Sign of severe tension Pneumothorax: IMP!

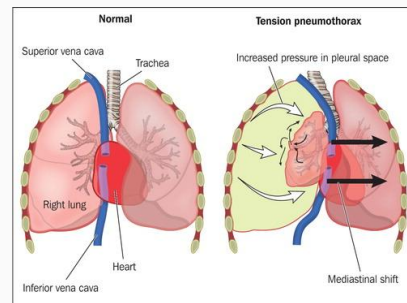
Total lung collapse, deviation of mediastinum and trachea, flattening of diaphragm, widening of intercostal space, the distance between the apex and thorax is more than 3cm, the distance between the mid of lung to the side is also more than 3cm.

### Treatment:

1. immediate **needle decompression (initial)** through 2nd intercostal space in mid-clavicular line \*if the patient has muscular body or obese you can go to 4th or 5th or 6th anterior axillary line.

2. followed by **chest tube (definitive)** in 5th intercostal space anterior axillary line.

3. Supportive management: analgesia, ventilators support, CXR monitoring, Chest physiotherapy



### What is it?

**Massive hemothorax** is defined by the need for thoracotomy in OR

**Source of blood:** Chest wall or lung parenchyma or heart or vessels

**the indications are:** •Blood loss > 1,500 mL or 1/3rd of blood volume or •Blood loss >200 mL/h (3 mL/kg/h) for 2-4 hours

\*Hemothorax and Pneumothorax are the most common presentation of traumatized patient

### Symptoms:

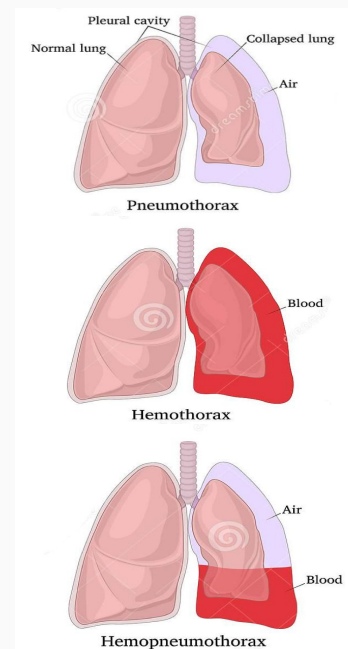
- Hemorrhagic shock: pallor, tachycardia, hypotension, cool peripheries pleural space
- External evidence of thoracic injury
- Decreased chest movement, dullness and decreased breath sounds ipsilaterally
- Persistent blood loss following intercostal cath

**total white-out** is an important x-ray sign of massive hemothorax, when you find it immediately do chest tube.

\***exam question:** patient had an accident, presented to the ER with respiratory distress, respiratory rate was high, O2 saturation was low, x-ray show total white out, what is your diagnosis? **Massive hemothorax**

### Management:

1. 2 large bore IVs with crystalloid infusion and blood transfusion
2. Chest decompression with chest tube insertion



## Massive Pneumothorax/ Hemothorax

## Open pneumothorax

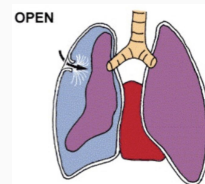
Skipped by the doctor.

### What is it ?

An open pneumothorax occurs when air accumulates between the chest wall and the lung as the result of an open chest wound or other physical defect.

### Management:

sealing the wound with occlusive dressing and tube thoracostomy



## flail chest

**What is it?**

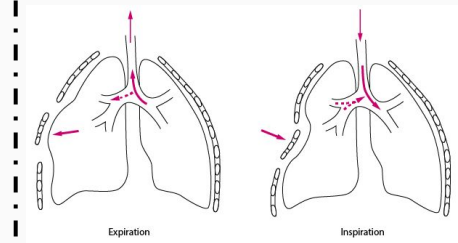
Fractures of 3 or more consecutive ribs in 2 or more locations with Paradoxical movement in which the segment moves inwards on inspiration as the rest of the chest expands and outwards on expiration as the rest of the chest deflates

**Symptoms**

1. Chest pain
2. Respiratory distress
3. Bony crepitus
4. Paradoxical chest wall movement

**Management:**

1. Supportive care, O<sub>2</sub>
2. Stabilization of the segment with manual or object pressure
3. Postpositive pressure ventilation
4. Requires an endotracheal intubation and mechanical ventilation.



## Skipped by the doctor.

**What is it?**

- blood or fluids fill the space between the sac that encases the heart and the heart muscle. This places extreme pressure on your heart. The pressure prevents the heart's ventricles from expanding fully and keeps your heart from functioning properly
- More common in penetrating thoracic trauma than blunt trauma
- As little as 75 mL of blood accumulating in the pericardial space acutely
- can impair cardiac filling, resulting in tamponade and obstructive shock

**Symptoms:**

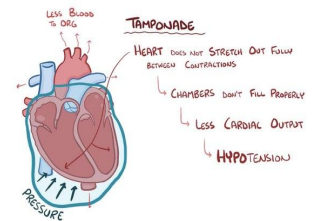
- Obstructive shock — tachycardia, hypotension, cool peripheries

Almost always seen with a penetrating wound Cardiac Beck's triad:

1. Hypotension tamponade
2. Distended neck veins
3. Muffled heart sounds (important to differentiate it from tension pneumothorax)
4. Pulsus paradoxus (drop in systolic blood pressure >10 mmHg on inspiration)

**Management:**

1. Managed with needle pericardiocentesis then thoracotomy & repair as definitive management
2. O<sub>2</sub>
3. May transiently respond to fluid challenge
4. ED Thoracotomy



## Cardiac tamponade



# CIRCULATION

## When do we consider it?

- **Adults** consider up to 2 lit of fluids if patient hypotensive, cardiac arrest (until blood available)
- **Children** 20 cc/kg of body wt

## Assessment

- Pulse rate, blood pressure, capillary refill, state of neck veins, ECG monitor, warmth of peripheries and **LOOK FOR BLEEDING!!!** ( look at the pictures next slide)
- **Tachycardia** in a traumatized patient indicates shock until proven otherwise.

## Blood Loss

- External or obvious
- Internal or covert
  - Chest
  - Abdomen
  - Pelvis
  - Limbs (fractured bone)

## Resuscitation

Arrest bleeding

Obtain vascular access

## Management:

1. Identify exsanguinating haemorrhage and apply direct pressure

\*external bleeding -> apply direct pressure Internal bleeding->send him to OR

2. Place two large calibre intravenous cannulas **Give intravenous fluids** (crystalloid or colloid)

\* it's not advised to exceed 2 liter of crystalloid, why? Because it will cause dilution of both RBC and platelets (dilutional coagulopathy)

## Important notes:

\*MCQ: The best product for traumatized patient who have hypotension and bleeding is Packed RBC. But the problem with Packed RBC is that it can increase the plasma volume so much which results in platelet dilution. So we usually add platelets and FFP ( this is called 1:1:1 method of transition).

\*so what is 1:1:1 method of transfusion? A fixed-ratio (1:1:1) transfusion strategy is a resuscitation strategy for trauma patients that promotes the transfusion of red blood cells (RBC), plasma and platelets (PLT) at a 1:1:1 ratio while minimizing crystalloid infusion.

\*To sum up: in the ER what do we do for traumatized hypotensive patient who is bleeding? We give 2 liter of crystalloid fluids until packed RBC arrive ( remember to give it in 1:1:1 method)

# CIRCULATION

Tachycardia in a cold patient indicates shock

## Causes of shock following injury:

1. Hypovolemic It's the most common type of shock in trauma patient.
2. Obstructive
3. Cardiogenic The dramatic events of a car accident can cause a heart attack to occur, leading to cardiogenic shock, or they can have the a heart attack while driving (before the accident) so make sure in the history to ask what exactly happened to give the right treatment plan.
4. Neurogenic
5. Septic

## Response to initial fluid challenge:

- Immediate & sustained return of vital signs <20% blood loss  
Bleeding ceases spontaneously
- Transient response with later deterioration bleeding within body Cavities  
Surgical intervention reqd.
- No improvement >40% of blood vol lost  
require immediate surgery  
Continued IV fluids detrimental

## \*Some patients does not respond to the treatment why?

1. Because the bleeding might be still active, in this case do immediate Ultrasound sound ( FAST) -> you might see liver laceration -> immediately send him to the OR and fix it surgically.
2. The patient is still deficit because we didn't give enough fluids

## \*Why do traumatized patients bleeds? "the doctor said it's very important "

1. Because of the trauma itself (such as: liver laceration)

2. Because they are hypothermic ( hypothermia causes decreased coagulation ability -> bleeding).

3. Because of the acidosis (hypovolemic shock in traumatized patients -> causes Inadequate oxygen delivery which interfere with aerobic metabolism -> Increased anaerobic metabolism leads to production of lactic acid and metabolic acidosis -> acidosis decreased platelets function -> decreases coagulation ability -> further bleeding

4. Large volumes ( more than 2 L) of crystalloid fluid used for resuscitation in these cases and can increase plasma volume -> dilution of both RBC and platelets ( dilutional coagulopathy).

4. Large volumes ( more than 2 L) of crystalloid fluid used for resuscitation in these cases and can contribute to increased plasma volume -> dilution of both RBC and platelets ( dilutional coagulopathy).

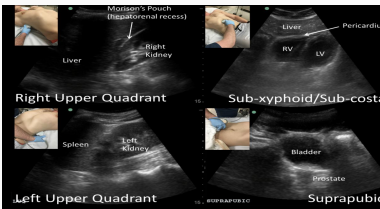
## 1- Assessment of chest



Seat belt sign



## 2- Assessments of abdomen



Look for bruising and Distention and do Palpation Looking for tenderness

## 3- Pelvic assessment



1) Medial pressure



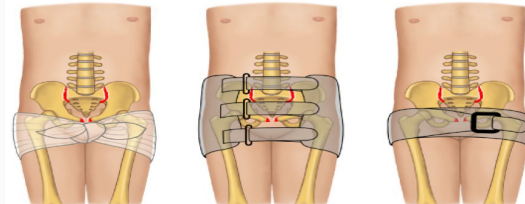
2) Posterior iliac pressure



3) Posterior pubis pressure



Open Book fracture



Pelvic Binder

Stability assessment :Check stability of pelvic by 3 things (important)

1. Apply gentle medial pressure with palms by pressing in ward on iliac crest
2. With patient supine apply gentle posterior pressure by pressing down ward on iliac crest
3. Apply gentle downwards pressure on pubis to check pelvic ring stability

## Mid shaft femur fracture

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- **What do you see?**

1. Externally rotated and shortened limb with tender bulge in middle of thigh
2. Fractures is often angulated (limp deformity)
3. Moi is direct blow or violent external rotation

- **Sign and symptoms?**

1. Patients in severe pain has thigh muscle spasm , unable to move extremity
2. Pain on palpation is immediate

- **Treatment?**

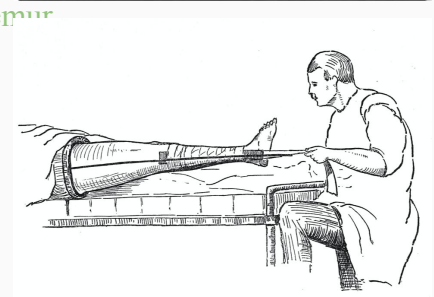
1. High flow O2
2. If angulation must realign before splinting
3. Apply traction splint such as sager
4. Transfer to backboard
5. Monitors shock, nothing to eat or drink
6. Rapid transport



What type of fractures causes the most of blood loss after a trauma? Pelvic and femur fractures

### Estimated Blood Loss

Bone	Approximate internal blood loss (mL)
Rib	125
Radius or ulna	250-500
Humerus	500-750
Tibia or fibula	500-1000
Femur	1000-2000
Pelvis	1000-massive

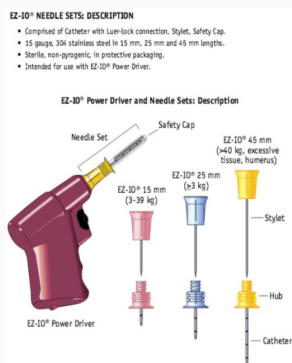


## Management

- Insert 2 large bore (16 gauge) IV's. Intraosseous line as backup
- Send off Trauma Labs: most importantly crossmatch blood
- Control external bleeding: direct pressure, tourniquets or by tying off vessels
- Restore intravascular volume: Start with NS or LR while waiting for the blood
- 1:1:1 ratio of plasma, platelets, and red blood cells should be targeted
- Pelvic Binder

Hemoglobin levels might still be normal in actively bleeding trauma patients as they are losing whole blood

Intraosseous line :



## Permissive hypotension

- Maintain systolic B.P. at 85 - 95 mm of Hg
- Turn off the tap and do not infuse too much of fluid and blood products

## (D) Disability/Dysfunction:

1. Assess level of consciousness using AVPU method  
A = alert                      V = responding to voice  
P = responding to pain      U = unresponsive
2. GCS (glasgow coma scale) very important to know
3. Assess pupil size, equality and responsiveness

Ex 1: unconscious, closed eyes, not responding to verbal commands, withdrawal from pain. What is his coma scale? 6 which is very bad.

Ex 2: conscious, spontaneously opening his eyes, respond very well to motor commands but he's very confused he don't know where he is and what happened, what is his coma scale? 14

\*know that 15 is the best response, while less the 7/8 is considered as very bad sign and indicates very bad outcomes. And 3 is totally unresponsive.

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	Best response	15
	Comatose client	8 or less
	Totally unresponsive	3

## (E) Exposure:

- Fully undress patients
- Avoid hypothermia

### Hypothermia Prevention and Treatment Strategies

- Limit casualties' exposure
- Warm IV fluids and blood products before transfusion
- Use forced air warming devices before and after surgery
- Use carbon polymer heating mattress

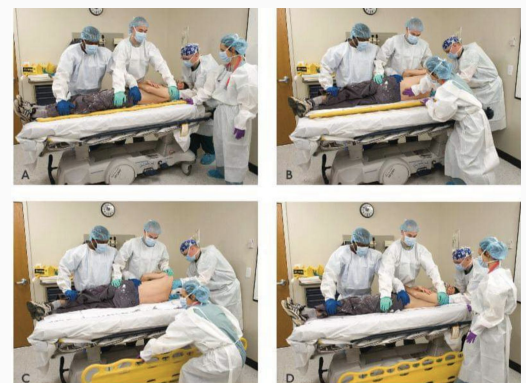
## Logroll

### Four-Person Logroll

Logrolling a patient to remove a spine board and/or examine the back.

- A) One person stands at the patient's head to control the head and c-spine, and two are along the patient's sides to control the body and extremities.
- B) As the patient is rolled, three people maintain alignment of the spine, while
- C) The fourth person removes the board and examines the back.
- D) Once the board is removed, the patient is returned to the supine position, while maintaining alignment of the spine.

It's important for you to know how to do it





# ATLS - SECONDARY SURVEY

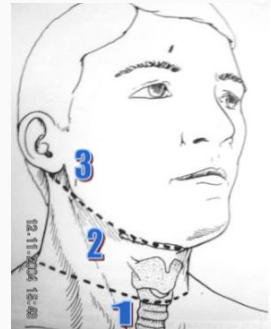
- Comprises of head to toe exam of the stable pt
- **Requires**
  - Detailed history
  - Thorough examination
  - KEEP MONITORING the vital signs
  - monitoring devices
    - pulse oximeter
    - rectal thermometer
- **Detailed radiographic procedures**
  - C.T., USG, M.R.I.

## HEAD, ENT

- Glasgow coma scale
- Reaction and size of pupils
- Plantar response
- Signs of rhinorrhoea, otorrhoea(base of skull#)
- Nose fracture, septal hematoma

## NECK

- Subcut emphysema
- Cervical spine fractures (specially C1,C2,C7)
- Penetrating neck injuries



### \*How can we assess the carotid artery in traumatized patients?

The best diagnostic ( gold standard) method is CT angiography. So it's absolutely indicated in penetrating neck trauma to check the carotid artery.

## THORAX

### Search for potentially life threatening injuries

- Pulmonary complication
- Myocardial contusion
- Aortic tear
- Diaphragmatic tear
- Oesophageal tear
- Tracheobronchial tear
- Early thoracotomy if initial haemorrhage > 1500 ml



Seat belt sign

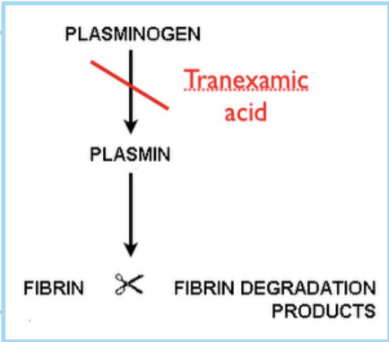
**437 A SLIDES**

- A** Allergies
- M** Medications
- P** Past illness/Pregnancy
- L** Last meal
- E** Events/Environment relating to injury:

**AMPLE history:**

Around the time of the secondary survey clarification of the history is important to ensure that no injuries, or relevant comorbidities, are missed.

- Don't forget the following:**
- Tetanus prophylaxis
  - Anti D immunoglobulin in possible preg female
  - Antibiotics (selective)
  - Tranexamic acid (TXA)

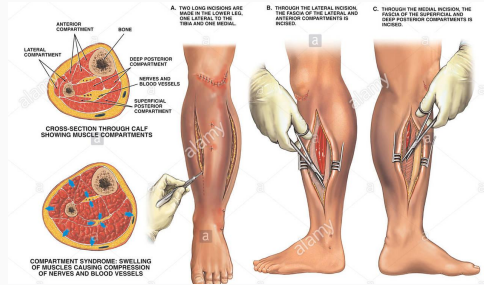


**ATLS - TERTIARY SURVEY**

**437 A SLIDES**

Secondary	Tertiary
More comprehensive head-to-toe assessment	Assessment of ABCDEs
Additional historical information <ol style="list-style-type: none"> <li>1. Significant others</li> <li>2. Past medical records</li> </ol>	Another head-to-toe assessment
Diagnostic studies	Review of lab data and diagnostic studies
	An injury found within 24 hours is not counted as a “missed” injury

- **Compartment syndrome \***
  - When a limb remains compressed for many hours/multiple fractures
  - Increased Compartment pressure and further ischaemia (of limb)
  - Treatment:
    - Fasciotomy
    - Amputation



- Tetanus
- A.R.D.S.
- **Fat embolism \***



- Management:
  - Supportive care
  - fractures management
- D.I.C.
- Multisystem organ failure

## CONCLUSIONS

- Diagnose, prioritize management as per ATLS PROTOCOL
- Recognize when to immediately refer a patient that requires urgent specialist management.
- Remember A include in-line immobilization of cervical spine while managing the airway.
- Function of spinal board as a transfer tool only
- Proper priority to orthopedic conditions that affect the patient life/limbs (open book pelvic fracture, bilateral femur fractures, mangled extremity).
- Importance of interpersonal and intrapersonal communication skills



**Case:** You are in ER, EMS is bringing middle age man involved in RTA and they will be there in 10 mins they mentioned to u he is confused, has difficulty breathing, visible right lower extremity open fracture. What do you do meanwhile?

★ **Steps:**

1. Preparation.
2. Triage.
3. Primary survey and Resuscitation.
  - Adjuncts.
4. Secondary survey.
  - Adjuncts.
5. Post-Resuscitation care.
6. Definitive care.

**1- Preparation:**

- A. Field.
- B. Hospital:
  - Space.
  - Medications and IV fluids.
  - Blood.
  - Equipment.
  - Services.
  - Transfer arrangement.
  - **PPI:**
    - Cap, Gown, Gloves, Mask/Eye shields, Shoe covers.

**2- Triage:**

- Field vs hospital.
- Condition.
- Resources.
- Multiple vs Mass.

**3- Primary survey:**

Easy way to assess it ? Patient talking to you ( good phonation, handling secretions ) A and B is fine

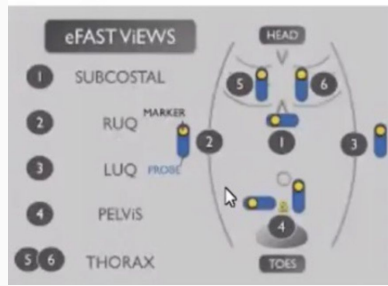
1. A: Airway check signs of obstruction? Stridor, change in voice, gurgling + C- spine any pt with obvious head injury assume C spine injury until proven otherwise.
2. B: Breathing and ventilation:RR, saO2,
  - Inspection, Palpitation, Auscultation.
  - Signs of clear injuries: Flail segment, Position of trachea, Palpate ribs (subcutaneous emphysema “ sign of pneumothorax “), Respiratory distress.
3. Circulation and hemorrhage control: we check HR, BP, obvious bleeding, pulses.
  - Assessment (LOC, Skin, Pulse) and Bleeding (bleeding control, replacement[IVF/Blood])
4. Disability:
  - GCS (E=4, V=5, M=6). Pupils.
5. Exposure and environmental control.
  - Complete exposure, Temp.

TABLE 38-2 Glasgow Coma Scale		
BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	Best response	15
	Comatose client	8 or less
	Totally unresponsive	3

When to intubate? GCS <8 trauma patients  
 General indications for intubation?  
 Head injury to protect airway, alcohol intoxication, seizure pt, Resp failure ( we have 2 types hypoxia or ventilation problem” asthmatic,copd”) ( not our main subject )

**- Adjuncts:**

- Continuous cardiac monitoring.
- Pulse oximetry.
- Vent rate, capnography, ABG
- Log roll
- Catheters: urine/gastric.
- X-rags.
- FAST/eFAST/DOL.:



- 1- heart (subcostal): check for pericardial tap
- 2- liver ,kidney hemoperitoneum
- 3- spleen and diaphragm: free fluid
- 4- bladder: free fluid

**Transfer?**

Special populations:

- 1- Elderly: weak skin and bone, more prone to Med SE.
- 2- Children: vital signs, low surface area , multiple system injury.
- 3- Pregnant: 3rd trimester, lying flat, push IVC,hypotensive, assess fetus
- 5- morbidly obese: difficult airway, hard to assess.
- 4- Athletes: bradycardia is Normal ( dif vital sign)

**Next step?**

Make sure to repeat the primary survey if there is any deterioration in the patient’s status.

**4- Secondary survey:**

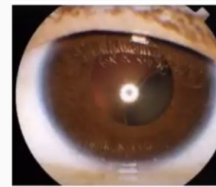
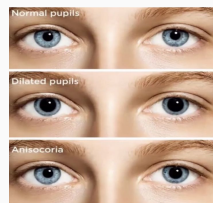
- History.
- Head to toe examination.



**AMPLE history:**

**Examination:**

1-Head: Inspection. Eyes, Ears, Nose.
2- Maxillofacial: Inspection, Palpitation, Intra-oral examination, Occlusion.
3- Cervical spine and neck: Inspection, Palpitation, Auscultation.
4- Abdomen: Inspection, Palpitation,
5- Pelvis: Inspection, Palpitation,



Dislocated lens



Rupture of globe



Orbital floor fracture



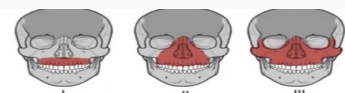
Battle sign



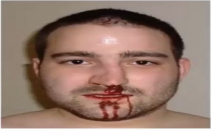
Auricle hematoma, complication is cauliflower ear



Nose Septal hematoma> lead to saddle deformity



Maxillofacial



Raccoon eyes

It's a sign indicates base of skull fracture

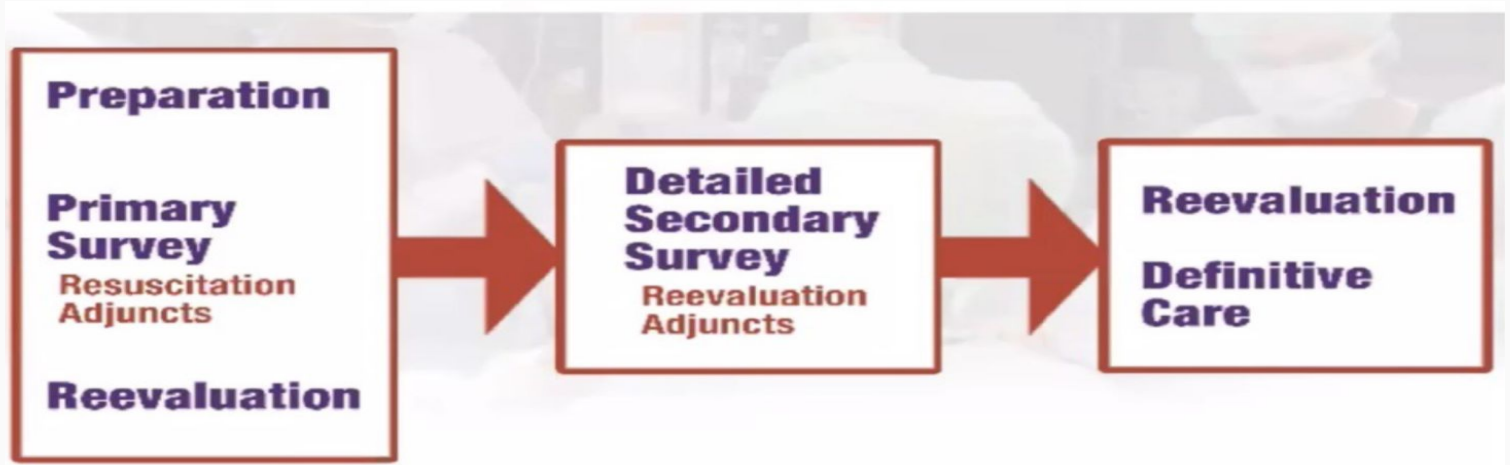


6- Perineum, Rectum, Vagina: Inspection, Palpitation, DRE
7- MSK: Pelvis, Every single joint.
8- Neurological: Full neurological exam.

### Next step?

- Continuous re-evaluation to not miss any overlooked injuries.
- Definitive care.

### Conclusion:



- Frequent reassessments.
- Keep a high index of suspicion.

# CASE

- A 32-year-old Male presents after being bucked off of his horse.
- EMS: Called in , ETA=5 min, BP 75/30, RR 30, HR 150, O2 70% RA

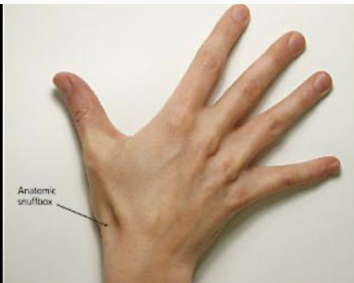


## Proper your room

### In the ED

#### Primary survey:

- **A:** Shouting “I am in Pain” and controlling secretions. C-Collar Applied
- **B:** O2 70% on RA, RR 30 with No Air Entry on The R side with distended JVD, BP 75/30, HR 150
  - Identify: Pneumothorax
  - Fix: Needle decompression followed by a chest tube after stabilising the pt
  - Reassess: Good Air Entry bil, O2% 95 RA and **BP 85/40, HR 125**
- **C:** BP 85/40, HR 125, Lower abdominal Bruising and Tenderness. Unstable Pelvic exam
  - Identify: Open Book pelvic fracture
  - Fix: 2 large IVs, IVF resuscitation (Don't delay blood) and Pelvic Binder
  - Reassess: BP 120/80 HR 110
- **D:** Moving all 4 limbs.
- **E:** Log Roll and full exposure
- Pain Management (lowered HR to 90)



# SUMMARY

- Pneumothorax: Chest tube in place
- Open Book Pelvic Fracture: Blood transfusion and pelvic binder
- Pan CT done with no other significant injuries
- Pt Transferred to OR : Pelvic fixation

## MCQS

**1-A patient comes to ER and he unstable, hypovolemic and he responds to resuscitation for short period then declines again, you were consulted if he has pelvic fracture or not, how to R/O the fracture?**

- a. Pelvic instability (apply gentle pressure on pelvis).
- b. CT.
- c. Probe.
- d. X-ray.

Ans: A

**2- Patient came to ER with severe back after MVA otherwise normal ATLS was performed on the patient What is the next step?**

- A. Do physical examination spine
- B. X-ray spine
- C. CT spine
- D. MRI spine

Ans: A

**3- Patient presented to the ER after an RTA Examination suggest cauda equina syndrome also X-ray suggest burst fracture of the spine. What's the best modality to confirm the diagnosis?**

- A. Myelogram.
- B. T99 bone scan.
- C. PET scan.
- D. CT scan

Ans: D

**Done!**

***Big Thanks for everyone who participated in this team:***

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Abdulaziz Almuhanha

Abdulaziz Alobaid

Abdulaziz Alsarhani

Abdullah Alangari

Abdullah Alessa

Abdullah Alobaidan

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Azzam Alghuraybi

Bandar AlJammaz

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Hisham Almousa

Hosam Alruwaite

Hussain Allami

Khalid Almutairi

Kholid Alshehri

Mansour Alobrah

Mohammed Almohaimeed

Mohammed Alzahrani

Muath Alhumud

Nawaf Alsubaie

Rakan Alghonaim

Saad Slhaddab

Saud Alghufaily

Suliman AlZomia

Yazeed AlDossare

Ahad Algrain

Arwa Aljohany

Arwa Alzahrani

Balgees AlAbbad

Buthaina Almajed

Dhayah AlEnezi

Dimah Alaraifi

Ebtesam almutairi

Esraa alnazzawi

Felwah Alsaawi

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Hind Aloraier

Khulood Alwehaibi

Laila Alsabbagh

Majd Albarrak

Marwah Alkhalil

Meaad faiz

Munira Almasaad

Nouf Alotaibi

Rahaf AlShammari

Rawan Alotaibi

Rawan AlRehaili

Rawan Altamimi

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