



Caring

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Basic Trauma Overview - ABC

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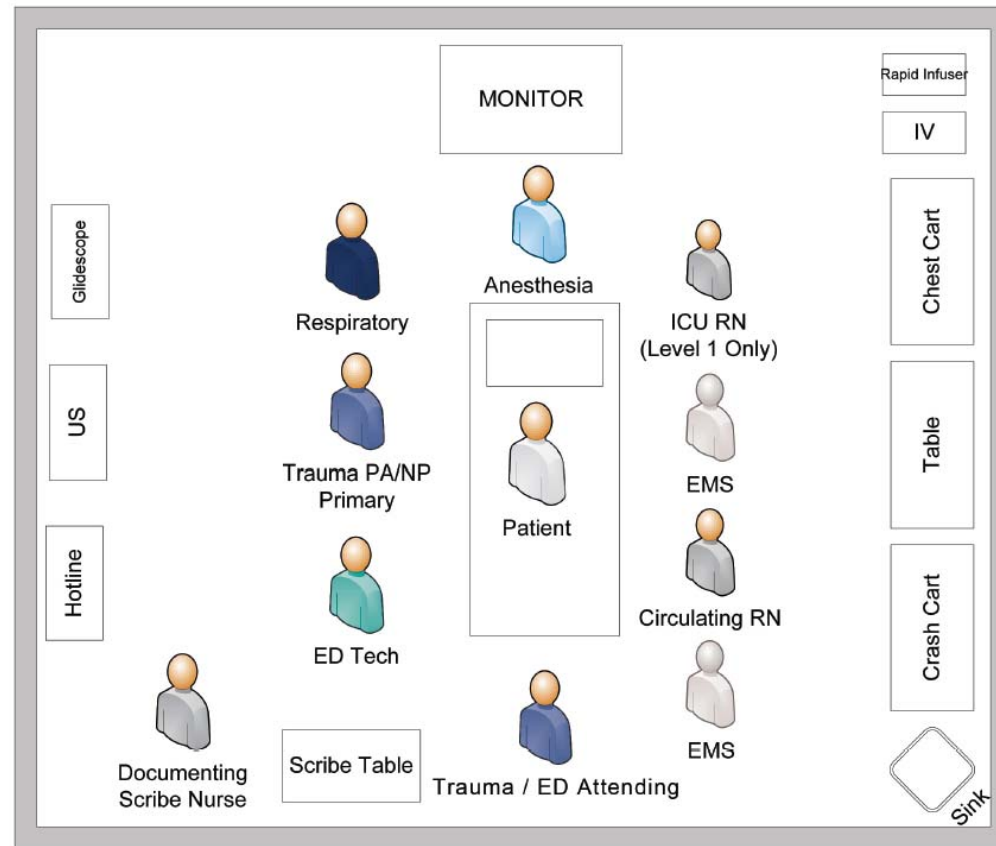
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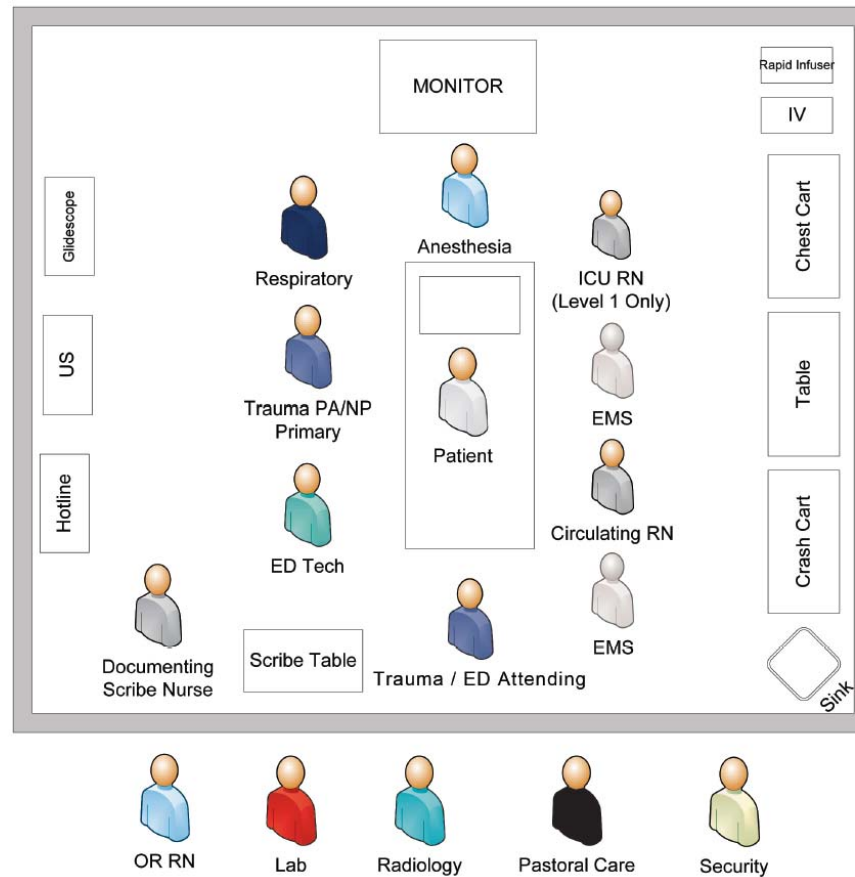
Team

Trauma Room Layout Level 1 & 2



Extended Team

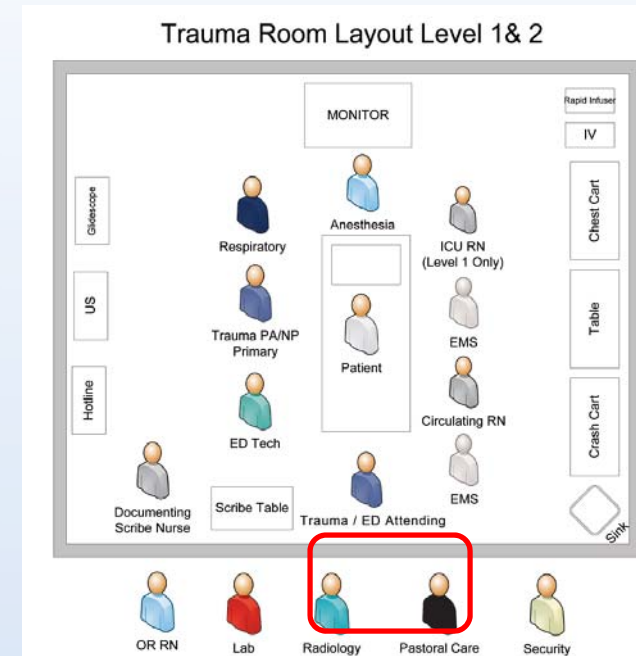
Trauma Room Layout Level 1& 2



Team Leader

Decrease chaos / optimize care.

- Remains calm
- Maintains control and provides direction
- Stays decisive
- Sees the big picture (situational awareness)
- Is open to other team members input
- Directs resuscitation
- Makes early decision to transfer the patients that exceed the local capabilities

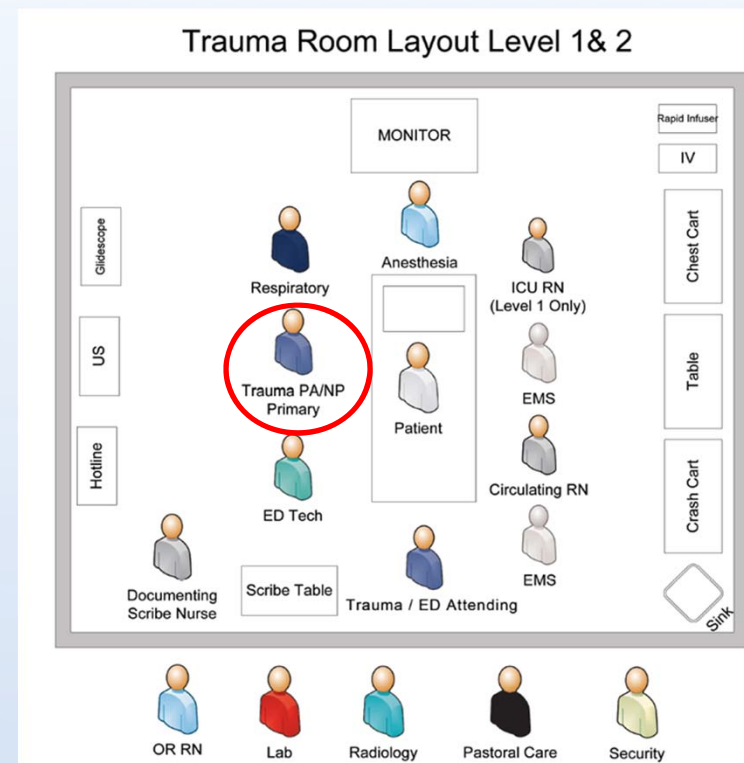


Team Members

- Know your roles in the trauma team
- Remain calm
- Be responsive to team leader
- Voice suggestions or concerns

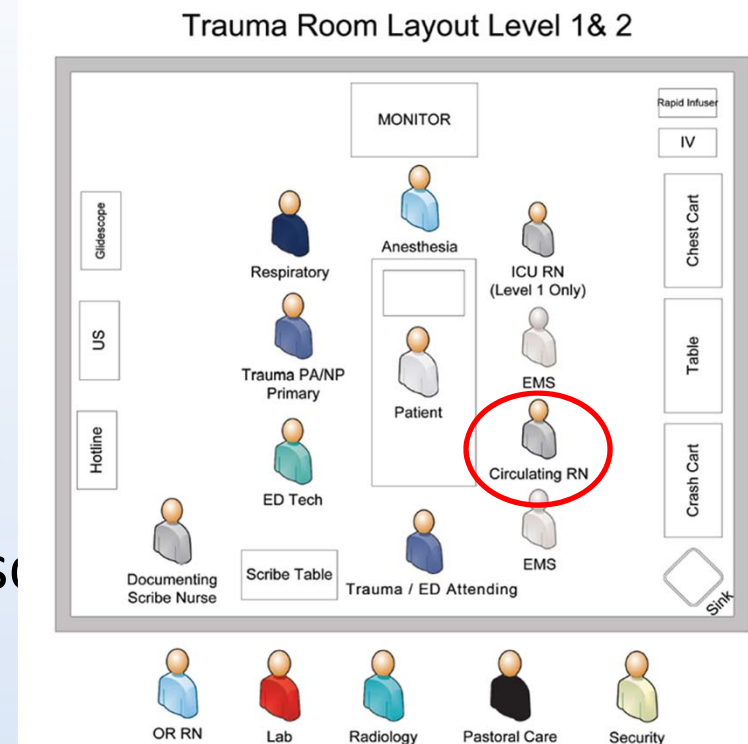
Responsibilities

- Perform the Primary and secondary survey
- Verbalize patient care
- Report completed tasks



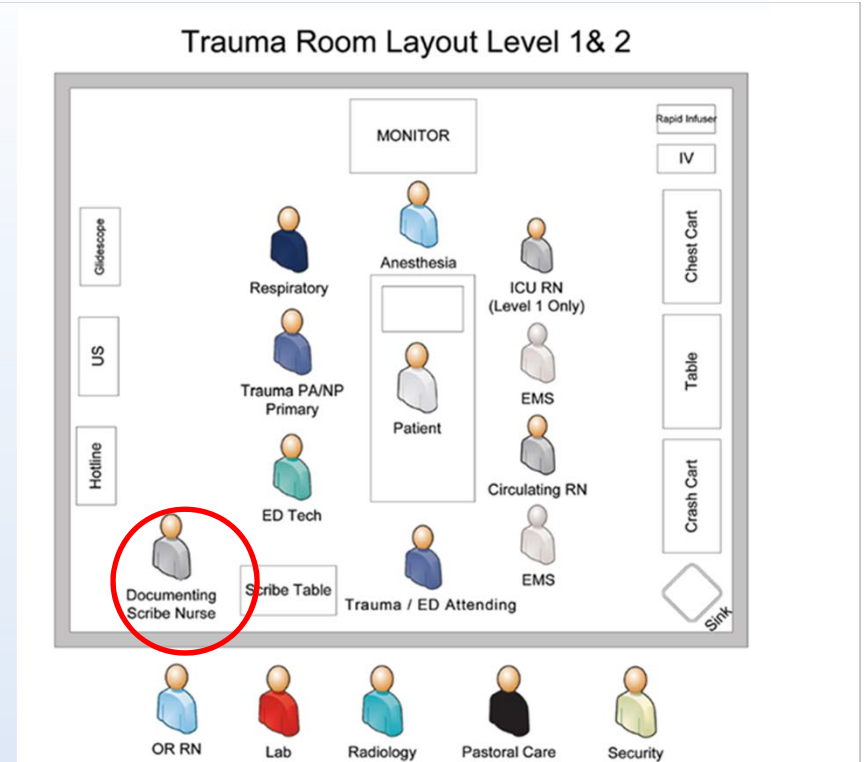
Responsibilities

- Monitors the patient
- Manual BP
- Obtains IV access
- Administers medications
- Dresses wounds
- Performs or assists in resuscitation



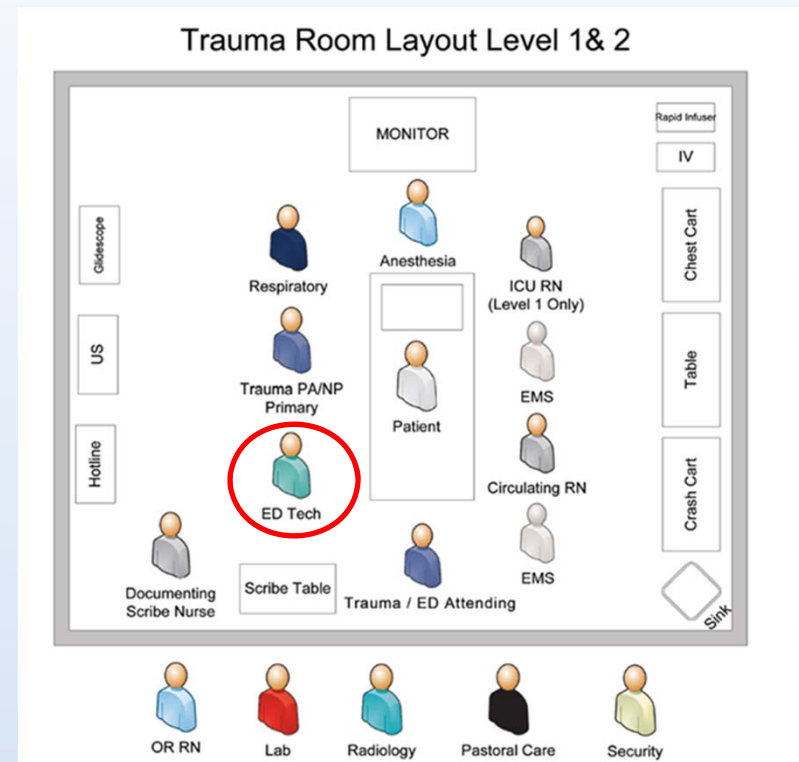
Responsibilities

- ❖ Records data
- ❖ Ensures documentation accompanies patient upon transfer
- ❖ Assists team members as needed



Responsibilities

- Obtains needed supplies
- Coordinates communication with local and external resources
- Assists team members as needed

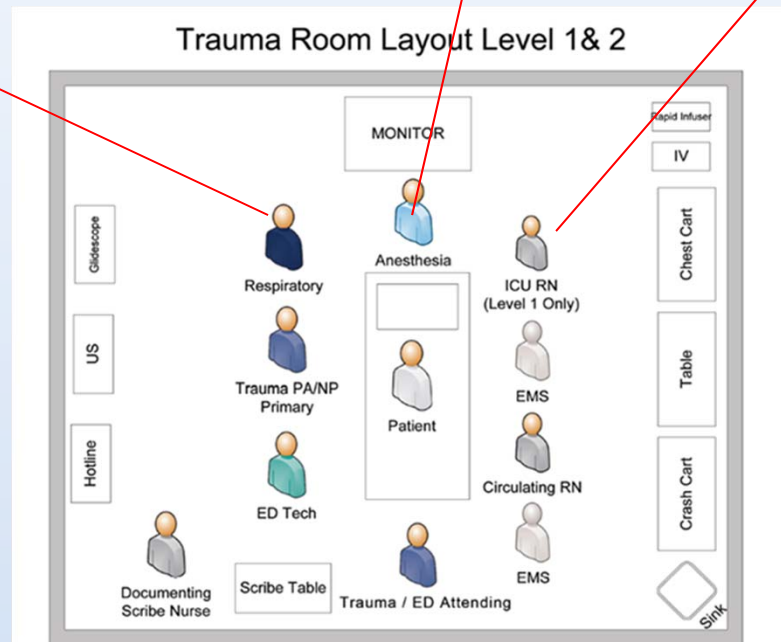


Responsibilities

- Place Oxygen on patient
- Manage ventilator if patient intubated

- Manage airway

- Hold C spine
- Manage rapid infuser line where indicated
- Assists team members as needed



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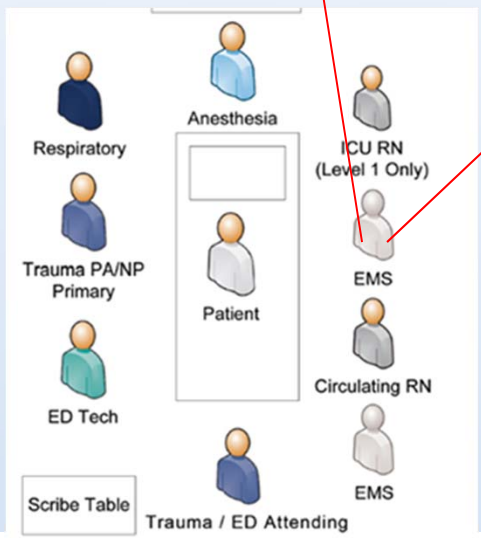


Organization of trauma resuscitation area

- Basic adult and pediatric equipment for:
 - Airway management (cart)
 - IV access with warm fluids
 - Chest tube insertion
 - Hemorrhage control (tourniquets, pelvic binders)
 - Immobilization
 - Medications
 - Pediatric length/weight based tape (Broselow Tape)
- Warming capabilities

D-MIST

- D**emographics
- M**echanism/medical complaint
- I**njuries
- S**igns (vitals)
- T**reatment



Age, sex
Mechanism of injury
Time of injury, list injuries, inspections
First set of vitals, any changes, include glucose
Any treatments

Only EMS is allowed to talk during DMIST (~ 30secs)

Primary Survey

- A** Airway ----- C spine
- B** Breathing
- C** Circulation
- D** Disability
- E** Exposure

Identify Immediate life-threats

A Airway open?

C-spine

B Breathing?

Decompression

C BP, pulse?

Control bleeding, IV access, fluids

D Disability?

GCS, Pupils

E Exposure

**Keep warm,
look for hidden injuries**

Secondary Survey

Thorough Head to toe exam

- Head and Neck
- Chest
- Abdomen
- Pelvis
- Extremities

**Can be delayed until all life-threatening injuries
have been dealt with**

History

A

Allergies

M

Medications

P

PMHx

L

Last Meal

E

Events related to injury

Adjuncts and tests

Adjuncts

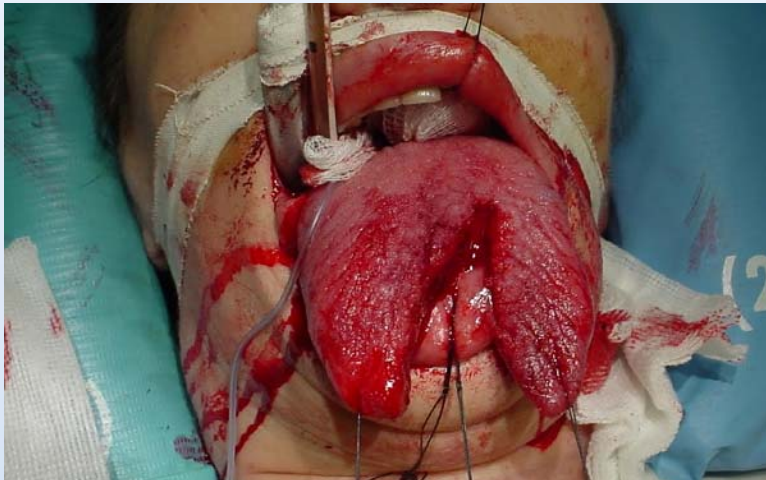
- Pulse oximeter
- Cardiac monitor
- Foley catheter
- NG tube

Diagnostic tests

- CXR
- Pelvic x-ray
- C-spine x-ray
- EKG
- Pregnancy test
- Labs

Airway

Recognizing and **managing** acute airway compromise are two of the most difficult yet critical skills which the **TEAM** must master in order to adequately care for the trauma patient.



Airway: Preparation

Organized equipment

Supplies

Medications

Team skills

Immediate accessibility



Recognizing Airway Compromise

Can be rapidly accomplished by talking to patient and eliciting answers to simple questions.

➤ Look

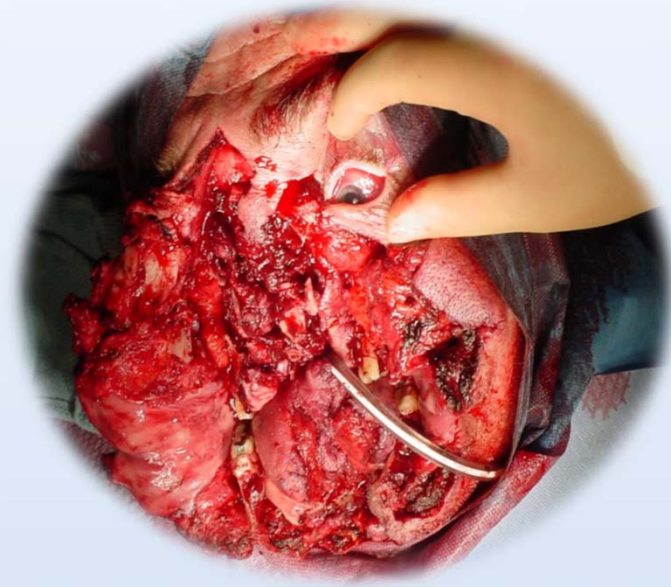
➤ Listen

➤ Feel



Recognizing Airway Compromise

- ❖ Head, neck and facial trauma
- ❖ Bleeding into airway
- ❖ Deformity/swelling
- ❖ Noisy breathing
- ❖ Burns
- ❖ Cyanosis
- ❖ GCS 3-8



Absolute Indications for Definitive Airway

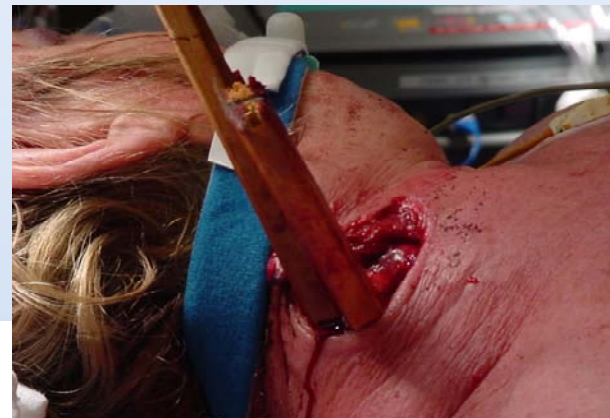
Respiratory insufficiency

GCS 3-8

Severe maxillofacial injuries

Severe neck injury with soft tissue swelling

Persistent or uncompensated hemodynamic instability



Relative Indications for Definitive Airway

- Agitation with possible injury to self or others
- Impending or potential airway compromise (flail, large pulmonary contusion, pneumatocele)
- Potential neurologic deterioration during transport
- Prolonged transport time



Airway: Basic Management

High-flow (15 liters) oxygen by mask

- O₂ sat monitor

In-line stabilization

Chin lift

Jaw thrust

Naso/oropharyngeal airway

Bag valve mask assist



Airway: Advanced Options

Laryngeal mask airway (LMA)

Combitube™ or King airway

Intubation

- Orotracheal
- Nasotracheal

Surgical

- Cricothyroidotomy



Rescue Airways



**Laryngeal Mask Airway
LMA**



**King Laryngeal Tracheal Airway
LTA**

Airway: Advanced Management

In-line stabilization

Cricoid pressure (Sellick maneuver)

Choose airway method

Medications

- Venous access

Equipment (endotracheal tube, laryngoscope, etc.)

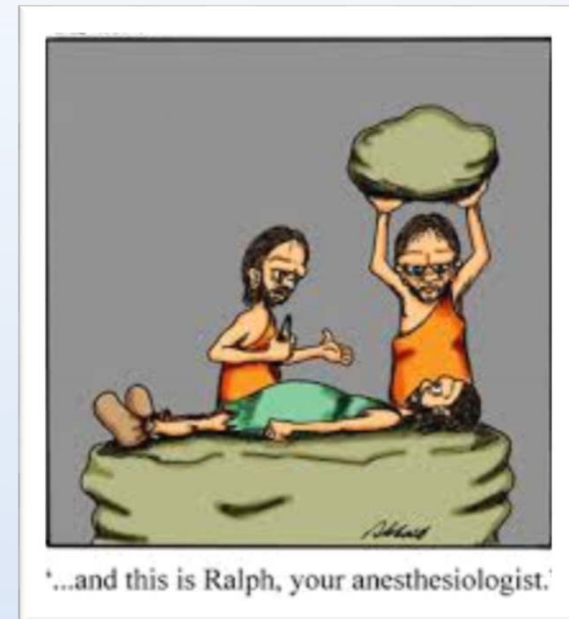


(Sellick maneuver)

Airway: Advanced Management

Rapid Sequence Intubation (RSI)

- Pre-oxygenate with 100% O₂
- Support with bag-valve mask
- Administer medications
 - Sedate
 - Paralyze
- Intubate



Rapid sequence intubation

Induction agents

Etomidate is now considered the criterion standard of induction agents in its use in RSI.

Very short acting non-barbiturate hypnotic agent

Its advantages are rapidity of onset, short duration of action,

Lack of cardiodepressant effects, marked safety in patients with head injury

Ketamine has direct negative inotropic effect on the myocardium is masked by an increase in blood pressure, heart rate, cardiac output, and an overall decrease in myocardial oxygen consumption

Thiopental has limited role in the ED as induction agents because of their cardiorespiratory depressant activity. Of all the barbiturates, these possess the shortest onset and briefest duration of action

Propofol decreases cerebral metabolism and, consequently, ICP also it is a myocardial depressant, causing a decrease in mean arterial pressure (MAP). This is compounded by the decrease in the systemic vascular resistance it causes. Both of these factors contribute to an overall decrease in oxygen delivery.

Confirm ET Placement

Listen to bilateral lung fields and epigastrium

Check position of endotracheal tube

Check end tidal CO₂

Check O₂ saturation

Check position of endotracheal tube with x-ray

“An esophageal intubation is no sin, but there is great sin in not recognizing such a placement.”

Pitfalls

Inability to intubate

Esophageal or right main stem intubation

Development of tension pneumothorax

Loss of airway

- After paralytic administration
- Dislodged tube

Equipment failure



Breathing: Impairment

Ventilation volume

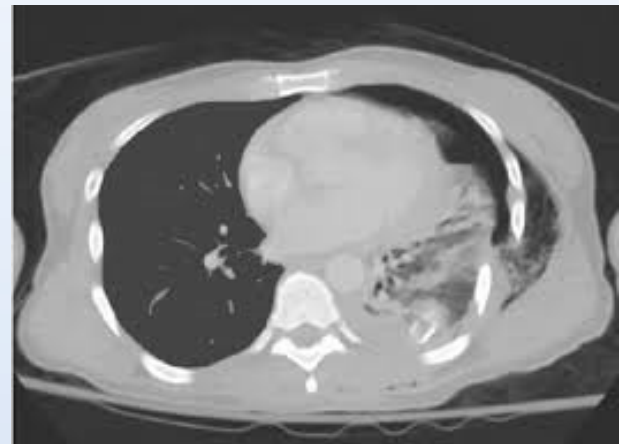
- Pneumothorax and hemothorax
- Flail chest
- Diaphragmatic hernia

Mechanics

- Paralysis
- Disruption of chest wall

Circulation

- Shock
- Tension Pneumothorax
- Contusion



Breathing Assessment: Look

Chest rise and symmetry

Respiratory rate

Tracheal alignment

Soft tissue abnormalities

Subcutaneous emphysema

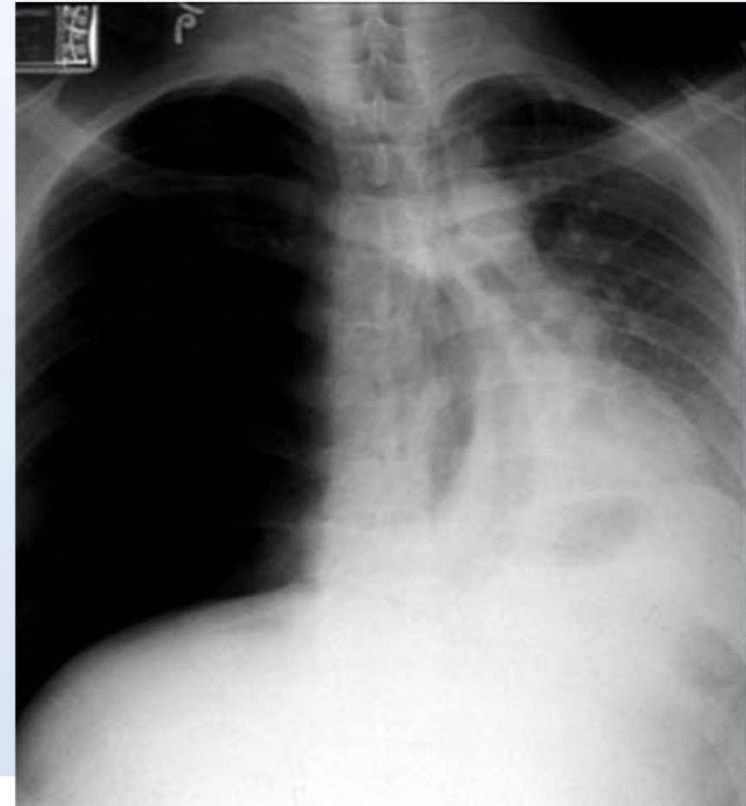


Breathing Assessment: Listen



Breath sounds

- What do you hear?



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Breathing Assessment: Adjuncts

Pulse oximetry

Colorimetric end tidal CO₂

Portable chest film

NG - OG tube



Breathing: Life-threatening Injuries

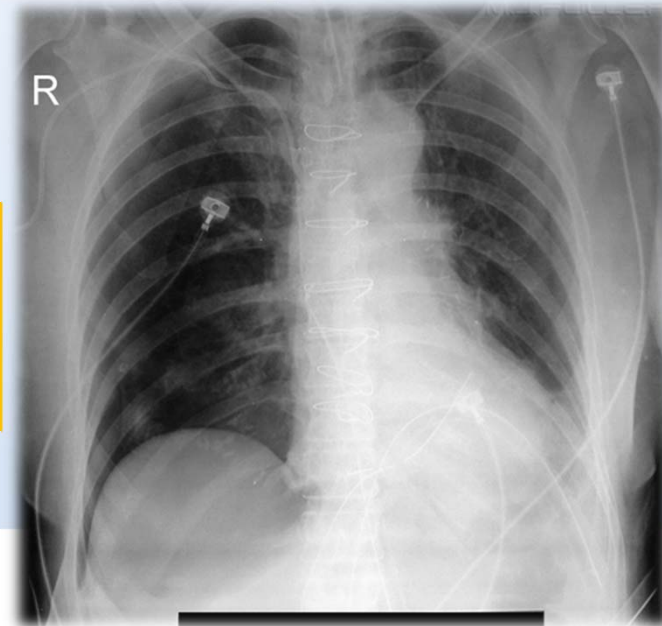
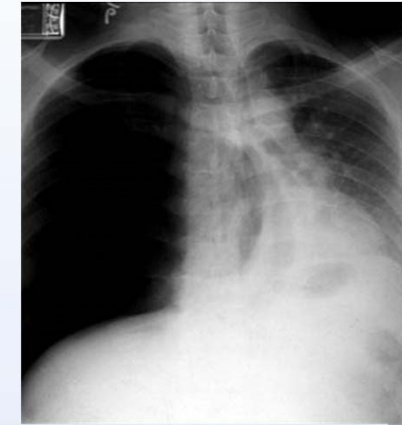
Tension pneumothorax

Massive hemothorax

Flail chest

Open pneumothorax

**You will miss 30% of
pneumothoraces on supine
CXR's**



Tension Pneumothorax

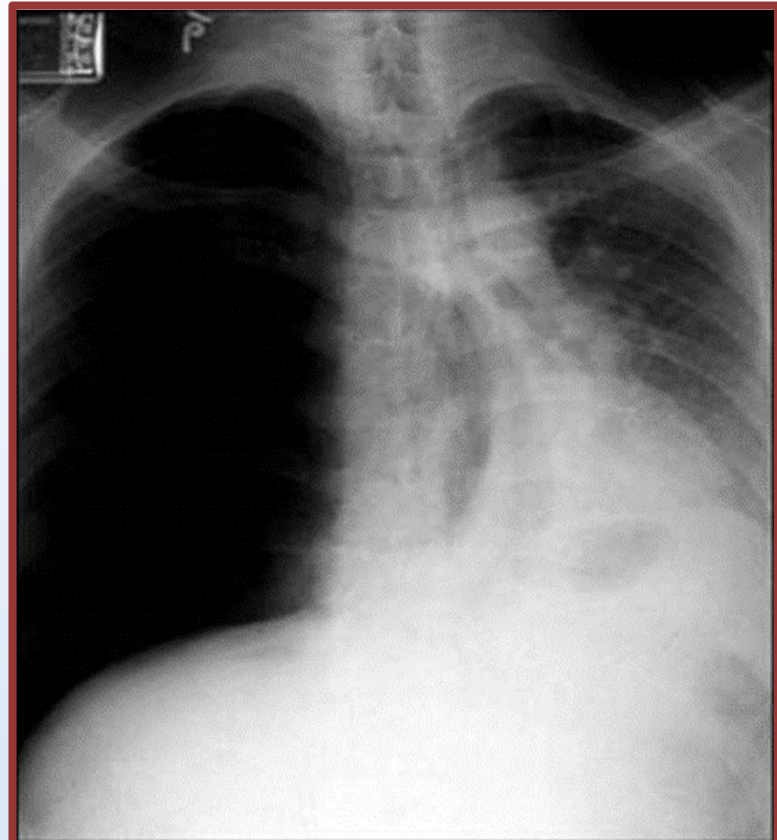
Respiratory distress

Unilateral absence breath sounds

Shock

Distended neck veins

Hyper-resonance on percussion

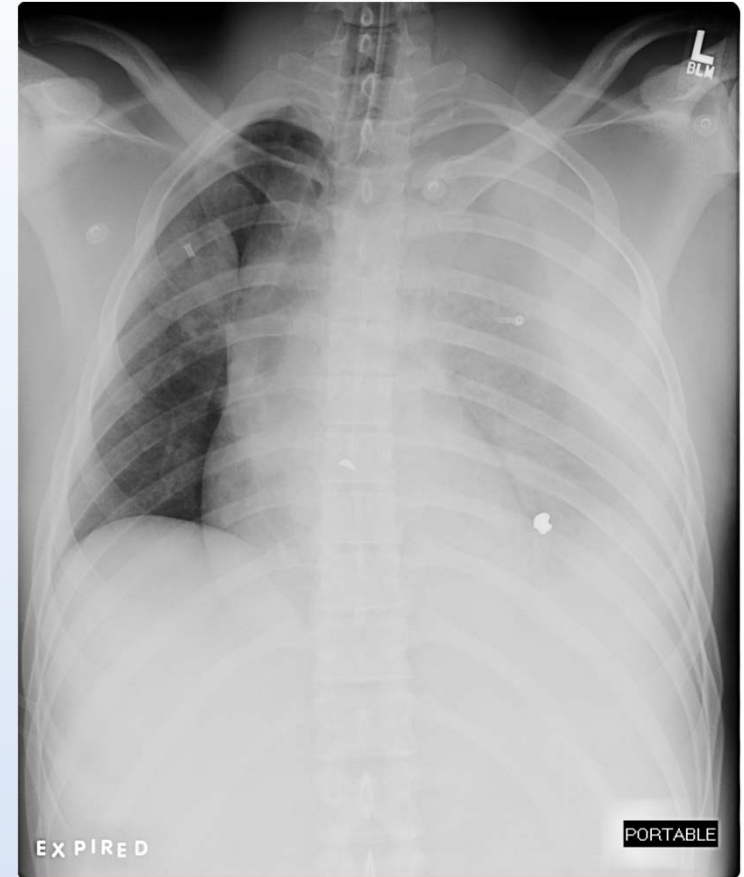


Needle Decompression

- Second intercostal space
- Mid-clavicular line

Massive Hemothorax

Hemi-thorax filled with blood
High mortality rate
Mass effect (mediastinal shift)
Exsanguination



Open Pneumothorax

‘Sucking chest wound’
Impaired ventilation



Treatment is 3-sided dressing and chest tube

Breathing Reassessment

How does your team reassess the patient's breathing?

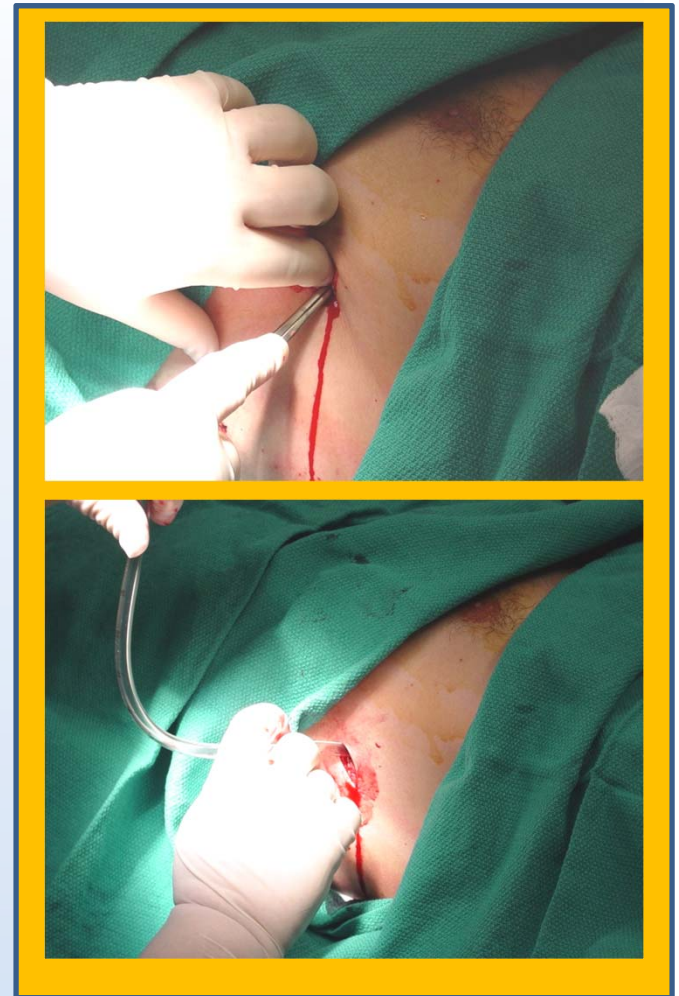
- Repeat primary survey
- Assure patient is oxygenating and ventilating
- Adjuncts
 - Pulse oximetry
 - End-tidal CO₂
 - Chest x-ray
 - NG - OG tubes

Breathing: Treatments

Chest tube insertion

- What size chest tube?

5th intercostal space anterior to mid-axillary line at infra-mammary crease



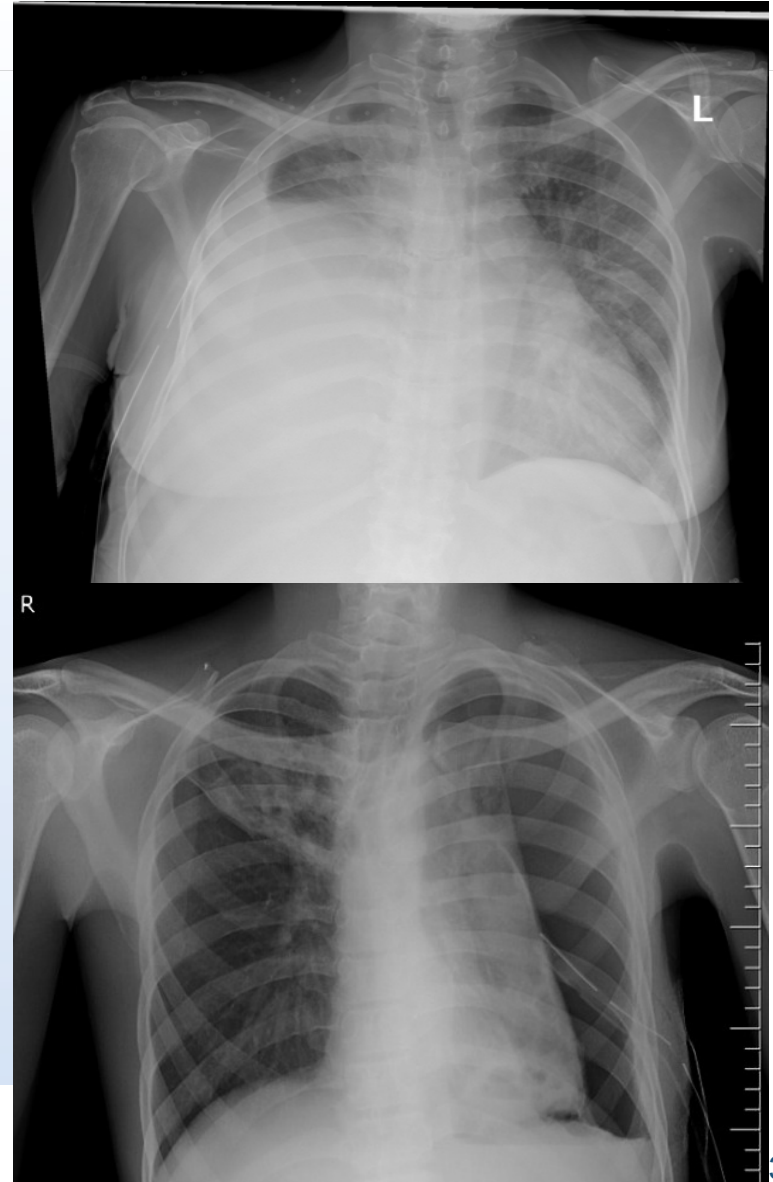
Breathing Treatment: Pitfalls

Inaccurate pulse oximeter readings

Simple to tension pneumothorax

Improper placement of chest tube

Migration of endotracheal tube



Breathing Summary

A team approach is critical to recognize and treat life-threatening breathing problems

Address breathing after airway is secured

Reassess after every intervention, being conscious of pitfalls

Team should have the skills and be prepared to intervene appropriately

Circulation



The most common cause of shock in trauma is **hemorrhage**

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Circulation

Identify and control bleeding

Initiate resuscitation

Define and recognize shock in trauma

Anticipate pitfalls

Trauma Bay Preparation

Warm room

Warm IV fluids

Dressings, splints, sutures, staples

Blood/blood products

Rapid infuser

Tourniquets

Pelvic binder

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Circulation:

Physiologic Changes in Shock

- Increased pulse rate
- Decreased mental acuity
- Narrowed pulse pressure early
- Decreased capillary refill
- Clammy skin
- Decreased blood pressure
- Decreased urine output

Class of haemorrhagic shock				
	I	II	III	IV
Blood loss (mL)	Up to 750	750–1500	1500–2000	> 2000
Blood loss (% blood volume)	Up to 15	15–30	30–40	> 40
Pulse rate (per minute)	< 100	100–120	120–140	> 140
Blood pressure	Normal	Normal	Decreased	Decreased
Pulse pressure (mm Hg)	Normal or increased	Decreased	Decreased	Decreased
Respiratory rate (per minute)	14–20	20–30	30–40	> 35
Urine output (mL/hour)	> 30	20–30	5–15	Negligible
Central nervous system/mental status	Slightly anxious	Mildly anxious	Anxious, confused	Confused, lethargic

Circulation: Vascular Access

Peripheral access

- 2 large bore IV's –
16 gauge or larger
- Blood drawn,
if not already

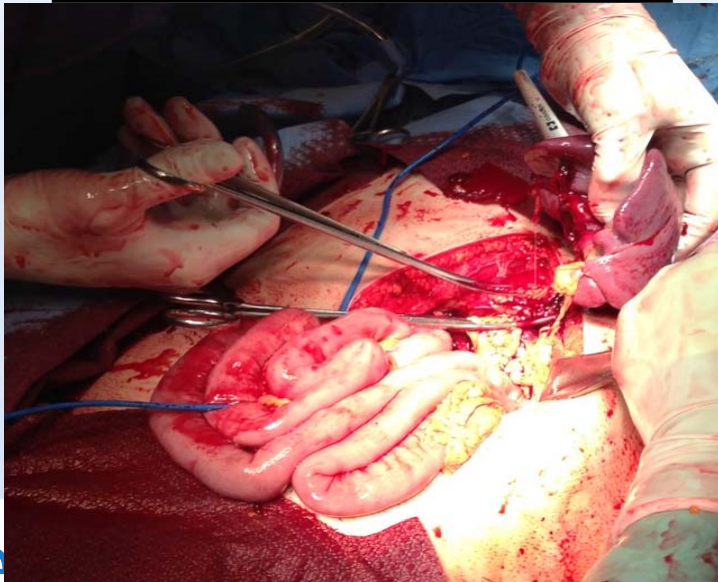
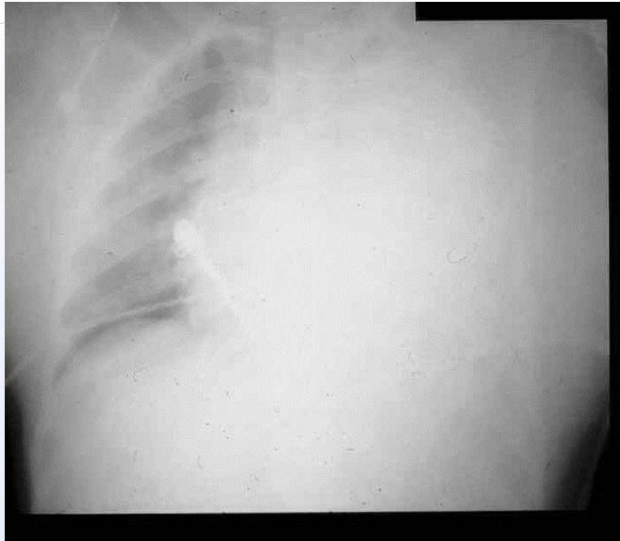
Central access

Venous cut down

Intraosseous



Hemorrhagic Shock



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Hemorrhage Control

Direct pressure

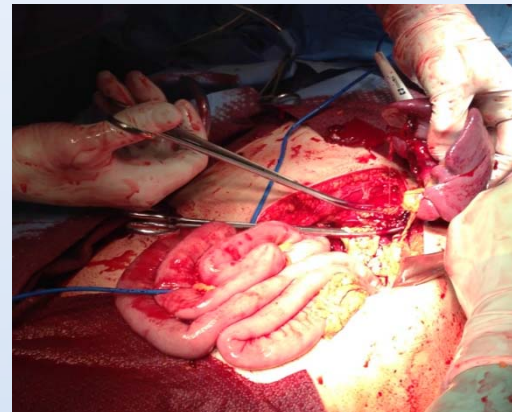
Close scalp lacerations

Reduce and splint fractures

Immobilize pelvic fractures

Tourniquet

Operating Room (Lap/Thoracotomy etc)



Circulation: Adjuncts

Urinary Catheter

- Contraindications
 - Blood at urethral meatus
 - High riding prostate
 - Scrotal/labial hematoma

Pulse oximeter

Lab evaluations

- H/H
- Type and cross



Circulation: Controlled Resuscitation

Stop bleeding as soon as possible

Tolerate systolic BP - 90 – 100 until the hemorrhage is controlled

Continue resuscitation with blood after initial crystalloid

Circulation: Resuscitation Guidelines

Continue resuscitation with blood after
initial crystalloid

Warmed IV fluid guidelines

- Adults - 2000 cc of lactated ringer's or saline
- Peds - 20 cc/kg bolus x 2

Blood

- O negative or positive until type specific available

End Points of Resuscitation

Improving mental status

Change in skin color and temperature

Improved capillary refill

Urine output begins or becomes adequate

Pulse normalizes

Systolic BP 90 to 100 mm Hg

Rapid Responder

Stable endpoints after:

- 1 to 2 liters for adults
- 20 cc/kg for children

Establish maintenance IV rate

Monitor for recurrent shock

Reevaluate ABC's

Transient Responder

Shock recurs after initial fluid bolus

Reassess ABCs

Stop all visible bleeding

Blood or repeat initial crystalloid, to keep systolic BP at 90-100 (Peds – refer to chart)

Alert OR

Alert Blood bank - Check amount of blood availability

Non-Responder

Shock persists in spite of fluid resuscitation

Reassess ABCs

Stop all visible bleeding

Transfuse as soon as possible

Alert OR

- Damage control surgery

Blood and blood product availability (MTP)

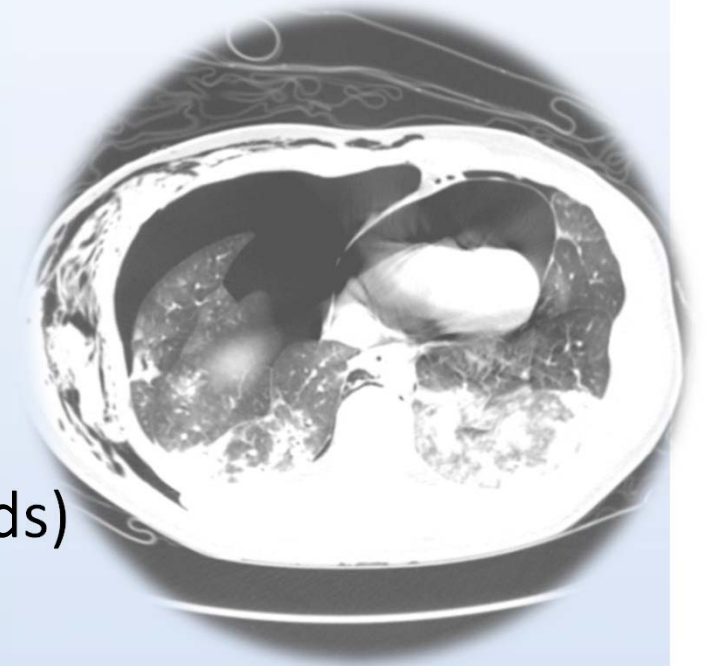
Persistent Shock

Hemorrhagic

- Unrecognized or uncontrolled bleeding

Non-hemorrhagic

- Cardiac tamponade
- Tension pneumothorax
- Neurogenic shock
- Myocardial infarction
- Massive gastric distension (peds)



Circulation: Pitfalls

Over resuscitation

- Increase BP = increase bleeding if bleeding not controlled
- Pulmonary edema
- Hypothermia
- Coagulopathy

Under resuscitation

- Usually not enough blood given
- Bleeding not controlled

Failure to:

- Recognize compensated shock
- Recognize patients on beta blockers have blunted response
- Realize tachycardia more significant in pediatric patients
- Decompress stomach of pediatric patients
- Recognize patients on anticoagulant

Circulation: Summary

Team and facility preparation

Identify and control bleeding

Begin resuscitation

Define and recognize shock

Define management options

Anticipate pitfalls

Trauma is a Dynamic Process

Continual reassessment is necessary to identify:

Changes in patient's condition

Possible ongoing blood loss

Response to interventions

Iatrogenic problems

- Tension pneumothorax
- Loss of vascular access

END

(Until next time)



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