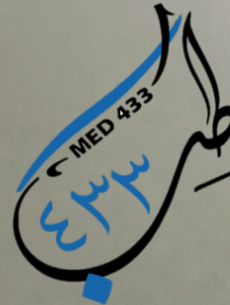


L16-Trauma Care



Surgery Team
MED 433



Objectives :

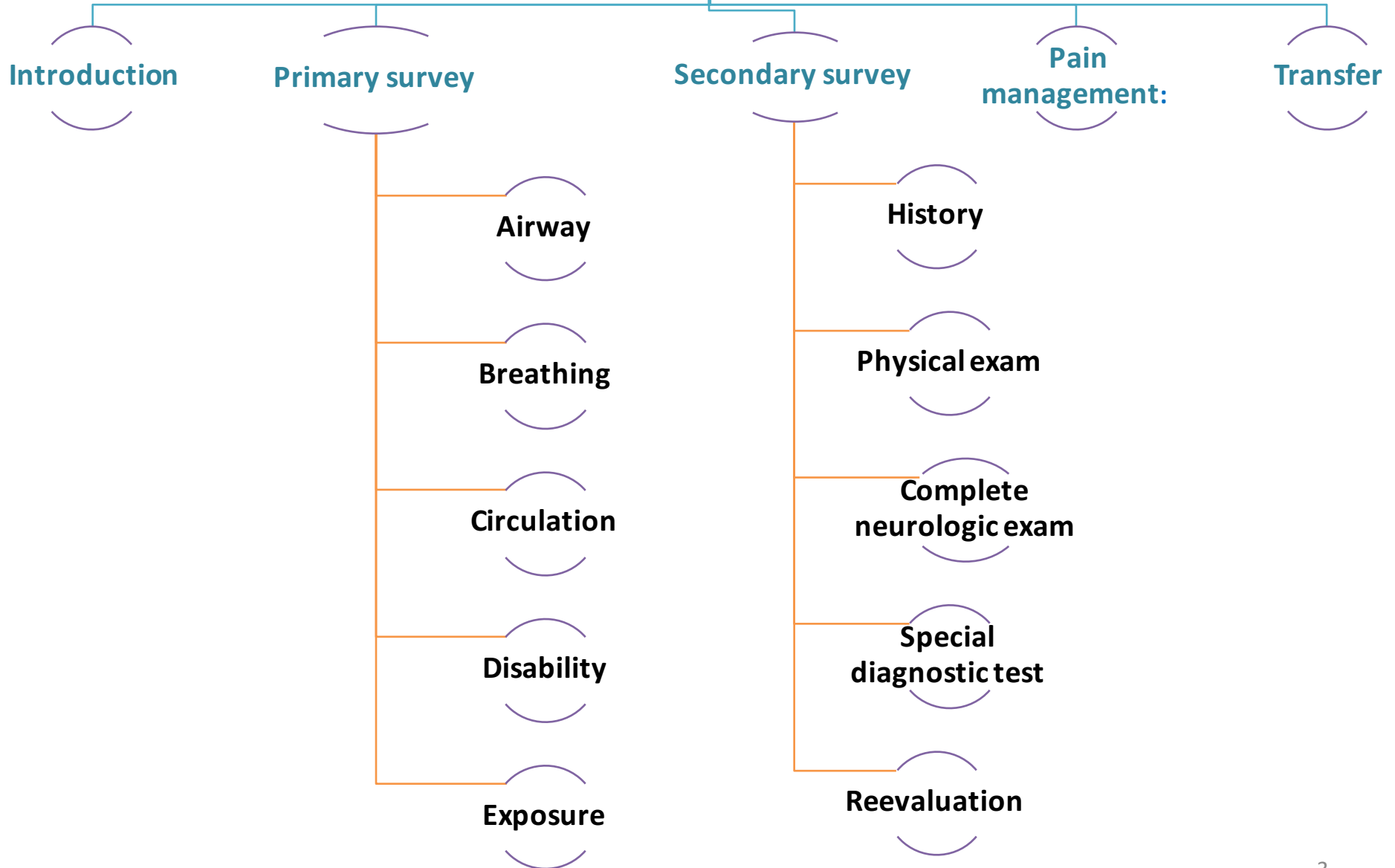
- ✓ Importance of Trauma Care
- ✓ Principles of primary and secondary assessments.
- ✓ Establish management priorities

[Color Index](#): Slides & Raslan's () | [Doctor's Notes](#) | Extra Explanation | [Additional](#)

This work is based on doctor's Slides +Notes and Raslan's only (Does not include the book)

Mind Map

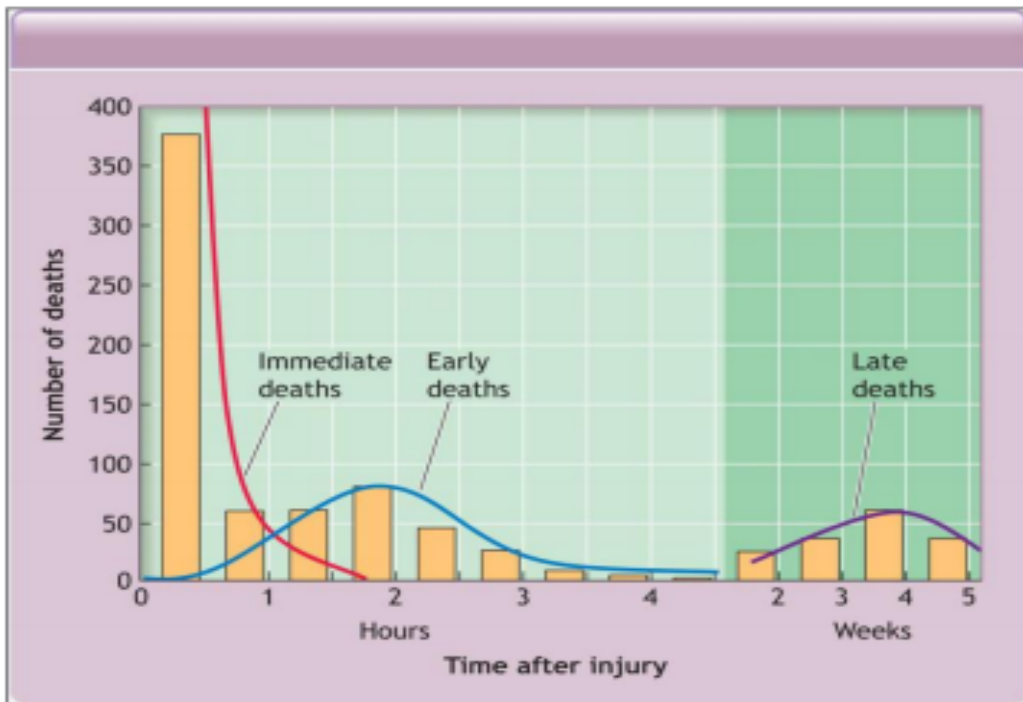
Trauma Care



1) Introduction

A) 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. (we don't call it accidents b/c it's preventable)
- ✓ Injury accounts for 12% of the world's burden of disease



Trimodal Death Distribution



Immediate:

You have to prevent it (seatbelt)!

Early : Get the patient to the hospital (Golden hour).

Late: Complications
e.g. infection, multi-organ failure.

B) Advanced Trauma Life Support Concept (Atls)

- ✓ 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

1-ABCDE Approach

- ✓ Airway with c-spine protection
- ✓ Breathing / ventilation / oxygenation
- ✓ Circulation: stop the bleeding!
- ✓ Disability / neurological status
- ✓ Expose / Environment / body temperature

4-Standard Precautions

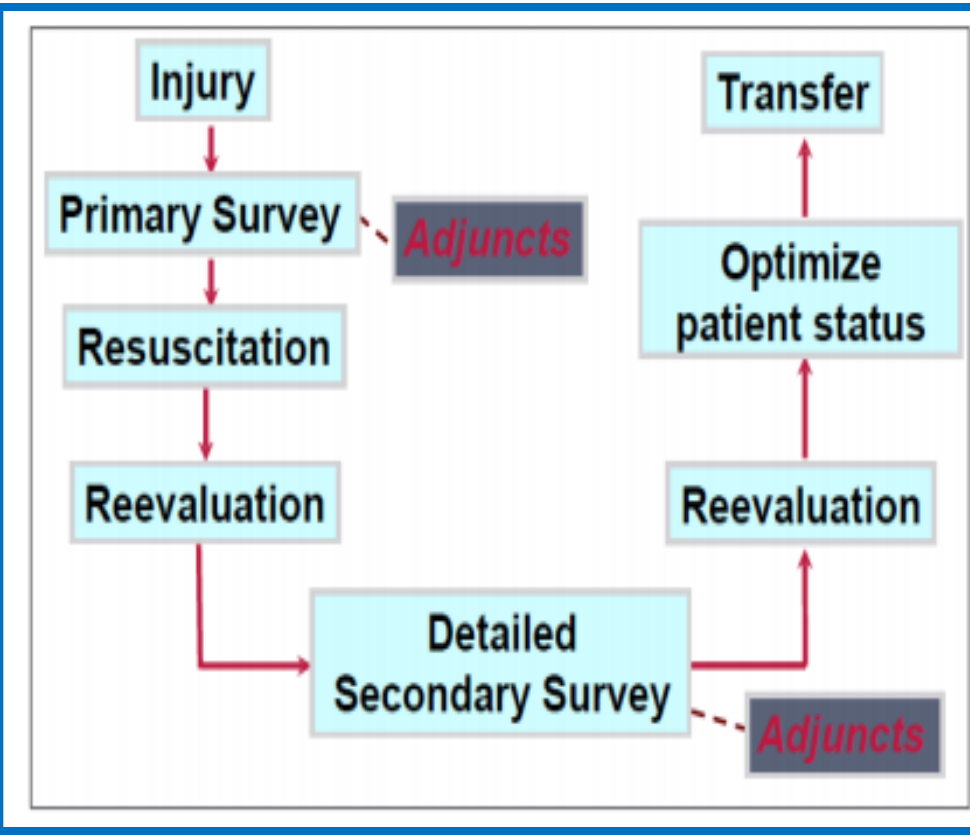
- ✓ Cap
- ✓ Gown
- ✓ Gloves
- ✓ Mask
- ✓ Shoe covers
- ✓ Goggles / face shield

2- Initial Assessment And Management [More details in the next slide](#)

3- Advanced Trauma Life Support Objectives

- ✓ Apply principles of primary and secondary surveys
- ✓ Identify management priorities
- ✓ Institute appropriate resuscitation and monitoring procedures
- ✓ Recognize the value of the patient history and biomechanics of injury
- ✓ Anticipate and manage pitfalls

2- Initial Assessment And Management



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

- Quick Assessment :**
- ✓ What is a quick, simple way to assess a patient in 10 seconds?
 - ✓ Identify yourself
 - ✓ Ask the patient his or her name
 - ✓ Ask the patient what happened
 - ✓ Or where are you know?, Who am I?

- An appropriate response to the previous question confirms the following:**
- ✓ Patent's Airway
 - ✓ Sufficient air reserve to permit speech
 - ✓ Sufficient perfusion to permit cerebation (High enough pressure to pump blood to the brain)
 - ✓ Clear sensorium



2) Primary Survey

The priorities are the same for all patients

- ✓ **Airway** with c-spine protection
- ✓ **Breathing** with adequate oxygenation
- ✓ **Circulation** with hemorrhage control
- ✓ **Disability**
- ✓ **Exposure** / Environment



More details in the next slides

Special Considerations :

Trauma in the **elderly, Pediatric** trauma ,Trauma in **pregnancy**.
have same approach with little changes

- ✓ In all of these (ABCDE) first you have asses then make a decision after that do an action
- ✓ It is a teamwork every one is handling something , but if you are alone do it step by step because what going to kill the patient first is if he can not breath

1-Airway

Establish patent airway and protect c-spine

A) Basic Airway Techniques:



1- Chin-lift Maneuver

*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



2- 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

B) Advanced Airway Techniques: orotracheal intubation (tube in trachea)

✓ Surgical airway : do cricothyrotomy -> insert tube into the airway through the neck

C) Pitfalls (Unexpected difficulties): (not mentioned by the doctor)

- Occult airway injury
- Progressive loss of airway
- Equipment failure
- Inability to intubate

2-Breathing

Assess and ensure adequate oxygenation and ventilation :

- ✓ Respiratory rate
- ✓ Chest movement
- ✓ Air entry
- ✓ Oxygen saturation (the most important thing)

Basic chest examination

- ✓ Pitfalls (Unexpected difficulties): (not mentioned by the doctor)

Airway versus ventilation problem?

- Iatrogenic pneumothorax or tension pneumothorax

**Life Threatening Injuries Come To
Your Mind Before Examination Then
You Start Excluding It.**



The Immediate Life Threatening Injuries :

1. Laryngotracheal injury / Airway obstruction
2. Tension pneumothorax
3. Open pneumothorax
4. Flail chest and pulmonary contusion
5. **Massive hemothorax (> 1.5 L)**
6. Cardiac tamponade



More details in the next slides

The Immediate Life Threatening Injuries

1-Laryngeotracheal injury / Airway obstruction

- ✓ Presents by **massive subcutaneous emphysema or massive pneumothorax**
- ✓ Rupture of trachea or bronchus in the chest -} the patient is trying to breath-} the air goes to the pleural space not into the lungs
- ✓ Most of the patient die before coming to the hospital

2-Tension pneumothorax

- ✓ It is a pneumothorax under pressure , pushes the lung and mediastinum to the other side
- ✓ Any pneumothorax causing hypotension is tension pneumothorax
- ✓ Tension pneumothorax is clinical diagnosis: deviated trachea, silent chest, hyper resonant, distended neck veins .
- ✓ Should not be identified from an x – ray because it is a clinical diagnosis

✓ **Management :**

Needle to the 2nd intercostal space at the mid axillary line (needle thoracostomy) followed by Chest tube



Where to insert chest tube?

5th intercostal space, anterior to the mid axillary line.

Size of tube: 28 or preferably 30 or 32 because we want to drain air and blood

3-Open pneumothorax:

✓ **Management:**

Placement of dressing secured on 3 sides to create (flutter-valve) because securing on 4 sides will cause tension pneumothorax, a chest tube distant from injury must then be placed.

4-Flail chest and pulmonary contusion

5-Massive hemothorax (> 1.5 L) in chest lung can not expand

o Chest tube , if the bleeding didn't stop, the patient must be taken to the OR

6-Cardiac tamponade:

✓ Heart can not expand , in trauma fluid in chest is blood

✓ **Management:**

✓ Heart injured, needle pericardiocentesis or pericardial window can be immediately life-saving.

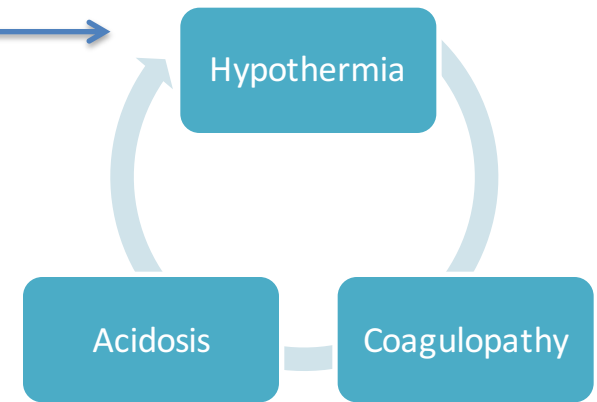
✓ **Thoracostomy is the definitive treatment with repair of injury**

3-circulation:

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

Circulatory Management:

- ✓ Control hemorrhage
- ✓ Restore volume
- ✓ Reassess patient
- ✓ **Lethal triad**



You need to break the circle

- ✓ **Pitfalls (Unexpected difficulties):** (not mentioned by the doctor)
 - Elderly • Athletes
 - Children • Medications

What Are The Causes Of Hypotension In Trauma? “ Its Bleeding , But where?”

- ✓ Bleeding in the chest - Dx: by Examination & X-ray
- ✓ Bleeding in the abdomen - Dx: Fast , DPL, abdominal distention
- ✓ Bleeding in the pelvis - pelvis is moving with hypotension!
- ✓ Long bone bleeding
- ✓ External bleeding
- ✓ Bleeding at the site of trauma

So you need to identify where is the bleeding and take him to the OR to fix it

4-Disability

- ✓ Baseline neurologic evaluation
 - ✓ Glasgow Coma Scale Score
 - ✓ Pupillary response: Size, reactive or not
 - ✓ Observe for neurologic deterioration
- } Asses head injury

5-Exposure / Environment

- ✓ Completely undress the patient
- ✓ Check for missed injuries
- ✓ Cover to prevent hypothermia



	Score
Eye opening (E)	
Spontaneous	4
To speech	3
To pain	2
No response	1
Motor response (M)	
Obeys	6
Localizes	5
Withdraws	4
Flexion	3
Extension	2
No response	1
Verbal response (V)	
Orientated	5
Confused conversation	4
Inappropriate words	3
Incomprehensible sounds	2
No response	1

Glasgow Coma Scale = E + M + V
(GCS minimum = 3; maximum = 15)

- ✓ Important you need to know how to calculate
- ✓ **Less than 13 -}** moderate brain injury
- ✓ **Less than 8 -}** severe brain injury, an indication to intubate



1-Resuscitation

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

2-Adjuncts To Primary Survey

X-rays to any trauma patient:

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

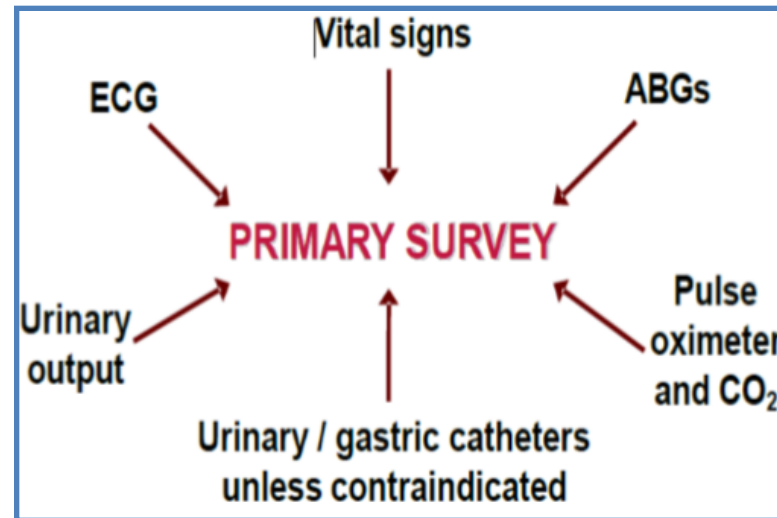
Diagnostic Tools:

- FAST (Focused Assessment with Sonography for Trauma)
- DPL (diagnostic peritoneal lavage)

Consider Early Transfer

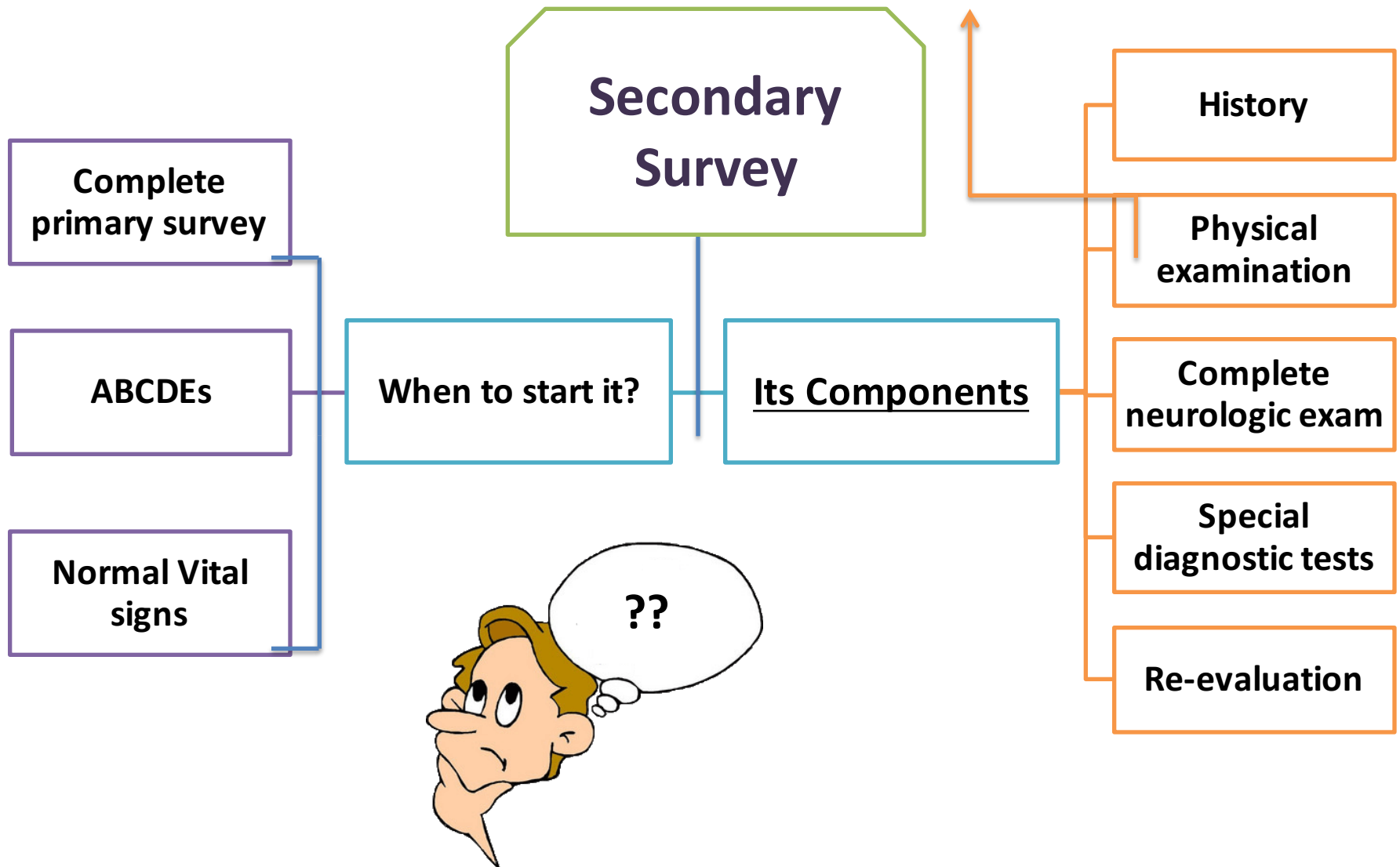
- Use time before transfer for resuscitation
- Do not delay transfer for diagnostic tests

Primary survey should take 10 – 20 minutes



3) Secondary Survey

More details in the next slides



1- Head:

- External exam
- Scalp palpation
- Comprehensive eye and ear exam, including visual acuity

Pitfalls:

- Unconsciousness
- Periorbital edema
- Occluded auditory canal

2- Maxillofacial:

- Bony crepitus
- Deformity
- Malocclusion

Pitfalls:

- Potential airway obstruction
- Cribriform plate fracture
- Frequently missed

3- Neck (Soft Tissue):

Mechanism: Blunt vs penetrating

Symptoms: Airway obstruction, hoarseness

Findings: Crepitus, hematoma, stridor, bruit

Pitfalls:

- Delayed symptoms and signs
- Progressive airway obstruction
- Occult injuries

4- Chest:

- Inspect
- Palpate
- Percuss
- Auscultate
- X-rays

Potential life threatening injuries:

- Blunt cardiac injury
- Traumatic aortic disruption
- Blunt esophageal rupture
- Traumatic diaphragmatic injury

5-Abdomen:

- Inspect
- Auscultate
- Palpate
- Percuss
- Reevaluate
- Special studies

Pitfalls:

- Hollow viscous injury
- Retroperitoneal injury

Indications for Laparotomy-Blunt Trauma:

- Hemodynamically abnormal with suspected abdominal injury (DPL /FAST)
- Free air
- Diaphragmatic rupture
- Peritonitis
- Positive CT

Indications for Laparotomy-Penetrating Trauma:

- Hemodynamically abnormal
- Peritonitis
- Evisceration
- Positive DPL, FAST, or CT

6-Perineum:

Contusions, hematomas, lacerations, urethral blood

7- Extremities:

- Contusion, deformity
- Pain
- Perfusion
- Peripheral neurovascular status
- X-rays as needed

8-Musculoskeletal:

Pitfalls:

- Potential blood loss
- Missed fractures
- Soft tissue or ligamentous injury
- Compartment syndrome (especially with altered sensorium / hypotension)

9- Vagina:

- Blood, laceration

Pitfalls:

- Urethral injury
- Pregnancy 12

10-Rectum:

- Sphincter tone,
- high-riding prostate,
- pelvic fracture,
- rectal wall integrity,
- Blood

11-Pelvis:

- Pain on palpation
- Leg length unequal
- Instability
- X-rays as needed

Pitfalls:

- Excessive pelvic manipulation
- Underestimating pelvic blood loss



12-Neurological:

1- Brain:

- GCS
- Pupil size and reaction
- Lateralizing signs
- Frequent reevaluation
- Prevent secondary brain injury (Early neurosurgical consult)

2- Spinal Assessment :

- Whole spine
- Tenderness and swelling
- Complete motor and sensory exams
- Reflexes
- Imaging studies

Pitfalls:

- Altered Sensorium
- Inability to cooperate with clinical exam

3-Spine and Cord:

- Conduct an in-depth evaluation of the patient's spine and spinal cord.
- **N.B** Early neurosurgical orthopedic consult

Adjuncts to Secondary Survey:

Special Diagnostic Tests as Indicated

Pitfalls:

- Patient deterioration
- Delay of transfer
- Deterioration during transfer
- Poor communication

How to minimize missed injuries?

High index of suspicion

Frequent reevaluation and monitoring

4) Pain management:

- Relief of pain / anxiety as appropriate Administer intravenously
- Careful monitoring is essential

5) Transfer:

Which patients do I transfer to a higher level of care?

Those whose injuries exceed institutional capabilities:

1. Multisystem or complex injuries
2. Patients with comorbidity or age extremes

When should the transfer occur?

As soon as possible after stabilization

Which patients do I transfer to a higher level of care?

- Airway and ventilatory control
- Hemorrhage control

Summary

- In ATLS first do ABCDE Then treat first the greatest threat to life
- An easy way to check the patency of the airway is to ask the patient his/her name
- **Primary Survey:**
 - A**irway with c-spine protection
 - B**reathing with adequate oxygenation
 - C**irculation with hemorrhage control
 - D**isability
 - E**xposure / **E**nvironment
- **Basic Airway Techniques:** 1. Chin-lift Maneuver 2. Jaw-thrust Maneuver
- **We check the circulation:**
 - ✓ Level of consciousness
 - ✓ Skin color and temperature
 - ✓ Pulse rate and character
- Bleeding is the main cause of hypotension in trauma
- **Secondary survey** is basically taking a complete history and physical examination
- **Transfer trauma patient when:**
 1. Multisystem or complex injuries
 2. Patients with comorbidity or age extremes

Thank You..

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