Trauma Care

Done by:
Sara AlBqami
Mada AlBatli
Davidson's Notes:
Salman AlGazaln
Edited and Reviewed by:
Elham AlGhamdi
Abdarrahman AlKaff

Course Objectives

- **Importance of Trauma Care**
- **Principles of primary and secondary assessments**
- **Establish management priorities within the Primary Survey**

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-Slides -Important -Doctor's Notes -Davidson's Notes -Surgery Recall -Extra

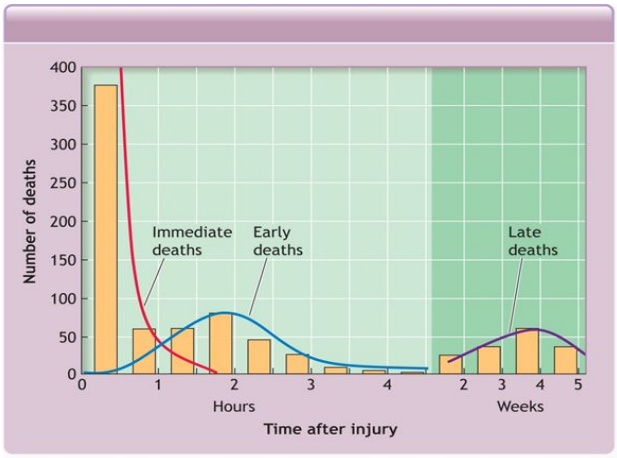
Correction File **Email: Surgeryteam434@gmail.com**

The Need:

- The leading cause of death in the first four decades of life.
- More than 5 million trauma-related deaths each year worldwide.
- Motor vehicle crashes cause over 1 million deaths per year.
- Injury accounts for 12% of the world's burden of disease.

Trimodal Death Distribution :

First peak:	Second peak:	Third peak:
Immediate – unsurvivable injuries, impacted by trauma prevention. You have to prevent it (seatbelt)! if we prevented accidents by wearing seatbelt and enforcing laws the first peak will reduce. if we had better resources and better training for physion the second peak will reduce and by default the third peak	Early – golden hour of care, impacted by early hospital care.	Late – caused by sepsis and multiple organ dysfunction syndrome (MODS), impacted by optimal early care and trauma center management.



Standard Concept :

- ABCDE approach to evaluation and treatment
- Treat greatest threat to life *first*
- Definitive diagnosis *not* immediately important
- Time is of the essence
- Do no further harm

ATLS Concept :

- Airway with c-spine protection

Always stabilize the spine with a c-spine collar.
ASSUME EVERY PATIENT HAS A SPINAL FRACTURE.

- Breathing / ventilation / oxygenation

Patients could die from an non-patent airway way before they die from bleeding. So always follow the steps and check the breathing before circulation.

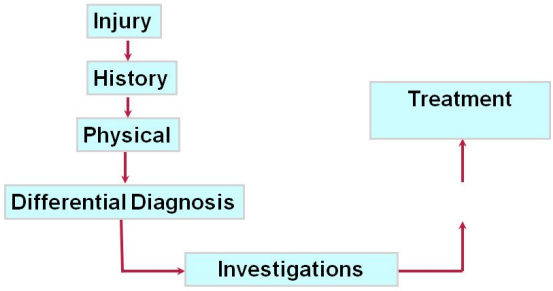
- Circulation: stop the bleeding!
- Disability / neurological status
- Expose / Environment / body temperature

Regular Medical Assessment: (this does not work in trauma), (do it after resuscitate) (secondary survey)

A trauma patient would die before receiving treatment if we approach him in the routine way.

All of this is important but is called the secondary survey

In Trauma we start with the primary survey to save the life



Initial Assessment / Management: (primary survey)

Case Scenario:

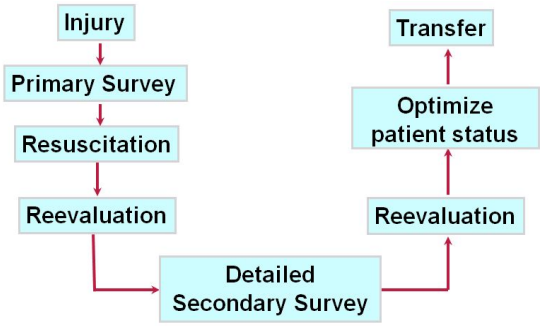
24-year-old male involved in a motorcycle crash into a truck, Not wearing a helmet ,Arrives at hospital with the red crescent ,BP 80/40, P140, RR 33, and central cyanosis ,C-collar, Oxygen at 8L/min, Dressing to forehead & thigh soaked in blood, Has a wrist splint & is on a spinal board

What do you think of the care?

Standard Precautions:

- Cap
- Gown
- Gloves
- Mask
- Shoe covers
- Goggles / face shield

They must be appropriately immunized for hepatitis B.



Quick Assessment:

Primary survey and resuscitation of vital functions are done simultaneously using a team approach

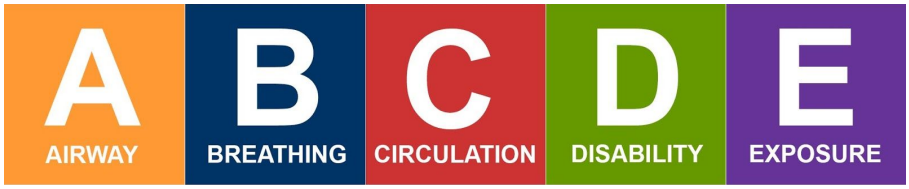
What is a quick, simple way to assess a patient in 10 seconds?	Appropriate Response Confirms:
• Identify yourself • Ask the patient his or her name • Ask the patient what happened! Or where are you know?, Who am I?	• A Patent airway • B Sufficient air reserve to permit speech • C Sufficient perfusion to permit cerebration (High enough pressure to pump blood to the brain) • D Clear sensorium

Primary Survey:

The priorities are the same for *all* patients: **ABCDE**

Special Considerations:

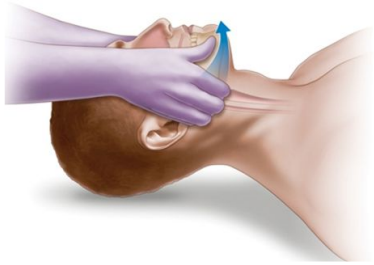
- Trauma in the elderly
- Pediatric trauma
- Trauma in pregnancy

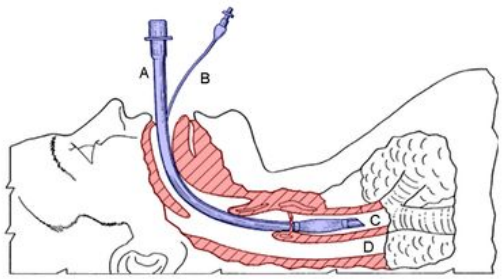


Airway

Establish patent airway and protect c-spine

Basic Airway Techniques		Advanced Airway Techniques
Chin-lift Maneuver No head tilt as this is a trauma patient ,*Simple way from BLS *Tilt head back then lift chin this move the tongue forward and allow breathing *The problem when head tilt back it will move the c-spine and may injure it	**Jaw-thrust Maneuver** *Pushing the jaw forward *The tongue is attached to the bone, so it will move forward *Better way you can do it anywhere ALWAYS DO A JAW THRUST MANEUVER RATHER THAN A CHIN LIFT TO KEEP THE NECK STABILIZED. IF IT'S STILL NOT PATENT, DO AN ENDOTRACHEAL INTUBATION. IF THAT ALSO FAILS DO A CRICOTHYROIDOTOMY	**Orotracheal intubation** ***Advanced airway techniques are required when:*** ***1) Protective airway reflexes are absent (usually caused by altered consciousness)*** ***2) Basic techniques are unable to cope with current or predicted airway compromise (e.g. major facial or burns/inhalation injury)*** ***3) There is a need for controlled ventilation (e.g. head and/ or chest injury).***





Pitfalls: (not mention by the doctor)

Occult airway injury

Progressive loss of airway

Equipment failure

Inability to intubate

First assessed by direct inspection.

Noisy breathing, snoring or stridor implies airway obstruction.

blood, vomit, secretions & other debris are removed from mouth and oropharynx using a rigid suction catheter. While large items such as lumps of food are removed using forceps.

The most common cause of airway obstruction is a reduced conscious level (assessed by Glascow Coma Score); in reduced conscious levels the tongue will fall back blocking the oropharynx. In addition to that, the protective gag & swallow airways reflexes are more likely to be ascent or compromised.

Breathing

Assess and ensure adequate oxygenation and ventilation

Basic chest examination:

- Respiratory rate
- Chest movement
- Air entry
- Oxygen saturation (the most important)
- Percussion
- Auscultation

The Immediate life threatening injuries:

- Laryngotracheal injury / Airway obstruction
- Tension pneumothorax clinical diagnosis, never order an x- ray to diagnose it. always use a large bore chest tube!size is 32 and above.
- Open pneumothorax
- Flail chest and pulmonary contusion
- Massive hemothorax

- Cardiac tamponade is a surgical problem that
- needs a proper cardiac surgeon.

ALWAYS CHECK FOR ACTIVE BLEEDING AS THE 5 DX.'S FOR HYPOTENSION IN TRAUMA PATIENT IS ALWAYS BLEEDING!
ANY FLUID IN ANY CAVITY DURING TRAUMA IS ALWAYS BLOOD (EG. HEMOPERICARDIUM NOT PERICARDIAL EFFUSION)

Respiratory compromise is characterized by tachypnoea or bradypnoea.

The use of accessory muscles of respiration, and paradoxical (see-saw) movement of the chest and abdomen, indicating failure of normal diaphragmatic function.

Repeated arterial blood gas analyses are needed to ensure that hypoxia is not present and that alveolar ventilation is sufficient to prevent hypercapnia.

Controlled ventilation is particularly important in patients with head injury, as hypercarbia causes dilatation of the cerebral vessels and increased intracranial pressure, whereas hypocarbia produces cerebrovascular vasospasm, compromising cerebral perfusion.

Circulation

- Level of consciousness
- Skin color and temperature
- Pulse rate and character

Assess for organ perfusion:

•Emphasize the reasons for assessing for signs of inadequate tissue perfusion instead of focusing on the patient's blood pressure.

•Emphasize the need to control hemorrhage or stop the bleeding.

•Also emphasize that the patient may require an operation to stop the bleeding. Stress the importance of reassessing the patient's response to treatment.

THE 5 PLACES THAT MOST COMMONLY CAUSE HYPOTENSION DUE TO BLEEDING INTO:

1. THE CHEST: X-RAY
2. THE ABDOMEN : FAST ASSESSMENT "ULTRASOUND"
3. THE PELVIS : X-RAY
4. THE LONG BONES: EASILY VISIBLE
5. THE STREET: OPEN WOUNDS TO THE FLOOR

- THE HEAD "CRANIAL HEMORRHAGES" DON'T HAVE ENOUGH BLOOD TO CAUSE HYPOTENSION

Circulatory Management:

●Control hemorrhage

●Restore volume

●Reassess patient

●Lethal triad : bleeding for a long time end up with **hypothermia ,Coagulopathy and Acidosis**

20% or more of total circulating blood volume can be lost without a measurable change in these recordings.

Trends in pulse rate and blood pressure are of much greater value. A rising pulse rate combined with a falling blood pressure strongly suggests uncontrolled, often occult, blood lossIt is inappropriate to correct haemodynamic measurements in isolation, and there are situations where, in the presence of an uncontrolled bleeding site (for example, in the pelvis or peritoneum), increasing blood pressure will simply exacerbate blood losses.

In blood transfusion, the aim is to maintain the patient's haematocrit at ~30%.

Where there is immediately life-threatening haemorrhage, group O Rhesus-negative blood is given, but more usually fully cross-matched or type-specific blood can be supplied.

A low or falling GCS may indicate cerebral hypoperfusion due to hypovolaemia or worsening intracranial injury.

Intraarterial blood pressure monitoring is significantly more accurate than standard cuff methods.

Disability

● Baseline neurologic evaluation

● Glasgow Coma Scale score (it will come in the exam)

● Pupillary response

Table 4. Pediatric Glasgow Coma Scale For Nonverbal Children.

Eye Opening	
Spontaneous	4
To speech	3
To pain	2
No response	1
Verbal Response	
Coos, babbles	5
Irritable cry	4
Cries to pain	3
Moans to pain	2
No response	1
Motor Response	
Follows commands	6
Localizes pain	5
Withdraws to pain	4
Decorticate flexion	3
Decerebrate extension	2
No response	1

Exposure / Environment (from head to toe)

- *Completely undress the patient*
- **Caution :**Prevent hypothermia
- **Pitfalls:** Missed injuries

completely undress the patient to adequately assess the entire patient, while at the same time preventing **hypothermia**.

Resuscitation

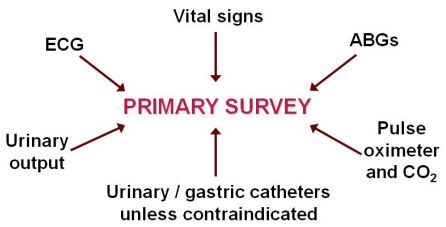
- Protect and secure airway
- Ventilate and oxygenate
- Stop the bleeding!
- Vigorous shock therapy
- Protect from hypothermia

Adjuncts to the Primary Survey

For pain management, opioid drugs such as morphine can be given in small intravenous doses titrated to effect.

•The primary purpose of these adjuncts during the primary survey is to determine where occult bleeding may be occurring that is not obvious on clinical exam.

•Emphasize the need to determine the source of shock.



X-rays to any trauma patient:

• C-spine x-ray • Chest x-ray • Pelvic x-ray

Portable chest and pelvic x-rays in the emergency department are the ONLY x-rays obtained during the primary survey. Previous editions of the course included lateral cervical spine x-rays, but this film is now obtained selectively and at the appropriate time, based on the doctor's judgment.

Diagnostic Tools:

- FAST [1] using ultrasound to check for blood in the abdomen
- DPL[2] not done anymore

Consider Early Transfer:

- Use time before transfer for resuscitation
- Do not delay transfer for diagnostic tests

[1] Focused Assessment with Sonography for Trauma.
[2] Diagnostic Peritoneal Lavage.

Secondary Survey

What is the secondary survey?

The *complete* history and physical examination like what we would normally do to any other patient after all life threatening injuries have been identified and patient stabilized

The patient is examined from top to toe to ensure that no wound, bruise or swelling is missed. The back and spine are examined with the patient 'log-rolled', looking specifically for localized tenderness, swelling, bruising.

When do I start the secondary survey?

After

- Primary survey is completed
- ABCDEs are reassessed
- Vital functions are returning to normal (stabilize)

What are the components of the secondary survey?

- History
- Physical exam: Head to toe
- Complete neurologic exam
- Special diagnostic tests
- Reevaluation

Surgical Recall

E=ENVIRONMENT	Keep a warm Environment (i.e., keep the patient warm; hypothermic patient can become coagulopathic)
Secondary survey	Complete physical exam, including all□orices : ears ,nose ,mouth ,vagina, rectum
Why look in the ears?	Hemotympanum + otorrhea is a sign of basilar skull fracture
What are typical signs of basilar skull fracture?	Raccoon eyes, Battle's sign, clear otorrhea or rhinorrhea, hemotympanum

Examination of what part of the trauma patient's body is often forgotten?	Patients back
What diagnosis in the anterior chamber must not be missed on the eye exam?	Traumatic hyphema blood in the anterior chamber of the eye
What potentially destructive lesion must not be missed on the nasal exam?	Nasal septal hematoma: Hematoma must be evacuated; if not, it can result in pressure necrosis of the septum
What is the best indication of a mandibular fracture?	Dental malocclusion: Tell the patient to "bite down" and ask, "Does that feel normal to you?"
What physical signs may indicate intra-abdominal injury?	Tenderness; guarding; peritoneal signs; progressive distention (always use a gastric tube for decompression of air); seatbelt sign
What is the seatbelt sign?	Ecchymosis on lower abdomen from wearing a seatbelt (10% of patients with this sign have a small bowel perforation!)
What must be documented from the rectal exam? (OSCE PR examination)	Sphincter tone (as an indication of spinal cord function); presence of blood (as an indication of colon or rectal injury); prostate position (as an indication of urethral injury)
What physical signs indicate possible urethral injury, thus contraindicating placement of a Foley catheter? (OSCE)	High-riding ballotable prostate on rectal exam; presence of blood at the meatus; scrotal or perineal ecchymosis