

The Primary Survey

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Outlining the ABCs

- **Why do we need such an approach?**
- **The Golden Hour**
- **ABCs – The Specifics**
 - **preventable deaths**
 - **problem recognition**
 - **management**
- **Take Home Points**

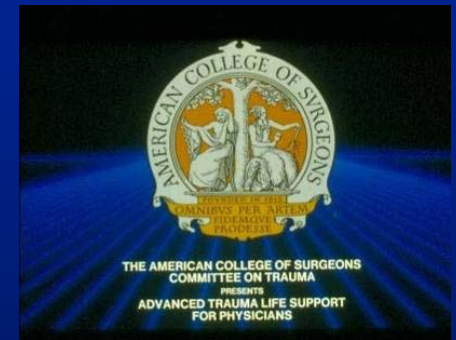
Why the ABCs?

- Annual trauma costs exceed \$400 billion
- Trauma = leading cause of death for age 1-44 yrs
- Inconsistent delivery of care prior to 1980
→ ATLS course initiated

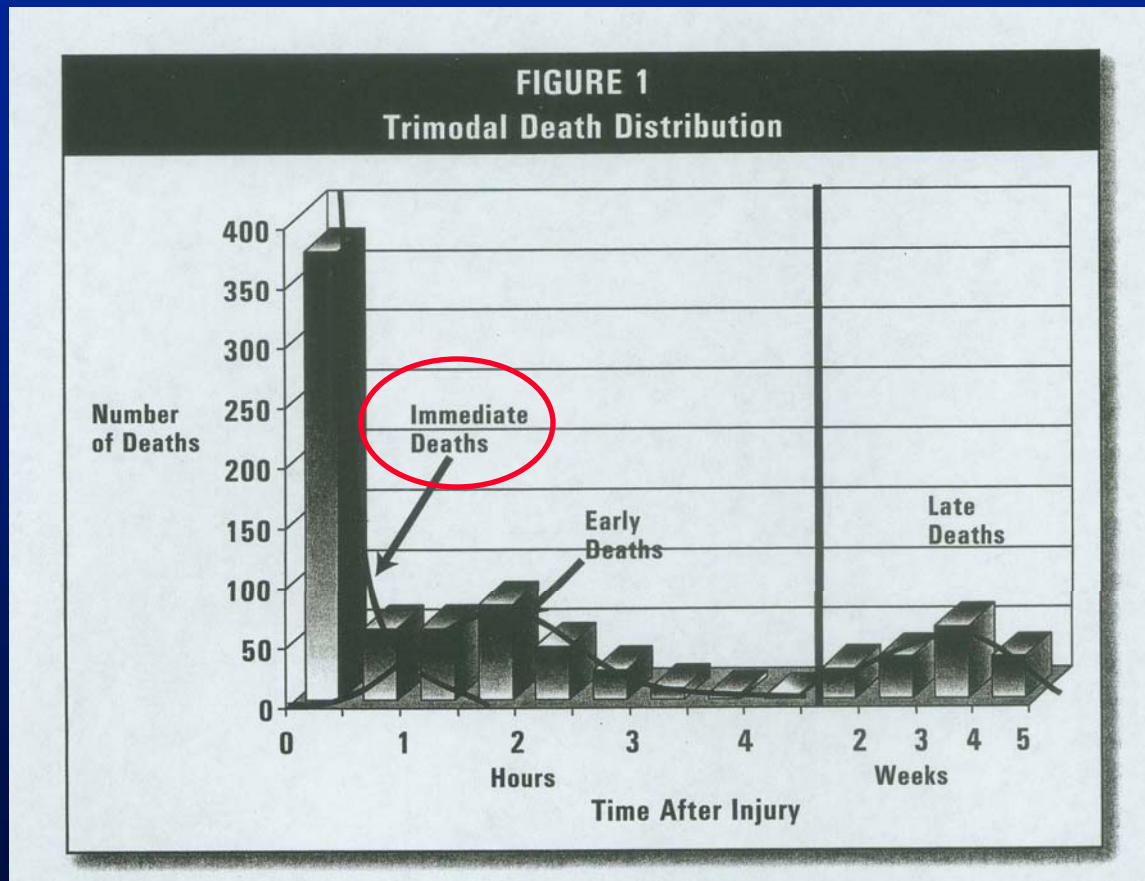


Why the ABCs?

- **Goals of the ATLS Course**
 - **appropriate and timely care**
 - **algorithm based**
 - **focus on the first hour**
 - **train practitioners who do not daily care for trauma patients**

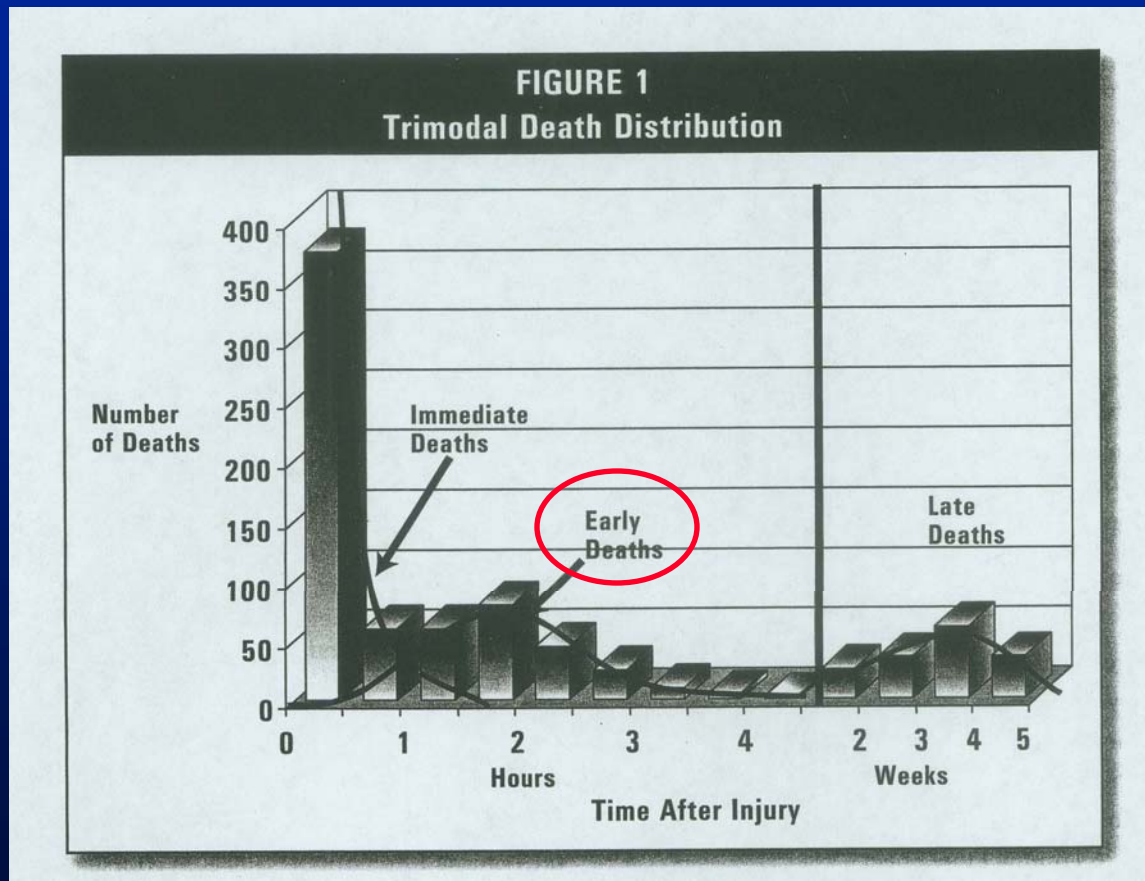


Trauma Deaths



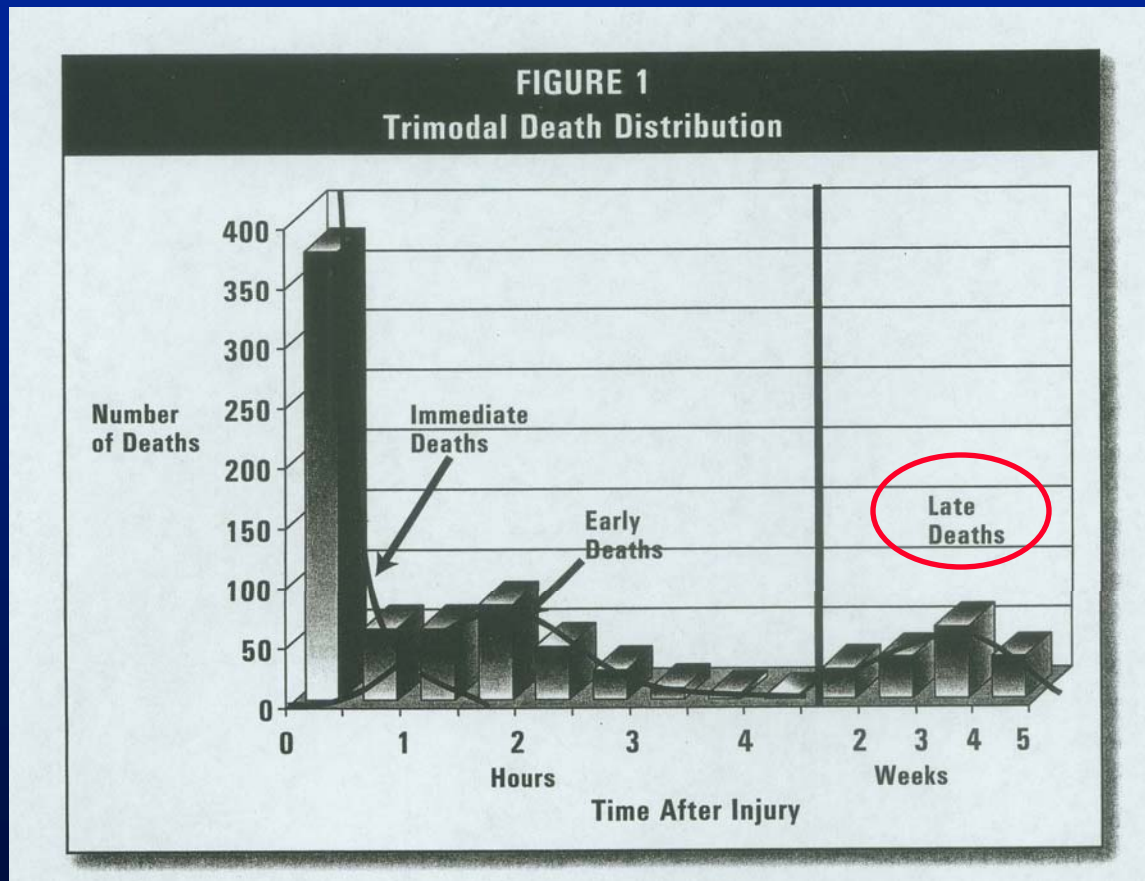
Trimodal distribution of trauma deaths.

Trauma Deaths



Trimodal distribution of trauma deaths.

Trauma Deaths



Trimodal distribution of trauma deaths.

Trauma Deaths: Prevention

- Immediate (1st peak)
 - injury prevention
 - rapid prehospital transport
- Early (2nd peak)
 - rapid assessment
 - prompt resuscitation
- Late (3rd peak)
 - ICU care



“Golden Hour”

The Golden Hour

- Treat the greatest threat to life first
- Treat despite lack of a definitive diagnosis
- Treat despite incomplete history

**ABCDE
Approach**



The Golden Hour

- **A** = **A**irway with c-spine protection
- **B** = **B**reathing
- **C** = **C**irculation, stop the bleeding
- **D** = **D**isability/Neuro status
- **E** = **E**xposure and Environment

The Golden Hour

- **ABCDE – Primary Survey**
 - sequential yet actually simultaneous
 - includes resuscitation efforts
 - normalization of vital signs
- **Secondary Survey**
 - **AMPLE** history
 - head-to-toe and x-rays



Starting with the ABCs

A = Airway

Airway: Preventable Deaths

- Failure to recognize need
- Inability to establish
- Incorrectly placed airway
- Displacement
- Failure to ventilate
- Aspiration



Airway: Problem Recognition

- **Objective Signs – Airway Obstruction:**
 - agitation, cyanosis = hypoxia
 - obtundation = hypercarbia
 - abnormal sounds
 - tracheal location
 - external trauma



Airway: Problem Recognition

- **Altered Levels of Consciousness**
 - closed head injury
 - intoxication
- **Maxillofacial Trauma**
 - hemorrhage
 - dislodged teeth
 - mandible fx



Airway: Problem Recognition

- **Penetrating Neck Trauma**
 - **laceration of trachea**
 - **hemorrhage with tracheal deviation/obstruction**
 - **patient may initially maintain airway**
 - **prophylactic intubation?**

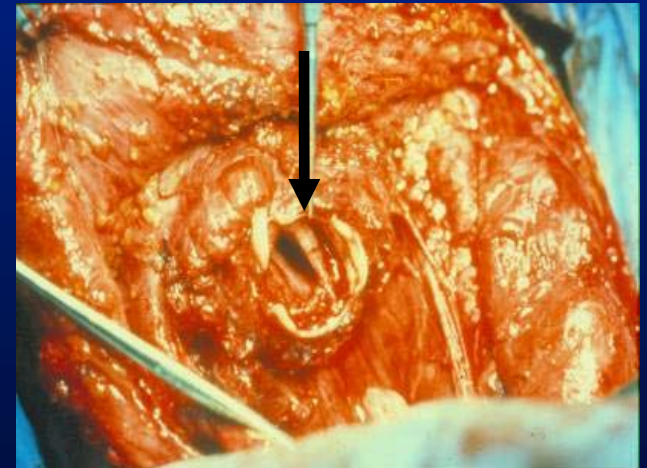


Airway: Problem Recognition

- **Blunt Neck Trauma**
 - hemorrhage with tracheal deviation/obstruction
 - disruption of the larynx
- hoarseness
- subcutaneous emphysema
- palpable fracture
- prophylactic intubation?



Airway: Problem Recognition



Clothes-line Injury to the Neck

Airway: Management

A always includes C-spine
in-line immobilization!



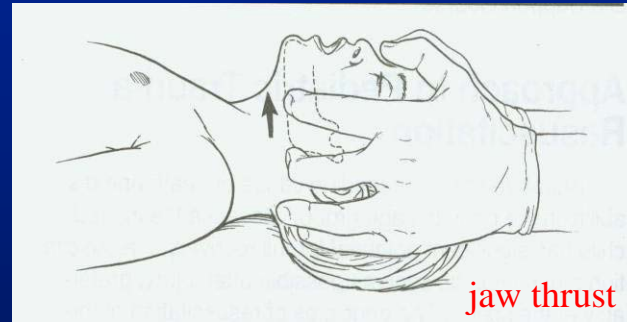
assume this



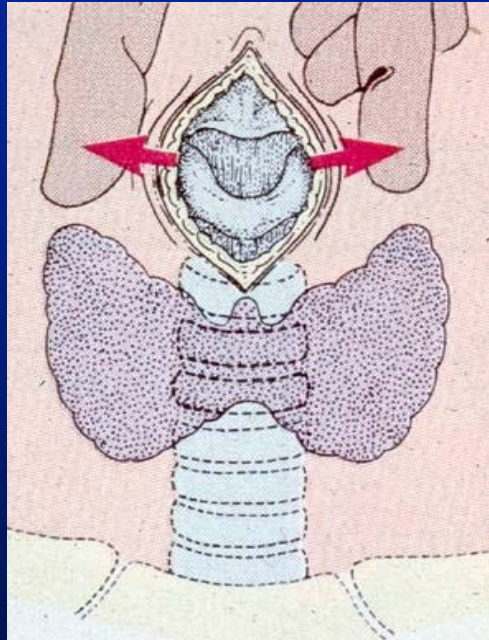
therefore, do this

Airway: Management

- Airway Maintenance Techniques:
 - chin lift
 - jaw thrust
 - oral airway
 - nasal trumpet
- Definitive Airway:
 - orotracheal or nasotracheal intubation
 - surgical airway

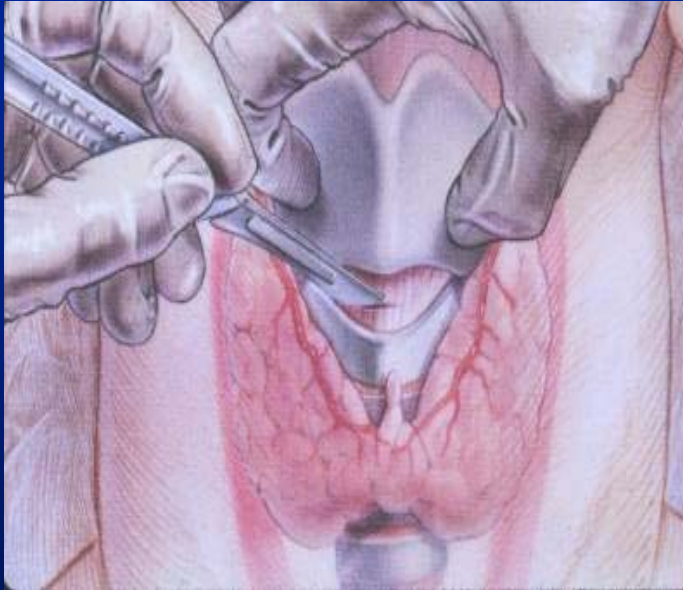


Airway: Cricothyroidotomy



Vertical skin incision – make it longer than you think you need....

Airway: Cricothyroidotomy



**Can use the trach hook to stabilize.
Incise the cricothyroid membrane.**

Airway: Cricothyroidotomy



Place a 6-0 endotracheal tube.

< 11yo, cric is contraindicated – do a trach.

Airway: Take Home Points

- Suspect impending airway obstruction
- C-spine immobilization
- Provide definitive airway
- Check patency, tube position
- Intubation unsuccessful → surgical airway



Address life threatening injuries!

Starting with the ABCs

B = Breathing

Breathing: Preventable Deaths

- Assess = “Look - Listen - Feel”
- Address:
 - Tension PTX
 - Open PTX
 - Flail chest
 - Massive hemothorax
(really part of C)



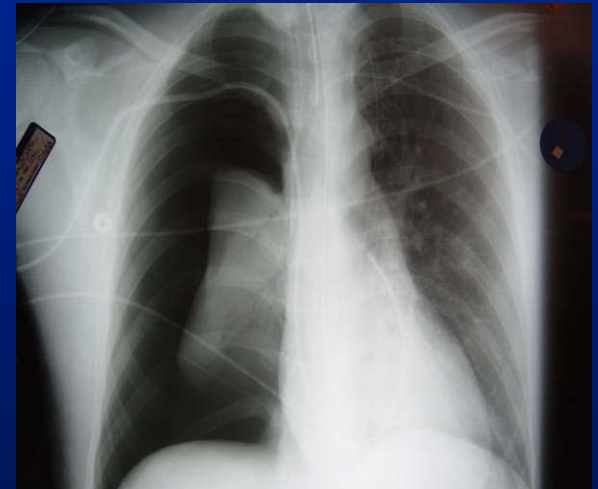
Breathing: Problem Recognition

- **Objective Signs – Inadequate Ventilation:**
 - **asymmetric chest rise**
 - **labored breathing**
 - **absent breath sounds**
 - **tachypnea**
 - **pulse oximeter**
(indirect measure)



Breathing: Problem Recognition

- **Tension PTX:**
 - “one-way-valve” air leak
 - blunt or penetrating mechanism
 - absent breath sounds
 - **CLINICAL DIAGNOSIS**
 - immediate decompression



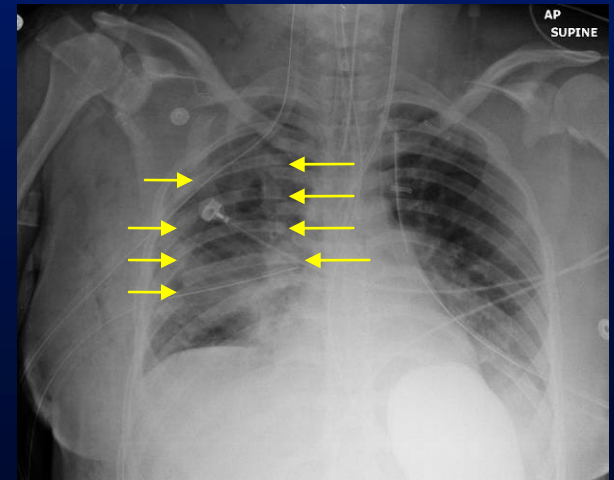
Breathing: Problem Recognition

- **Open PTX:**
 - defect of chest wall
 - air passes preferentially through defect
 - hypoxia & hypercarbia
 - occlusive dressing on 3 sides**until CT placed**



Breathing: Problem Recognition

- **Flail Chest:**
 - segment without bony continuity
 - asymmetric movement
 - crepitus
 - pulmonary contusion
→ hypoxia



KEY CONCEPT

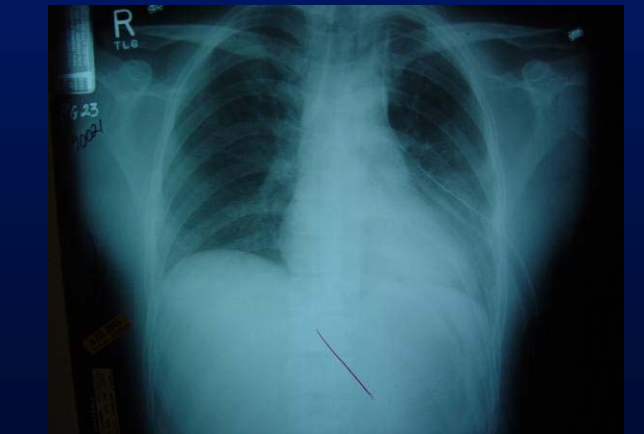
The patient's

hemodynamic status

dictates imaging and management.

Breathing: Management

- Chest tube, chest tube, chest tube
- Occlusive dressing
- Ventilatory support
- Thoracotomy?



Breathing: Take Home Points

- Look, listen, feel
- Adequate airway \neq adequate ventilation
- HD status determines imaging
- Tension PTX = clinical dx



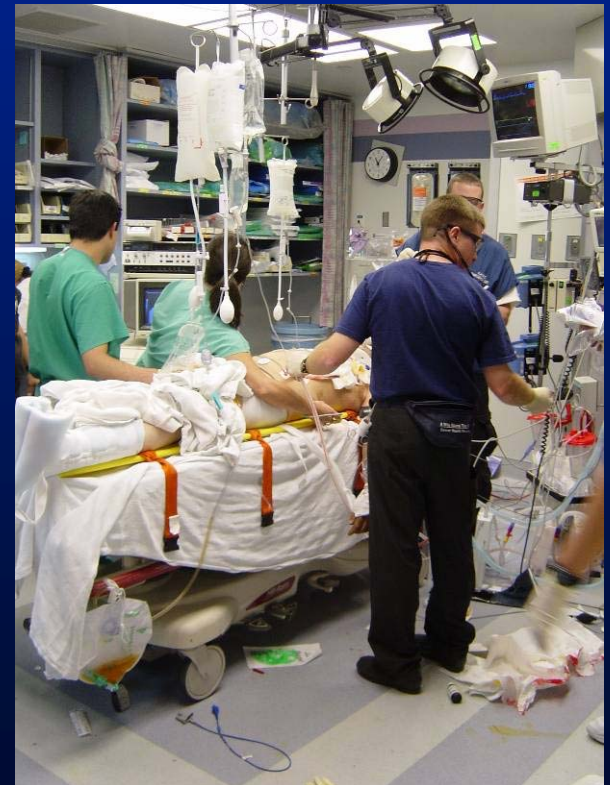
Address life threatening injuries!

Starting with the ABCs

C = Circulation

Circulation: Preventable Deaths

- Hypotension = Hemorrhage
- Assess:
 - level of consciousness
 - pulse / skin color
- Address:
 - external bleeding
 - massive hemothorax
 - cardiac tamponade
 - massive hemoperitoneum
 - unstable pelvic fracture



Circulation: Classes of Shock

	I	II	III	IV
Blood Loss	< 750 cc			
% Volume	< 15%			
Pulse	< 100			
BP	Normal			

Circulation: Classes of Shock

	I	II	III	IV
Blood Loss	< 750 cc	750 - 1500		
% Volume	< 15%	15 - 30%		
Pulse	< 100	> 100		
BP	Normal	Normal		

Circulation: Classes of Shock

	I	II	III	IV
Blood Loss	< 750 cc	750 - 1500	1500 - 2000	
% Volume	< 15%	15 - 30%	30 - 40%	
Pulse	< 100	> 100	> 120	
BP	Normal	Normal	↓	

Circulation: Classes of Shock

	I	II	III	IV
Blood Loss	< 750 cc	750 - 1500	1500 - 2000	> 2000
% Volume	< 15%	15 - 30%	30 - 40%	> 40%
Pulse	< 100	> 100	> 120	> 140
BP	Normal	Normal	↓	↓

Circulation: Causes of Shock

- Hypovolemic = Hemorrhage:
 - 5 spaces = scalp/street, chest, abdomen, pelvis, long-bones

- Fractures:
 - rib = 100-200 cc
 - tibia = 300-500 cc
 - femur = 800-1200 cc
 - pelvis = 1500 cc and up



Circulation: Causes of Shock

- **Cardiogenic:**
 - **tension PTX**
 - **cardiac tamponade or contusion**
 - **air embolism**
 - **primary cardiac disease**
- **Neurogenic:**
 - **spinal cord injury**
- **Septic**



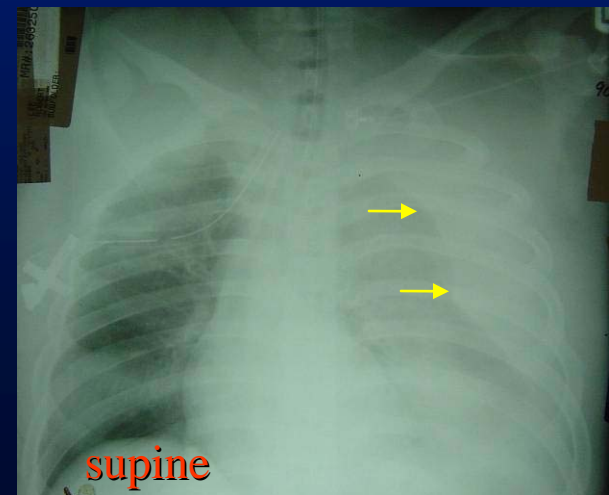
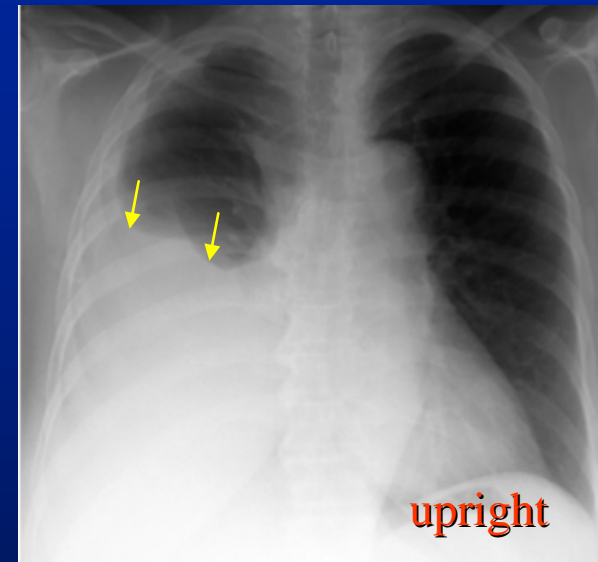
Circulation: Problem Recognition

- **External Hemorrhage:**
 - **apply direct manual pressure**
 - **don't indiscriminately use clamps**
 - **tourniquet if amputation**



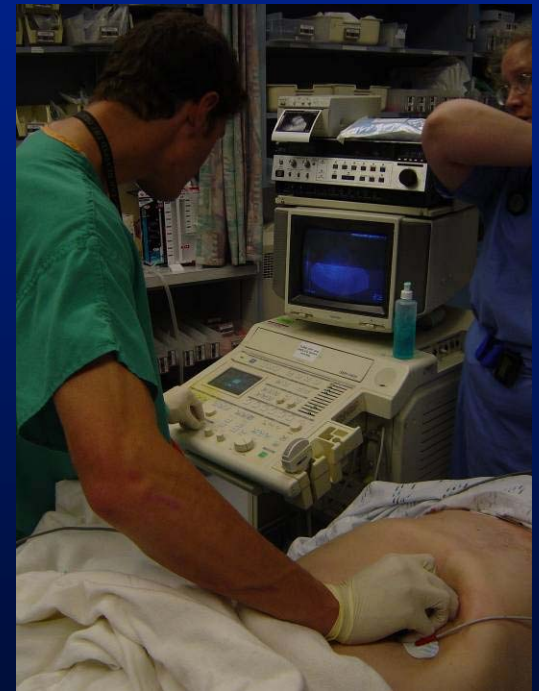
Circulation: Problem Recognition

- **Massive Hemothorax:**
 - **1500 cc blood**
 - **1/3 blood volume in a child**
 - **blunt trauma → rib fx, intercostal artery, lung lac**
 - **penetrating trauma → systemic or hilar vessels**



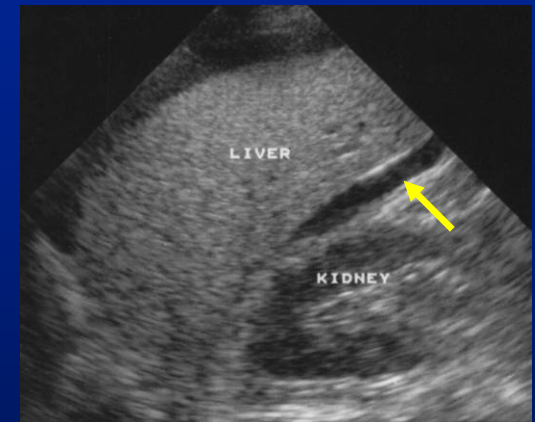
Circulation: Problem Recognition

- **Cardiac Tamponade:**
 - **penetrating = most common**
 - **diagnosis:**
 - Beck's triad = uncommon
 - CVP line
 - Ultrasound
 - **pericardiocentesis**



Circulation: Problem Recognition

- **Massive Hemoperitoneum:**
 - **consider mechanism**
 - X-rays if penetrating
 - **FAST is often diagnostic**
 - **DPA if patient remains unstable, FAST –**
 - **Emergent OR**



Circulation: Problem Recognition

- **Unstable Pelvic Fracture:**
 - **exam/film PLUS shock**
 - **R/O associated injuries**
 - **“sheet” the pelvis**
 - **If transfusing blood consider intervention: IR vs. OR**

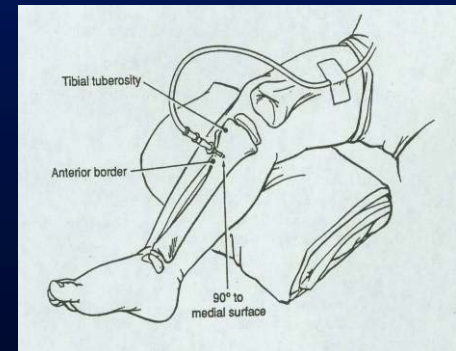


Circulation: Pitfalls

- **Elderly – limited reserve**
- **Children – abundant reserve, decompensate late**
- **Athletes – “relative” tachycardia**
- **Drugs – Rx and illegal**

Circulation: Management

- IV access:
 - 2 large-bore peripheral IVs
 - central line
 - saphenous vein cut down
 - IO needle



- 2 liter bolus

Circulation: Management

- Tube thoracostomy
- Pericardiocentesis



Circulation: Management

- “Wrap the pelvis” to close down volume



wrapped in ED



C-clamp



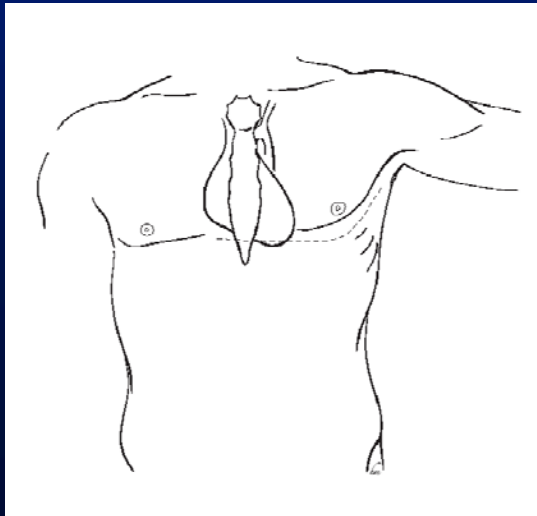
external fixator

Circulation: Management

THE OR

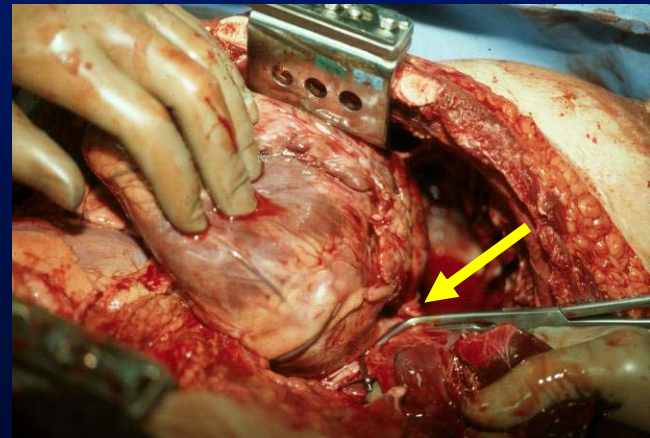
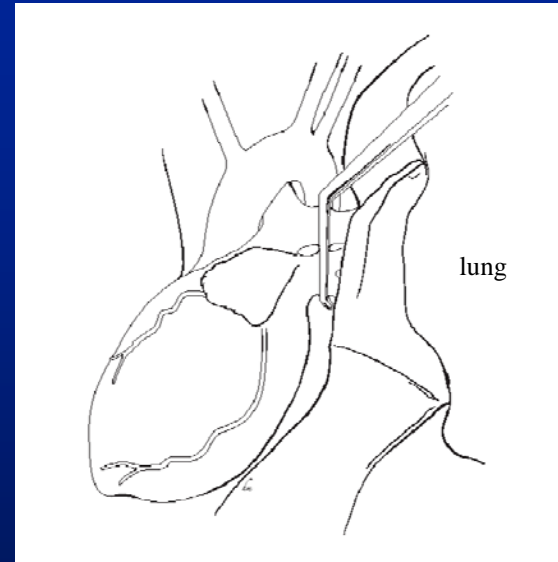
Circulation: Management

- **ED Thoracotomy:**
 - penetrating torso < 15 min CPR
 - penetrating non-torso < 5 min CPR
 - blunt < 10 min CPR



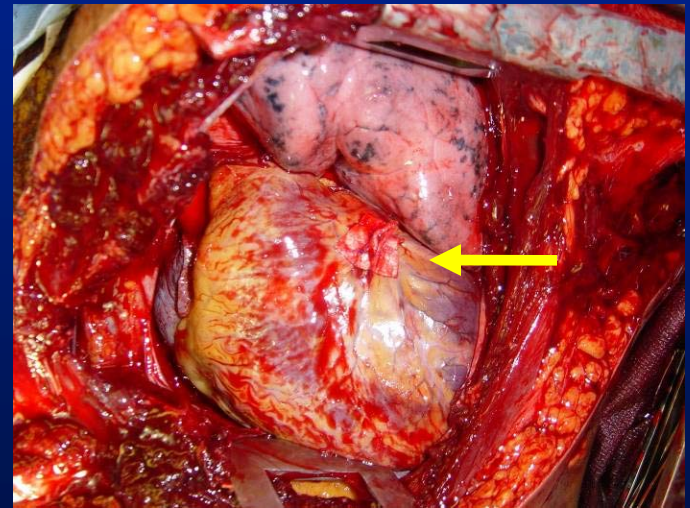
Circulation: Management

- Hilar Injuries:
 - satinsky clamp
 - hilar twist
 - digital compression



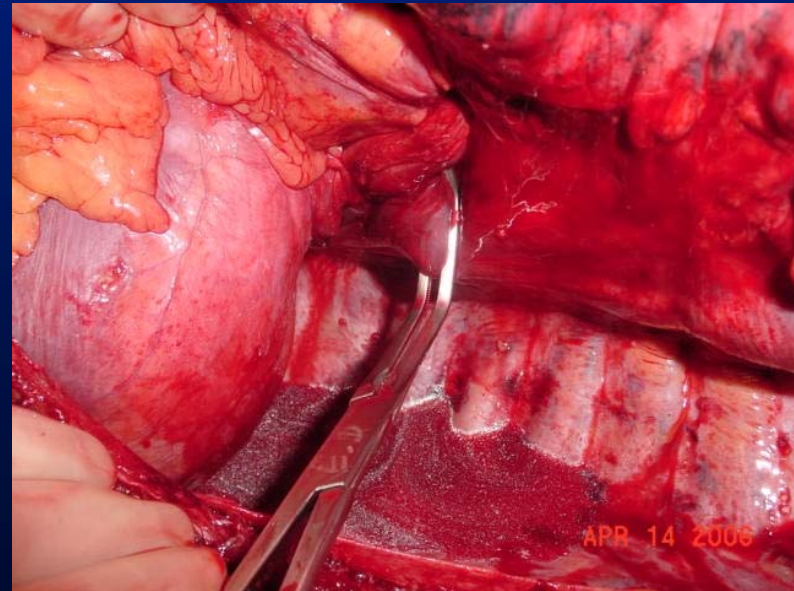
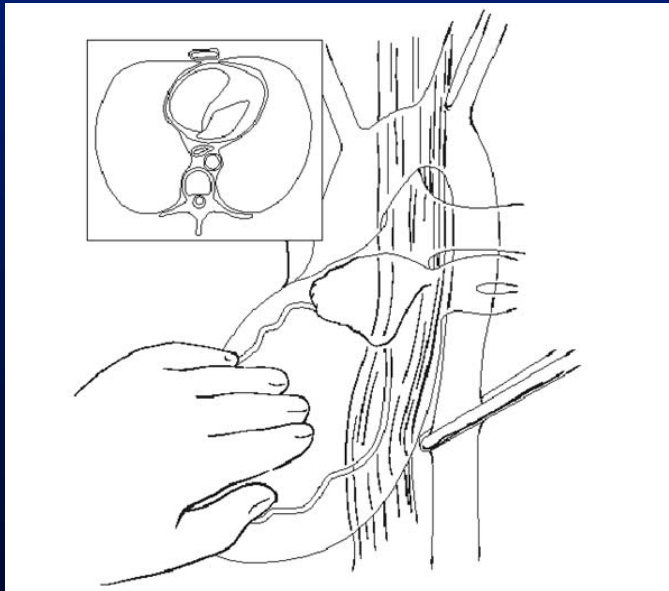
Circulation: Management

- Cardiac Injuries:
 - pledget repair RV
 - staple repair LV if linear wound
 - suture repair LV
 - avoid ligating a coronary



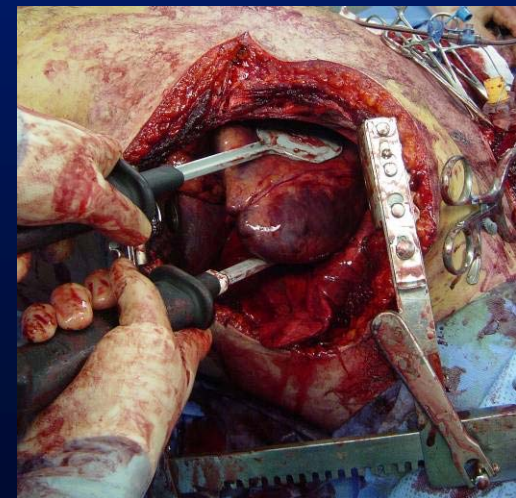
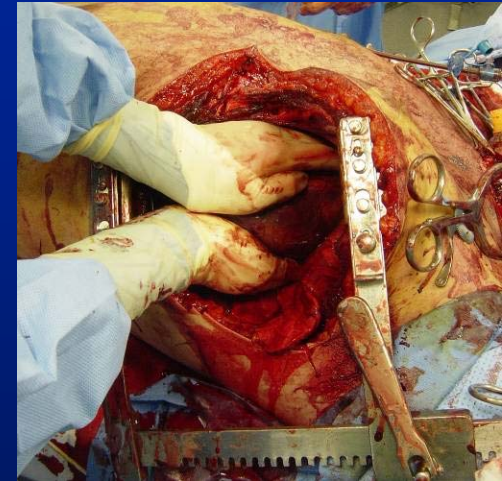
Circulation: Management

- **Cross-clamp aorta:**
 - after pericardium
 - do first if penetrating neck/extremity injury



Circulation: Management

- Don't forget:
 - proper hand position for cardiac massage
 - internal cardioversion paddles
 - intracardiac epi



Circulation: Take Home Points

- Hypotension = hemorrhage
- Class III shock before ↓ BP
- 5 spaces for blood loss
- IV access is key!



Address life threatening injuries!

ABCs: Take Home Points

- **Systematic evaluation**
- **Address life threatening injuries**
 - **airway obstruction**
 - **tension/open PTX**
 - **massive hemoperitoneum**
 - **cardiac tamponade**
 - **external hemorrhage**
 - **massive hemothorax**
 - **unstable pelvis**
- **Resuscitation without specific diagnosis**
- **Following this, proceed with 2° survey**

The Primary Survey

