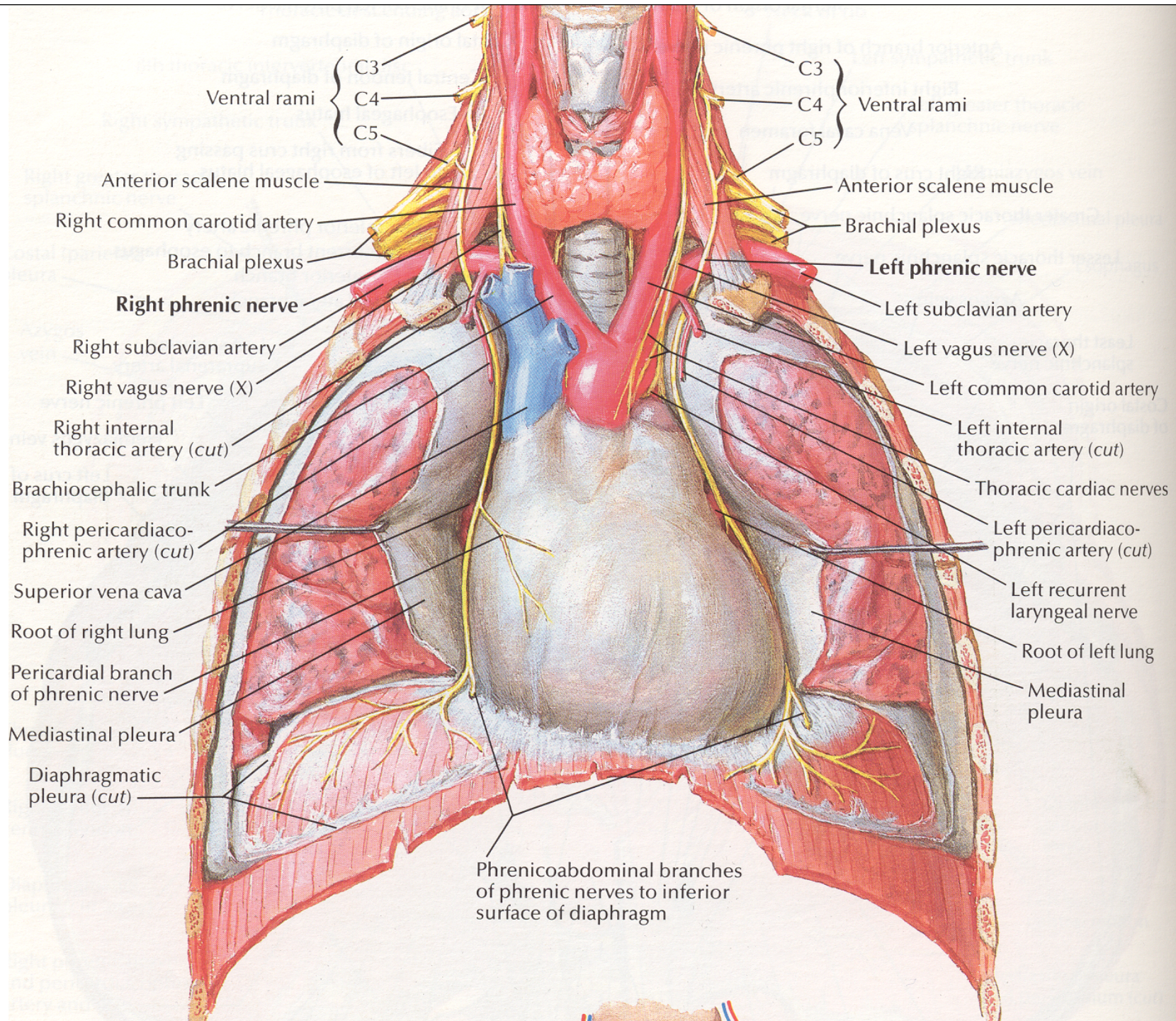
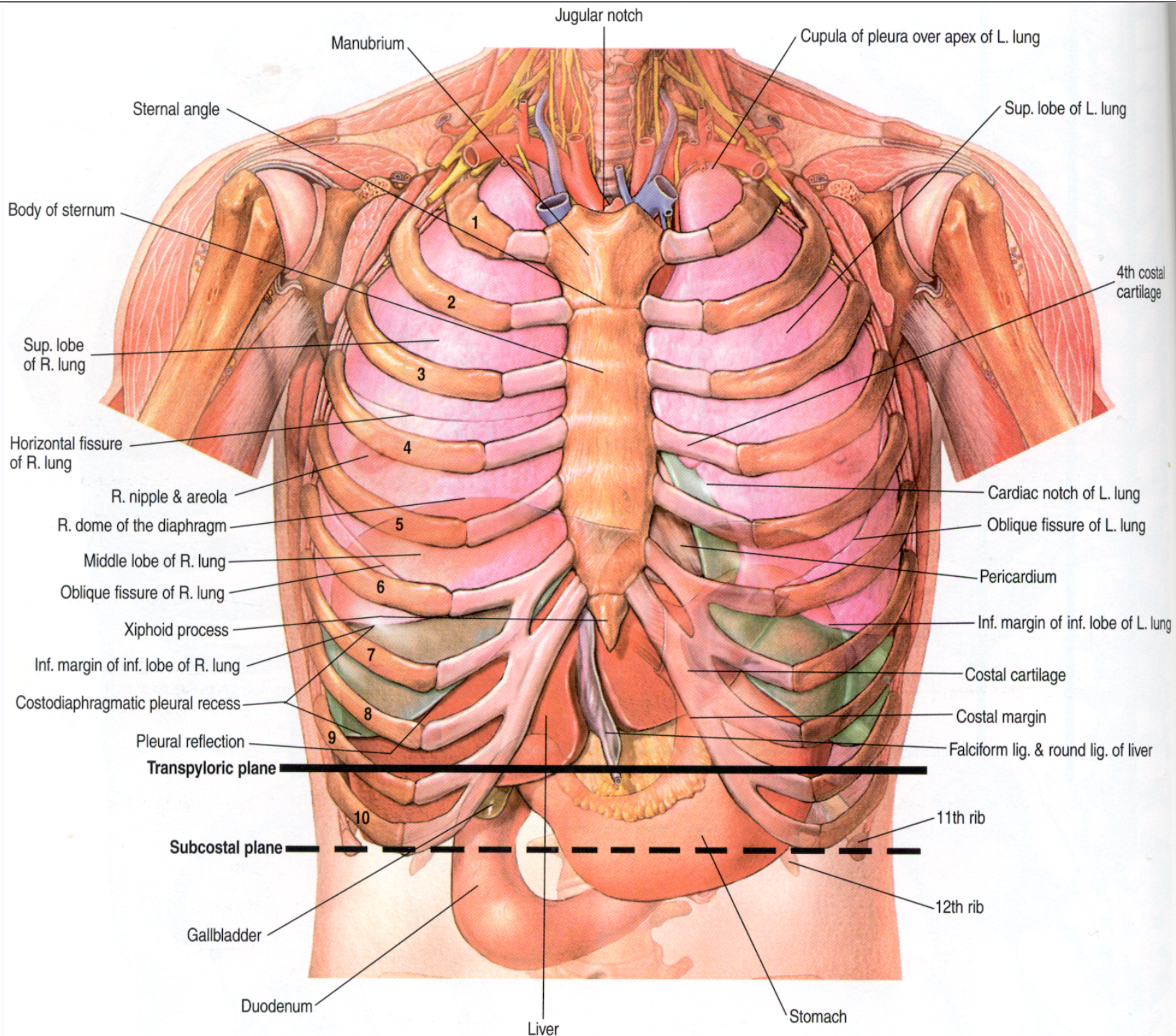
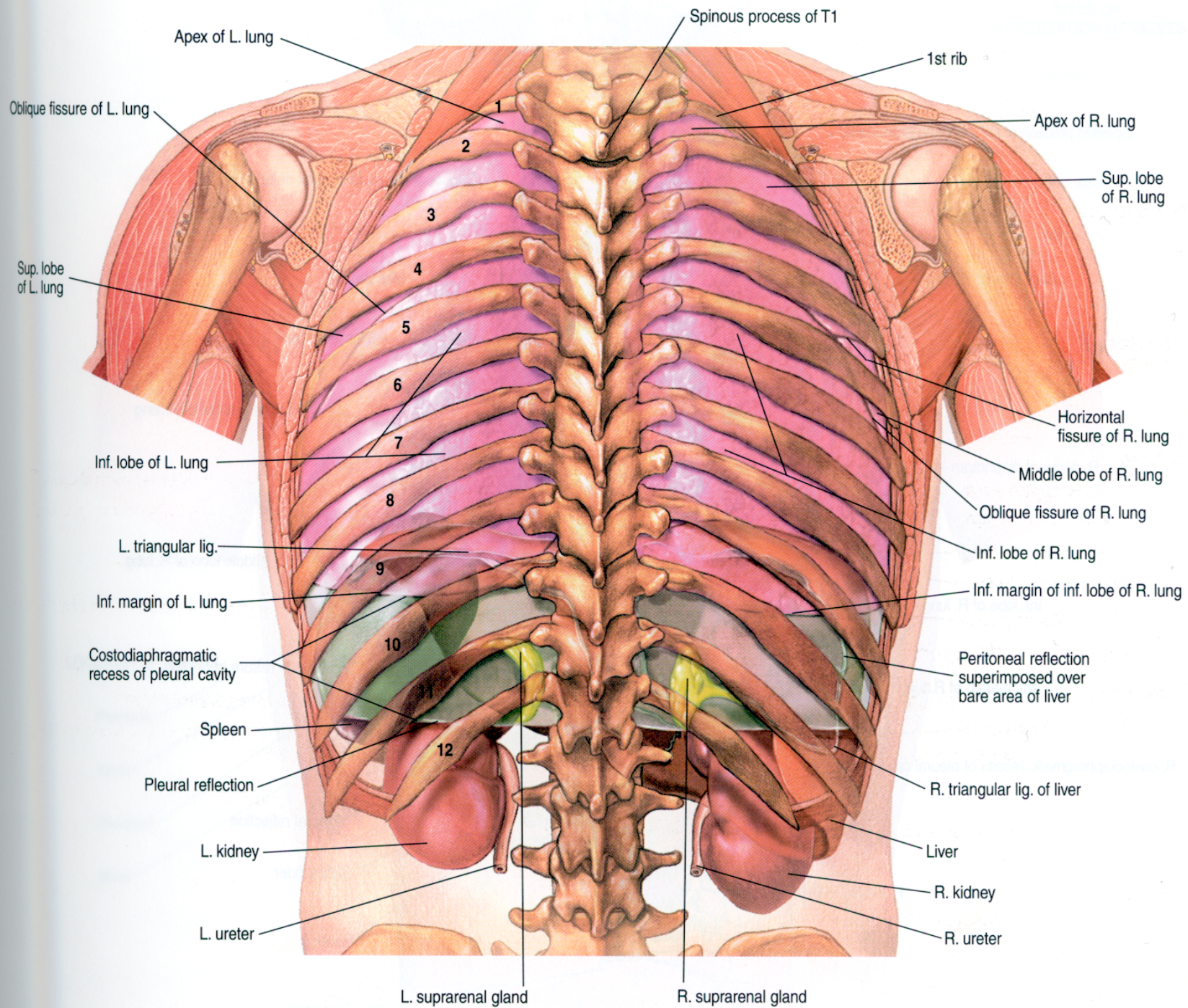


# Thoracic Trauma Abdominal Trauma

Scott R Snyder  
San Francisco Paramedic Association









# Quick-Case 1

Pneumothorax - closed  
Pneumothorax - open  
Hemothorax  
Tension pneumothorax  
Pericardial tamponade  
Liver injury  
Spleen injury

Intraabdominal injury  
Renal injury  
Flail segment  
Pulmonary contusion  
Cardiac contusion  
Fractured ribs  
Traumatic asphyxia



# Contusion

- Most common result of blunt injury
- Evidence of possible underlying injury
- Signs/Symptoms:
  - Erythema/Ecchymosis
  - Pain



# Rib Fractures

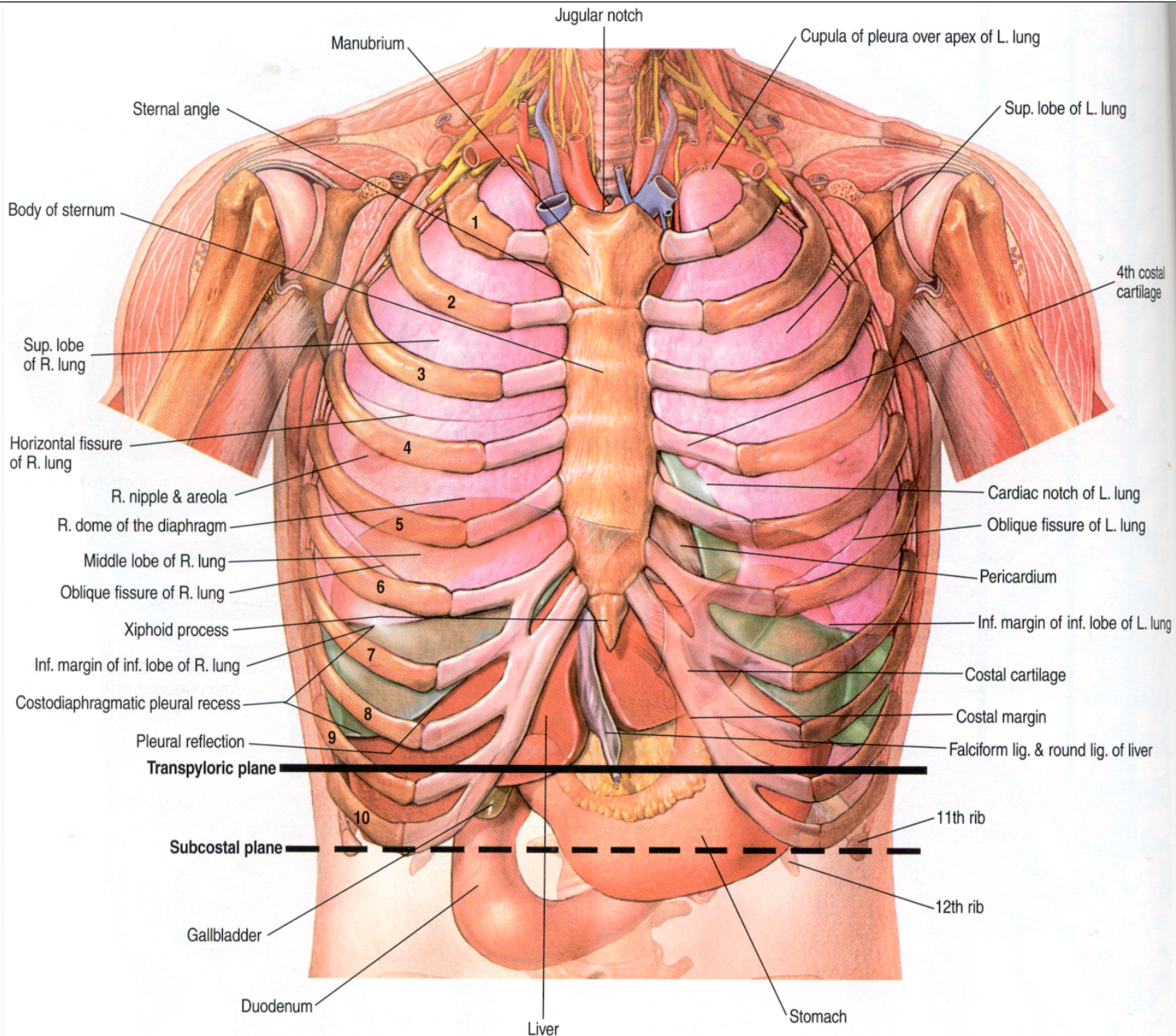
- Ribs 1-3 requires great force to fracture
  - Associated with about a 27% mortality
- Ribs 4-9 are most commonly fractured
- Ribs 10-12 less likely to be fractured

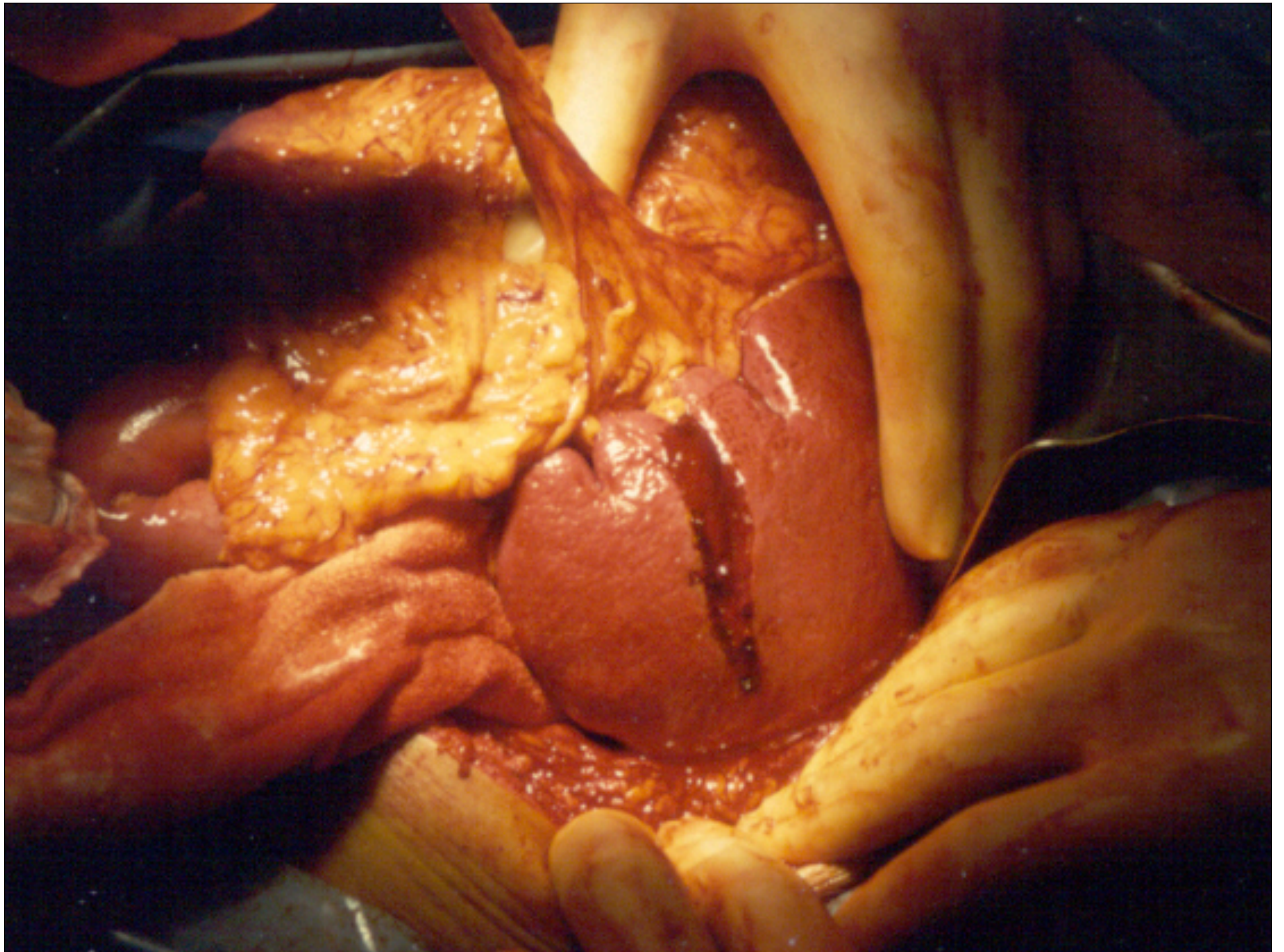
# S/S of Rib Fractures

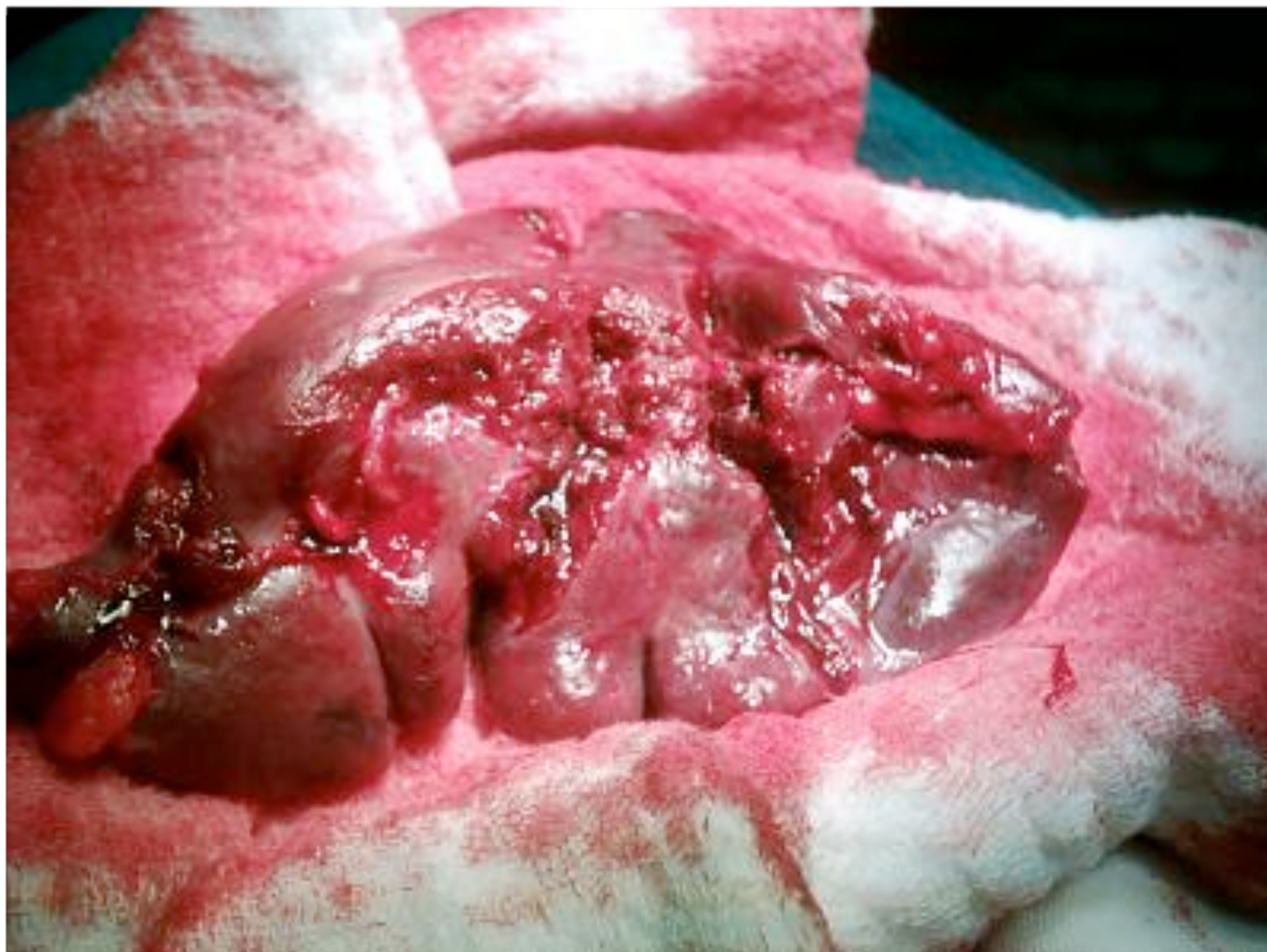
- Pain with palpation and/or respiration
- Crepitus
- Obvious deformity

# Treatment: Rib Fractures

- Consider need for spinal immobilization
- Allow patient to self-splint if desired
- ALS for pain control?

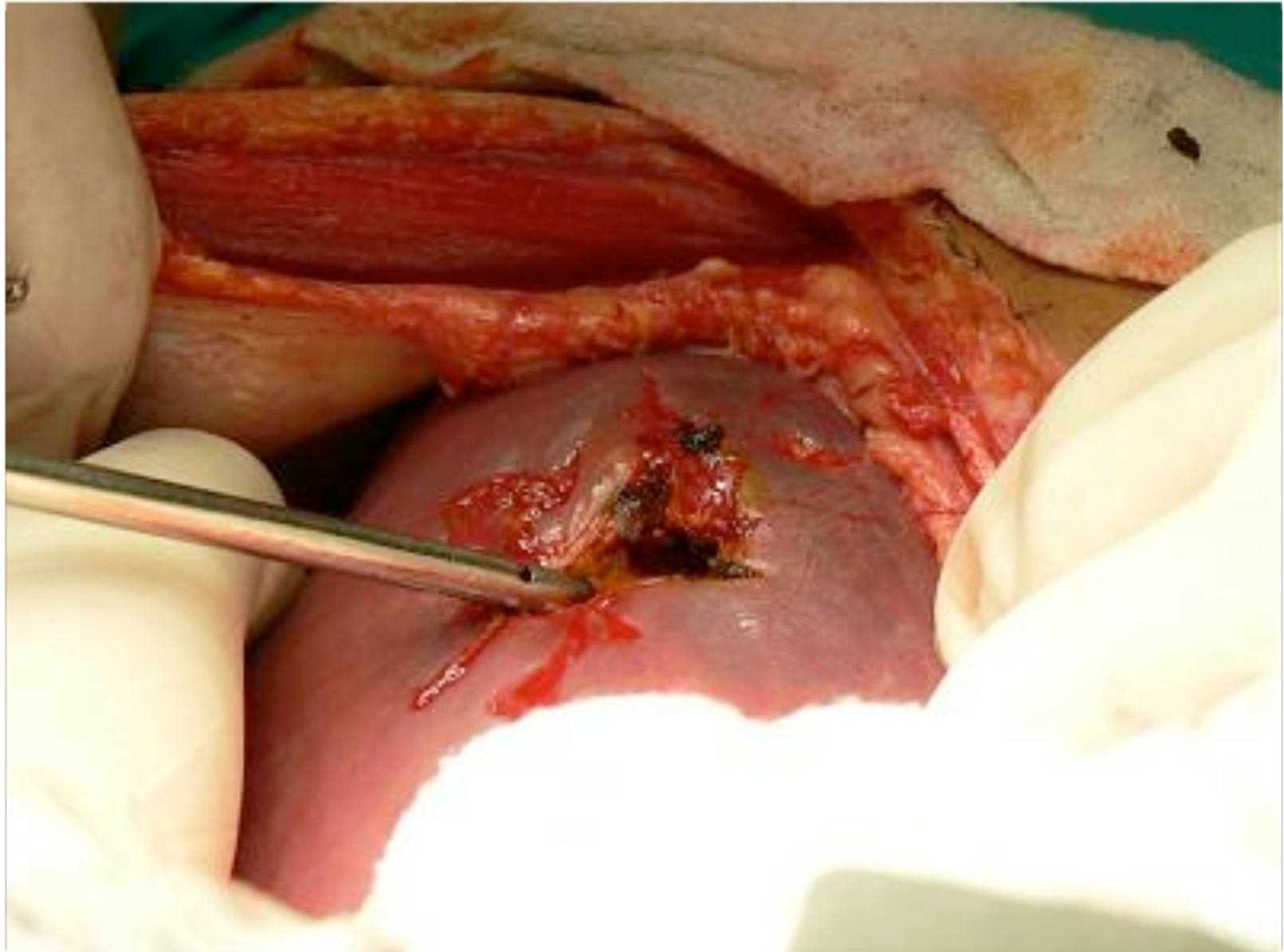


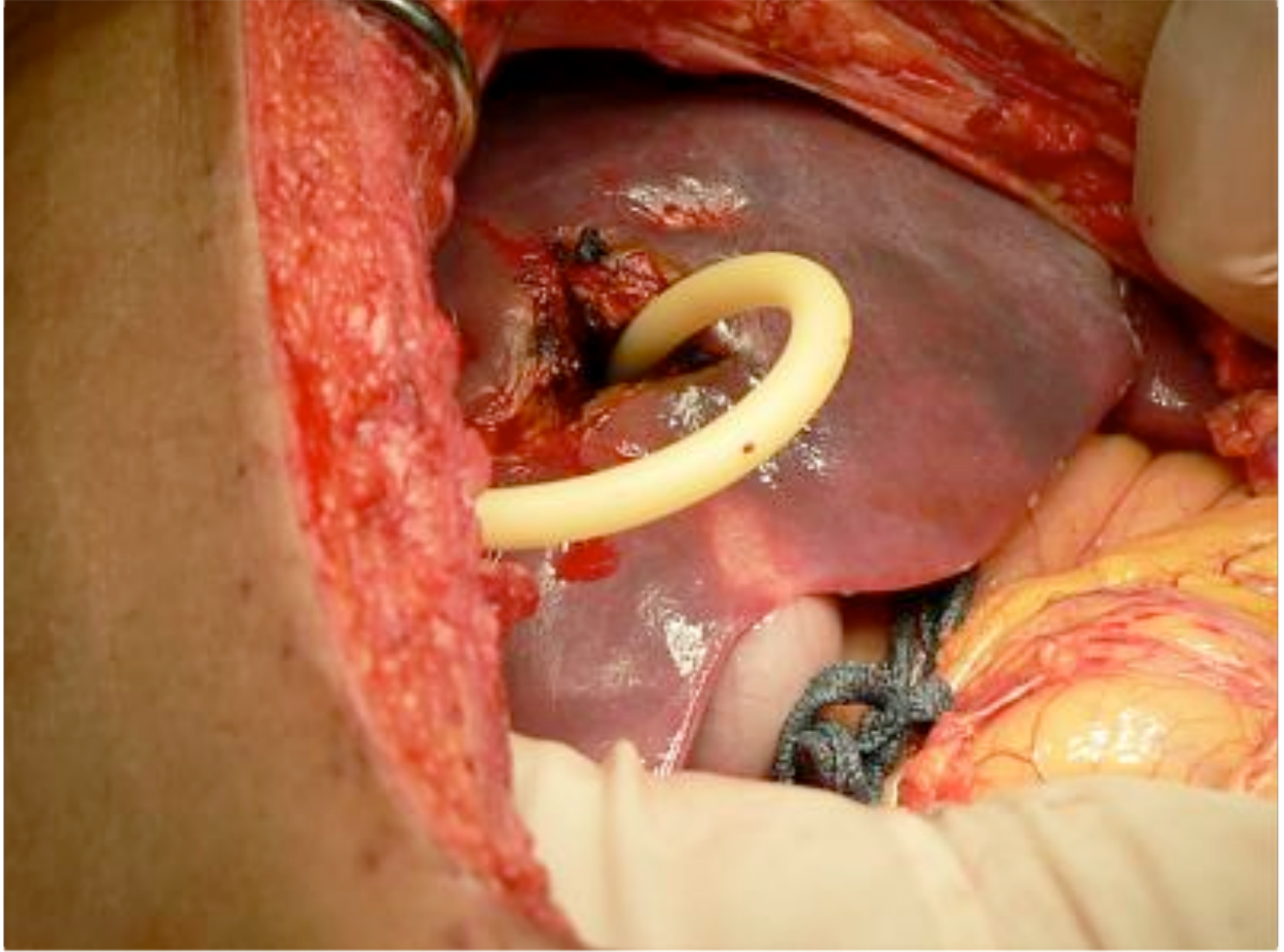














# S/S of Intraabdominal Hemorrhage

- MOI
- Bruising, contusions, etc to abd wall
- S/S of shock

# Tx: Intraabd Hemorrhage

- Consider need for C-spine precautions
- ABC's
  - oxygen
- Proper positioning and keep warm

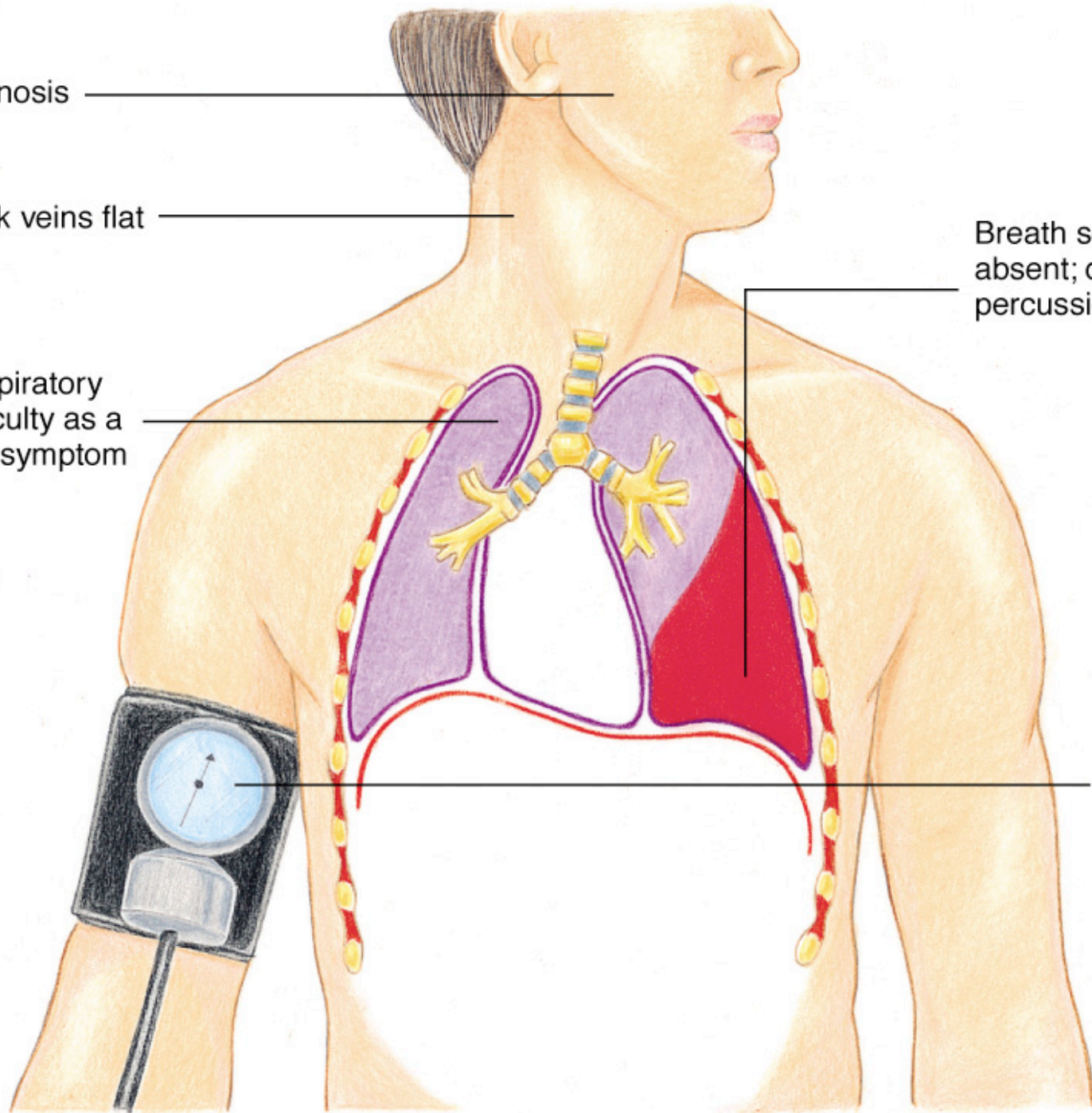
Cyanosis

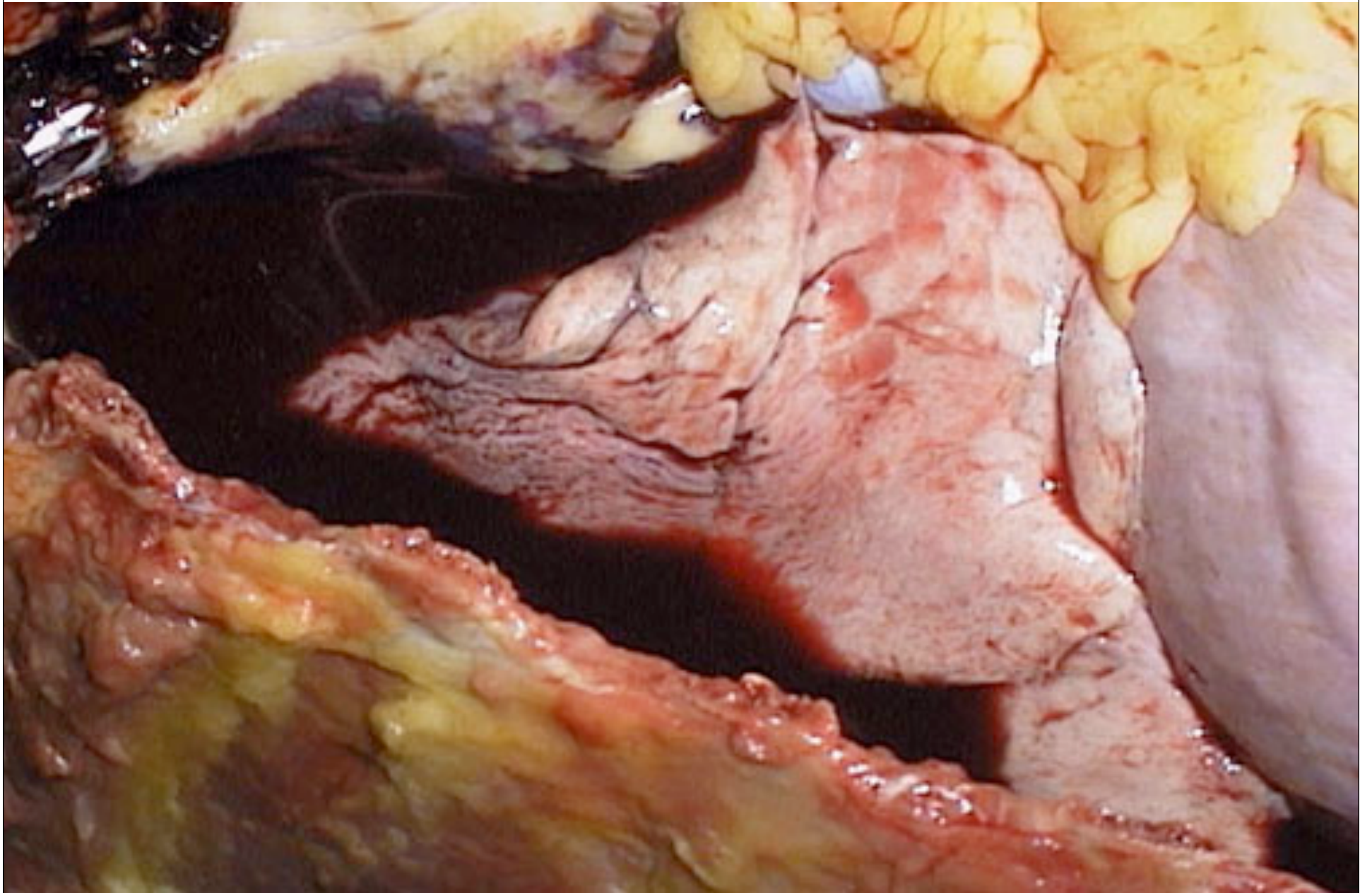
Neck veins flat

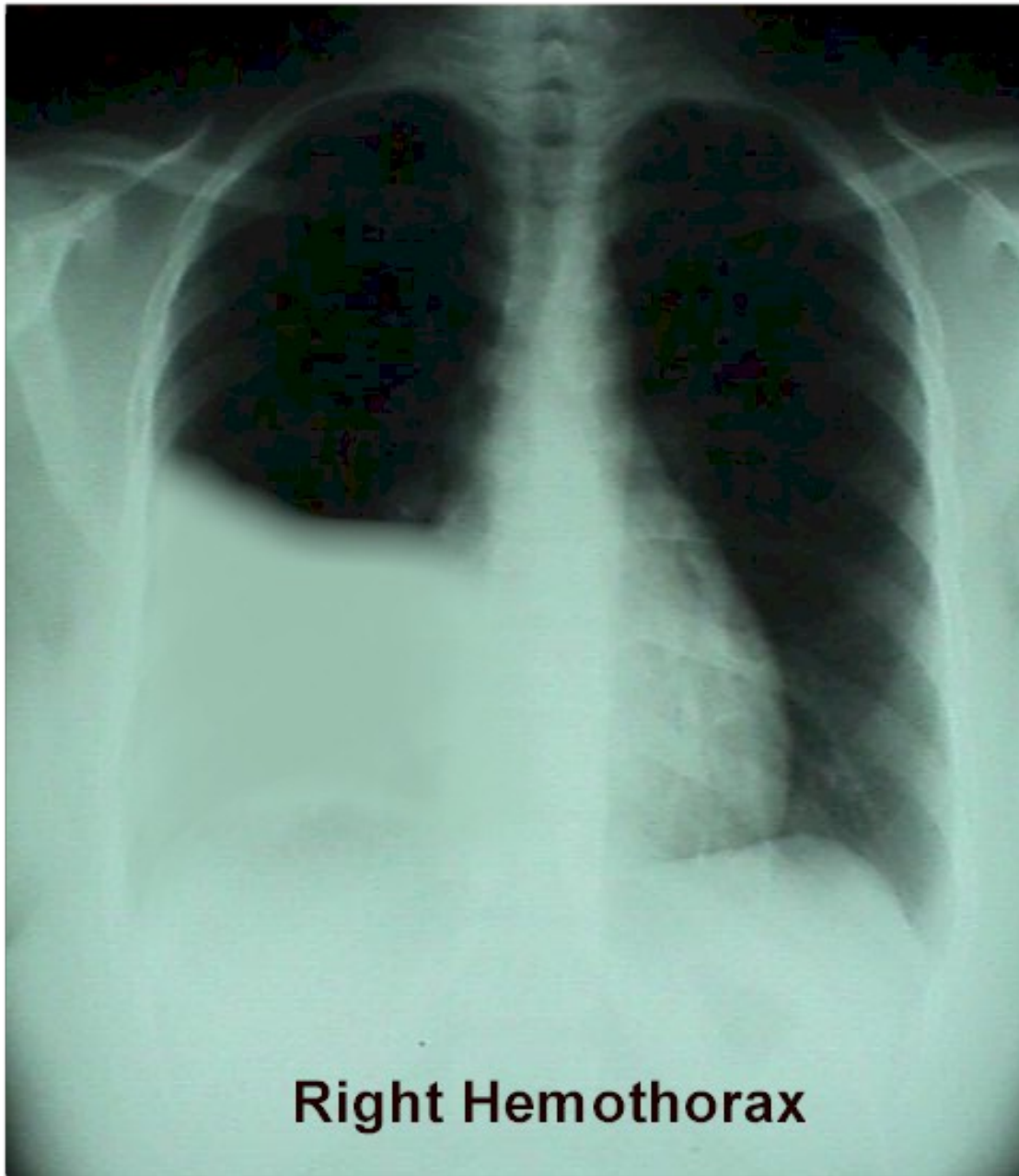
Respiratory  
difficulty as a  
late symptom

Breath sounds  
absent; dull to  
percussion

Shock









Right Hemithorax

# S/S of Hemothorax

- Blunt or penetrating chest trauma
- S/S of shock
- Decreased BS, resp distress
- Dull to percussion over injured side

# Tx: Hemothorax

- Consider need for C-spine
- ABC's
  - Oxygen administration
  - PPV may be required
- Proper positioning and keep warm

# Pulmonary Contusion



# Pulmonary Contusion

- Bleeding, interstitial edema =  
↓ perfusion = hypoxemia and CO<sub>2</sub> retention
- Microhemorrhage may account for 1-1 ½ L of blood loss

# Pulmonary Contusion: S/S

- Tachycardia, tachypnea, dyspnea
- Blunt chest trauma
- Cough, hemoptysis
- S/S of shock

# Treatment

- Consider need for c-spine
- ABC's
  - oxygen
  - PPV may be required
- Proper positioning and keep warm

# Quick-Case 2

Pneumothorax - closed  
Pneumothorax - open  
Hemothorax  
Tension pneumothorax  
Pericardial tamponade  
Liver injury  
Spleen injury

Intraabdominal injury  
Renal injury  
Flail segment  
Pulmonary contusion  
Cardiac contusion  
Fractured ribs  
Traumatic asphyxia







# S/S of Evisceration



# Tx: Abdominal Evisceration

- Wet, sterile dressing covered by 4-sided occlusive dressing
- Knee to chest position, if possible
- NOT treated during the primary exam! Is NOT a life-threatening injury!

# Quick-Case 3

Pneumothorax - closed  
Pneumothorax - open  
Hemothorax  
Tension pneumothorax  
Pericardial tamponade  
Liver injury  
Spleen injury

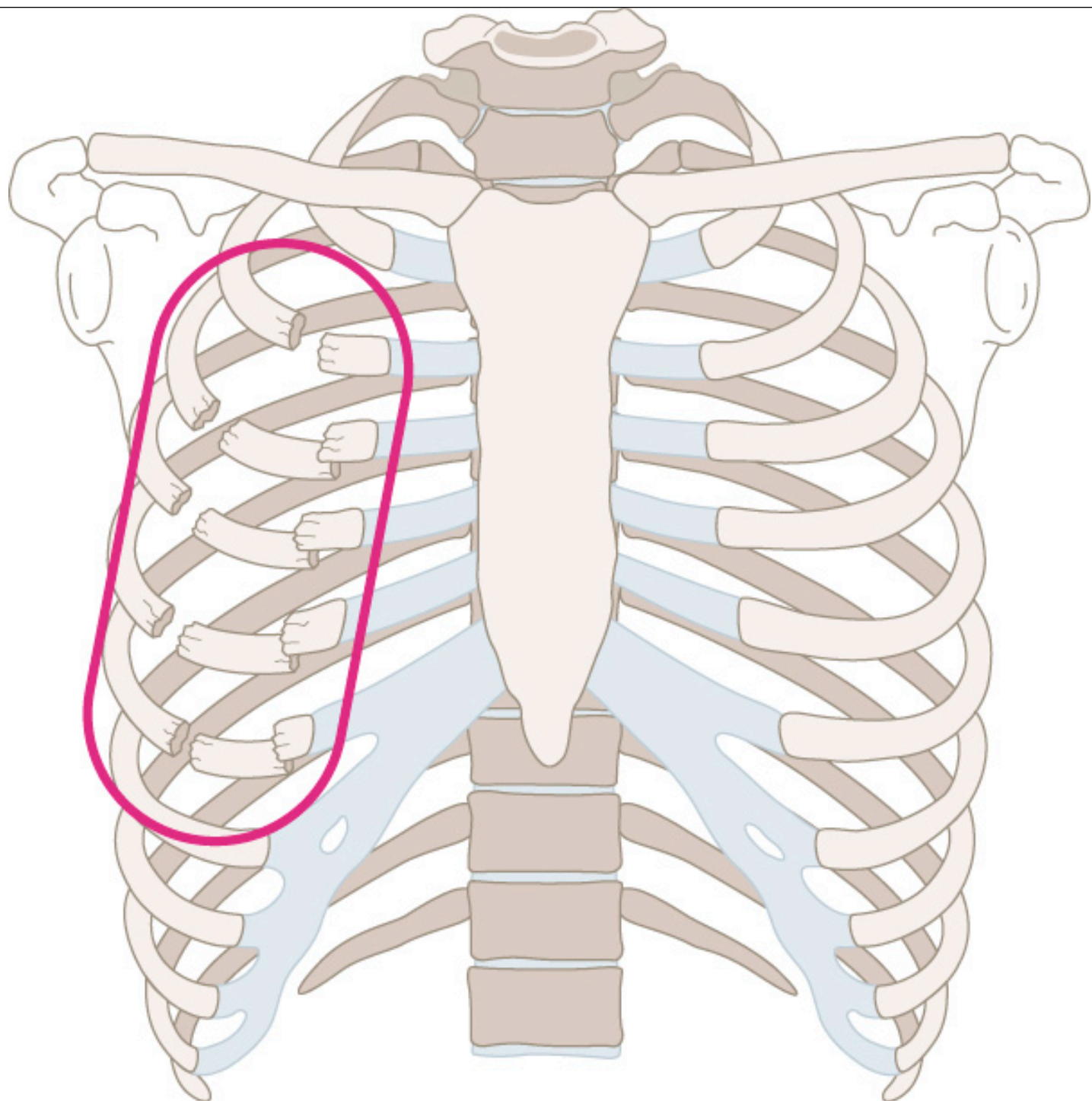
Intraabdominal injury  
Renal injury  
Flail segment  
Pulmonary contusion  
Cardiac contusion  
Fractured ribs  
Traumatic asphyxia

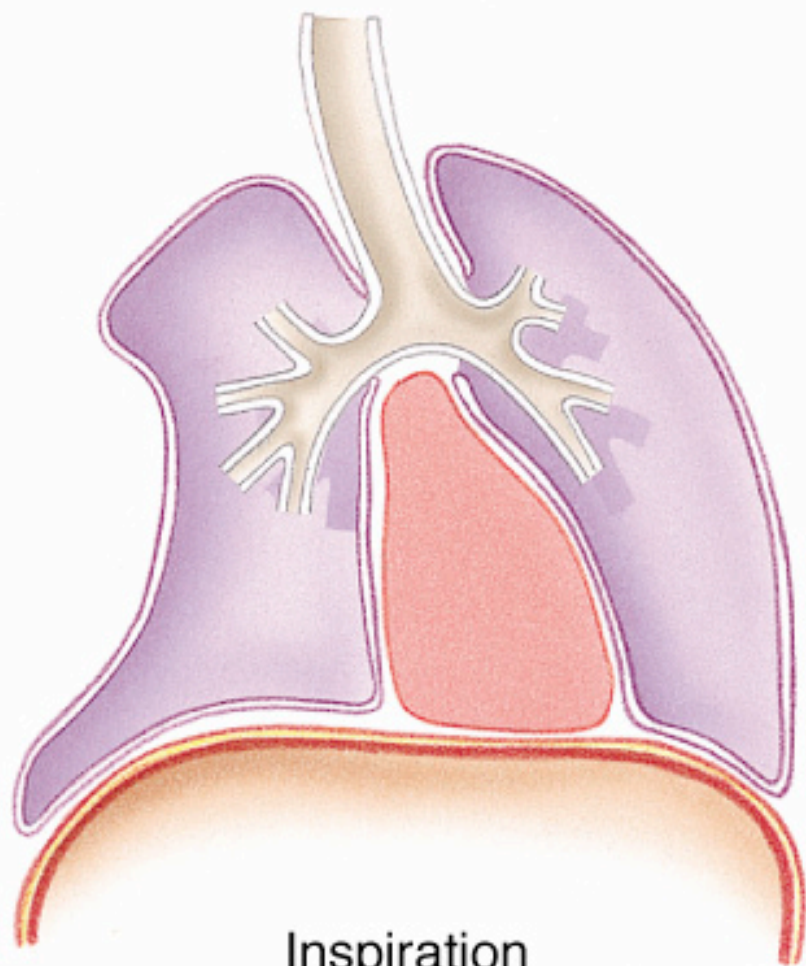




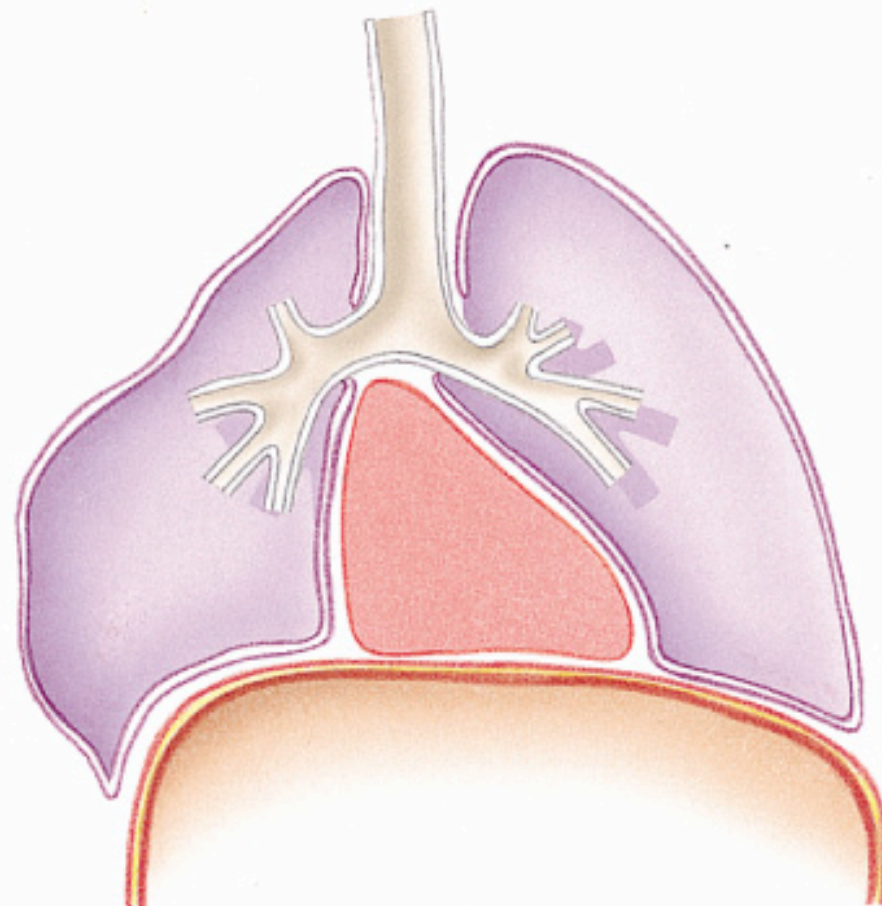
# Flail Chest

- 2 or more adjacent ribs broken in 2 or more places
- Segment of the chest becomes free to move with the pressure changes of respiration

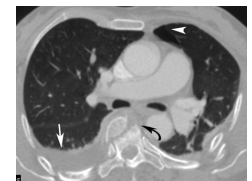
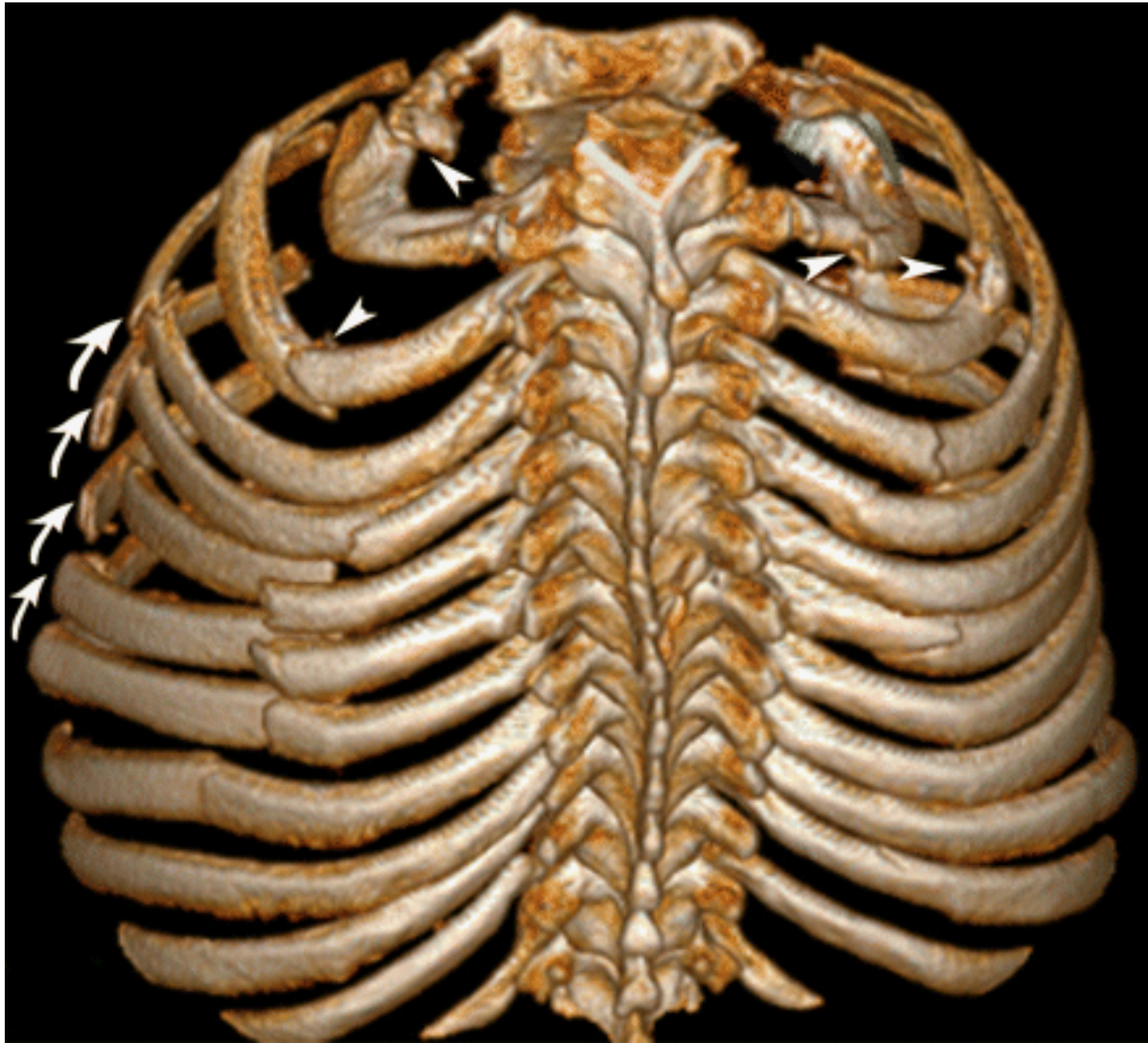


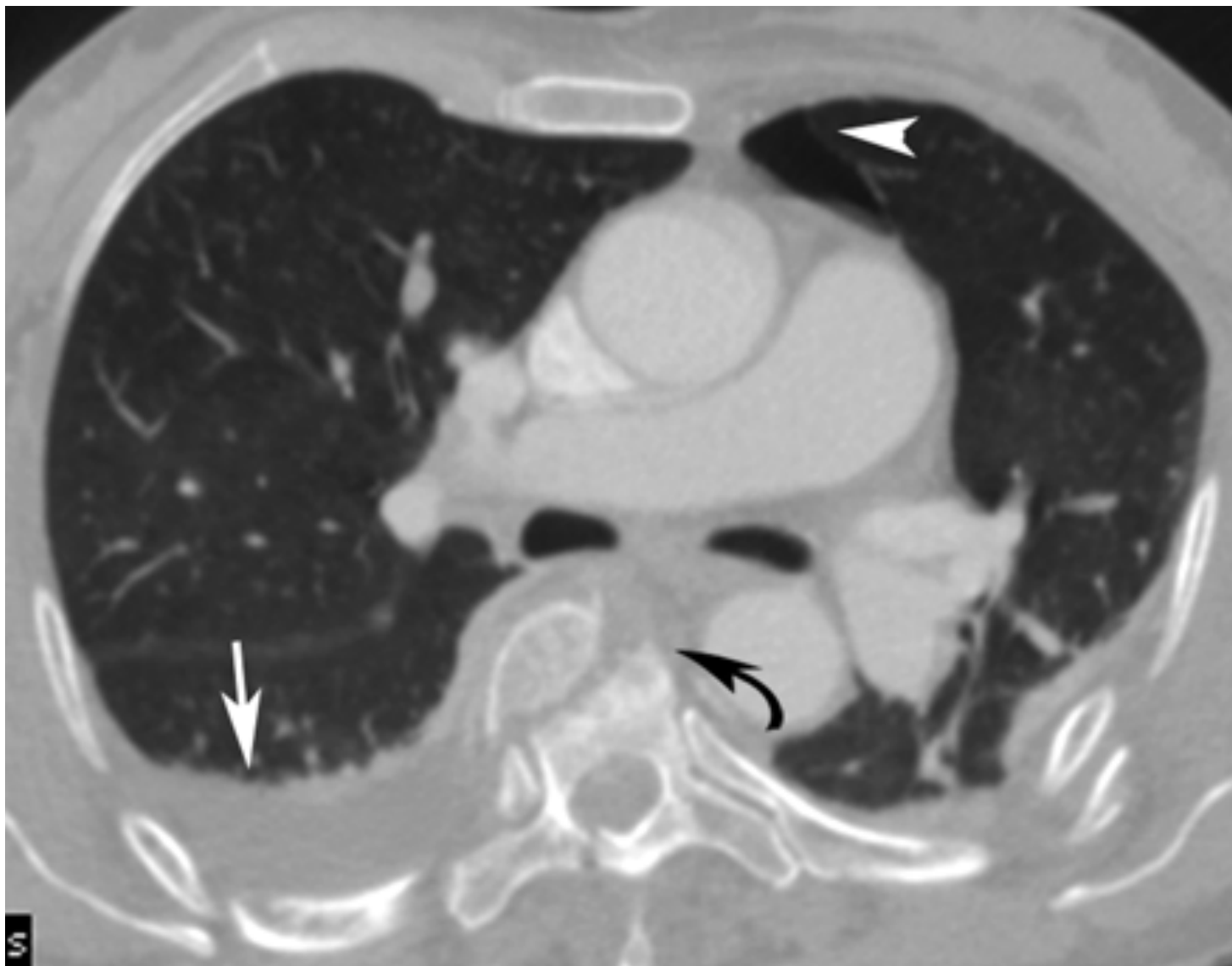


Inspiration



Expiration











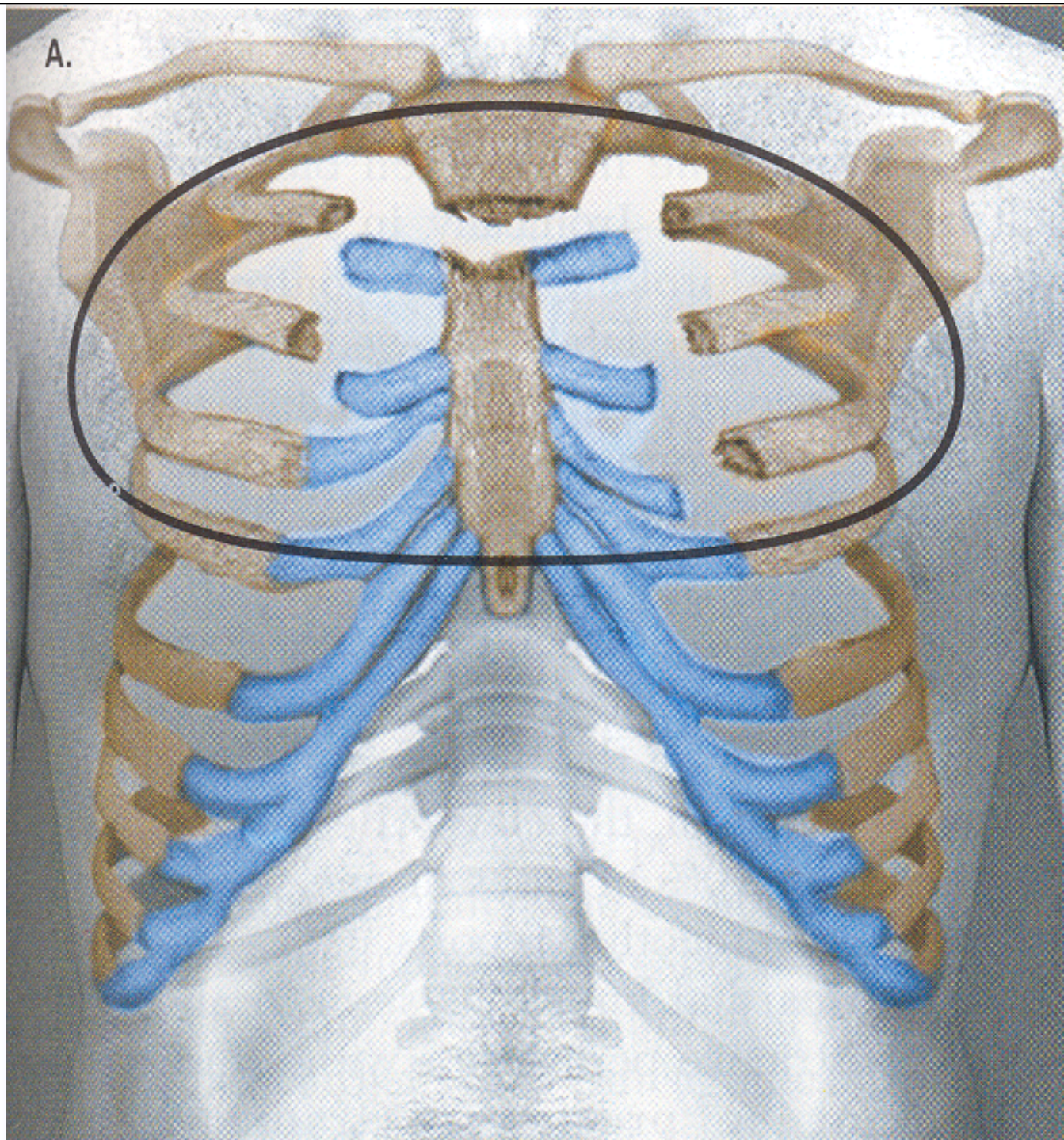
# Flail Chest: S/S

- Chest trauma, paradoxical chest wall movement, asymmetrical chest, crepitus, pain with inspiration
- Tachycardia, tachypnea
- Guarding, splinting of affected side



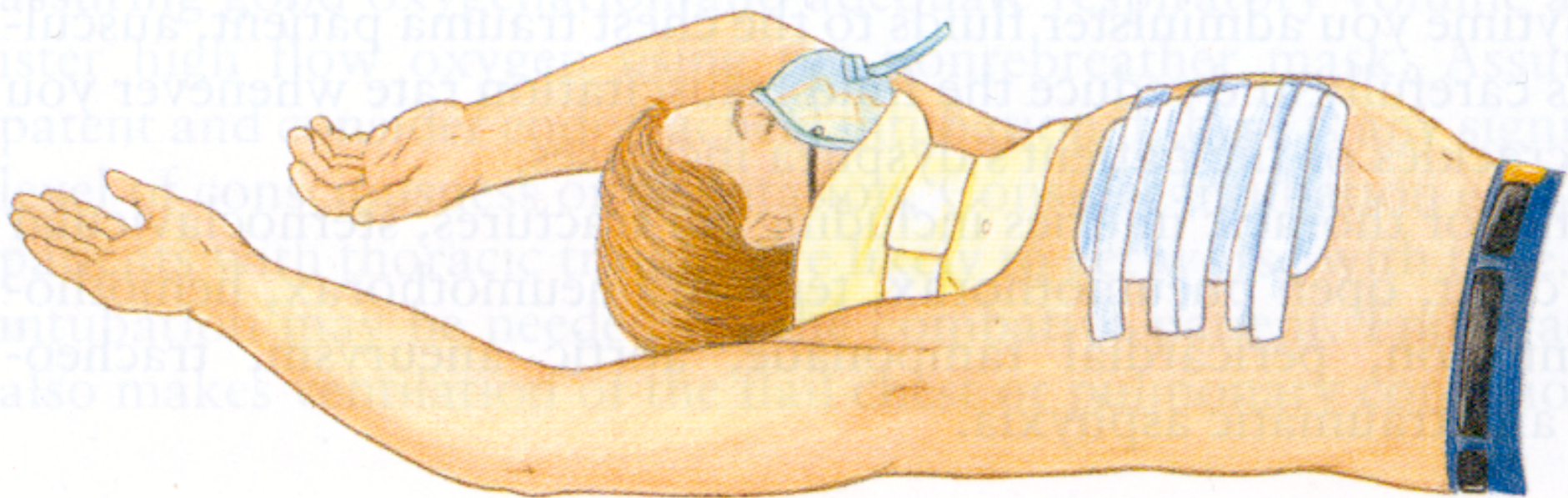


A.

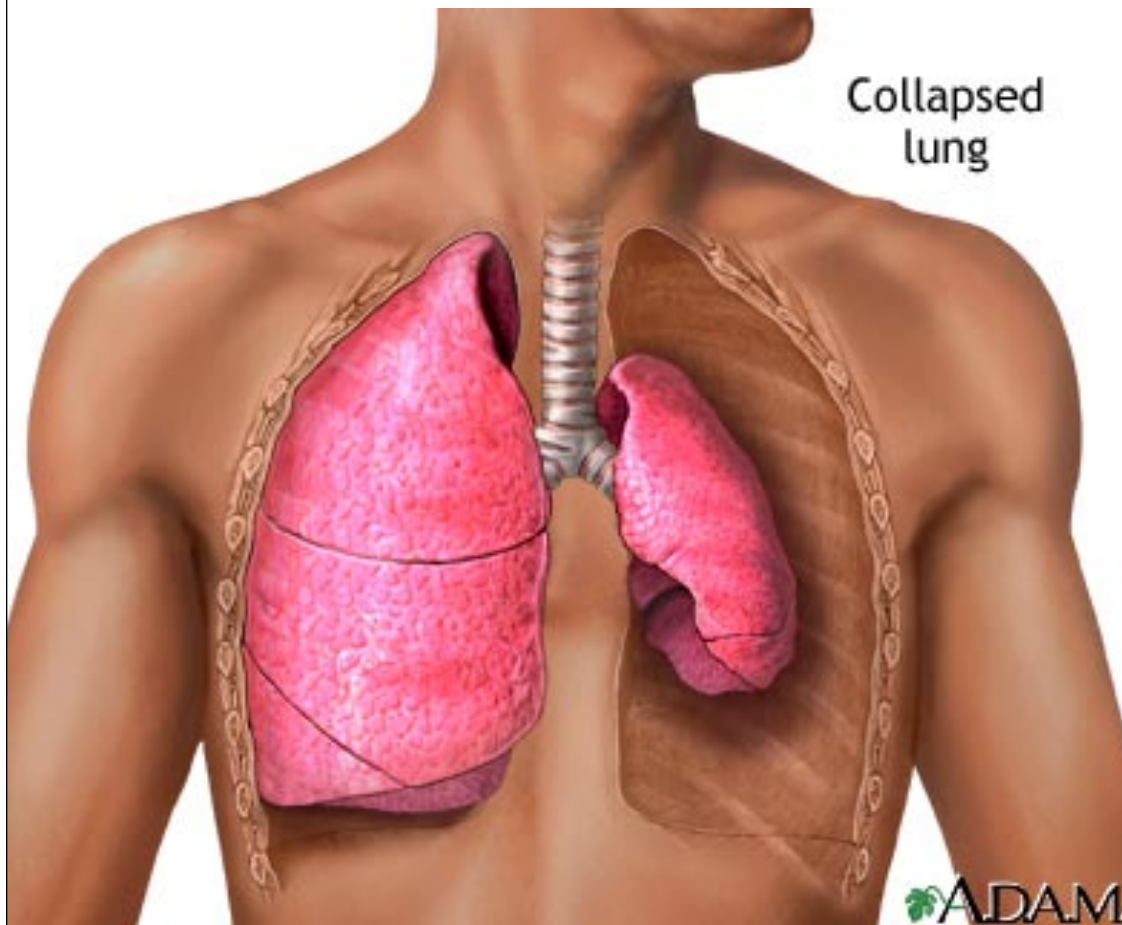


# Flail Segment: Treatment

- Cervical spine stabilization
- ABC's
  - Immediately stabilize with hand
  - Bulky bandage over flail segment
  - PPV, oxygen
- Proper positioning and keep warm



# Simple Pneumothorax



- Aka: Closed Pneumothorax
- Occurs when lung tissue is disrupted and air leaks into the pleural space

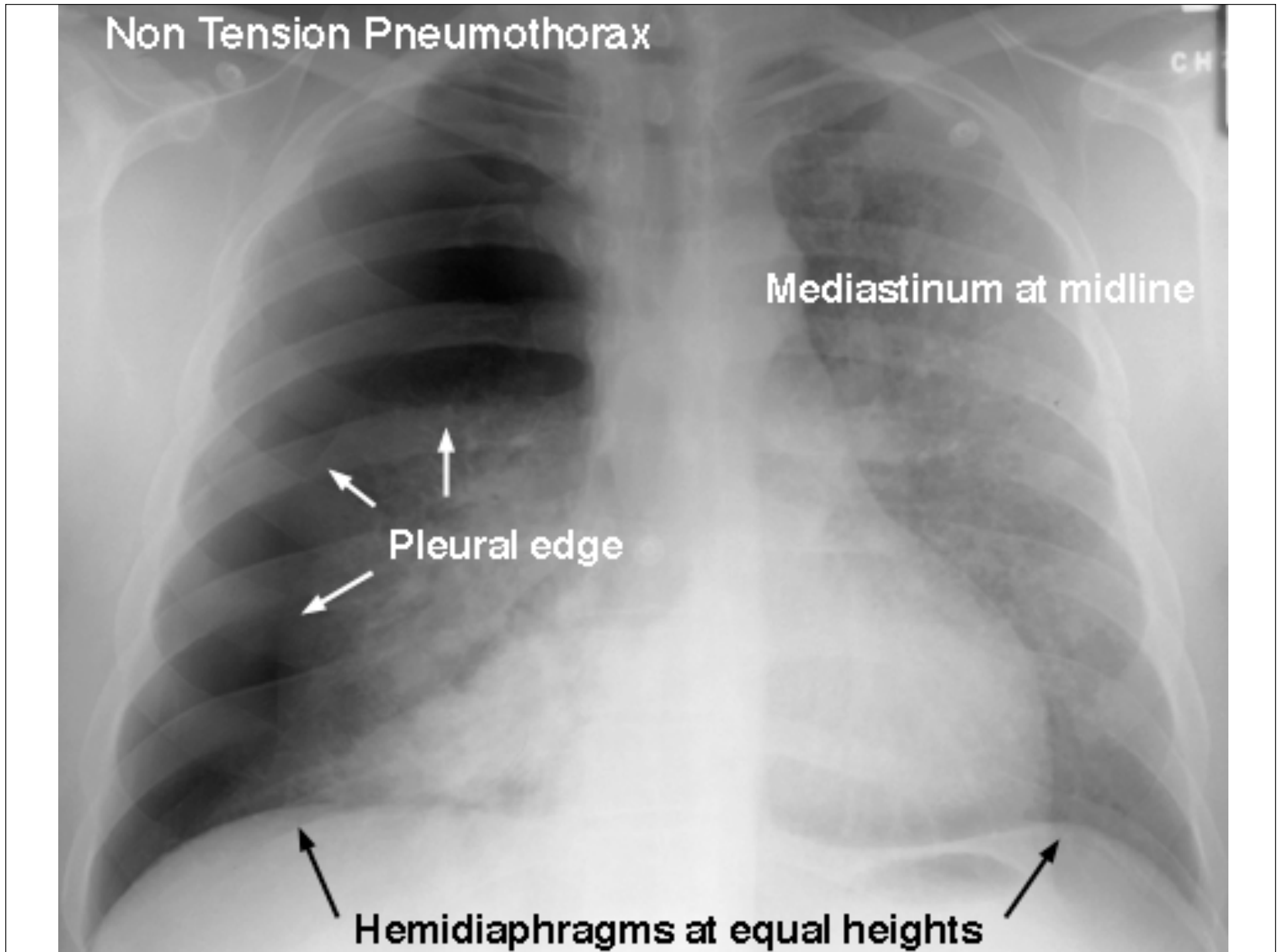
# Non Tension Pneumothorax

Mediastinum at midline

Pleural edge

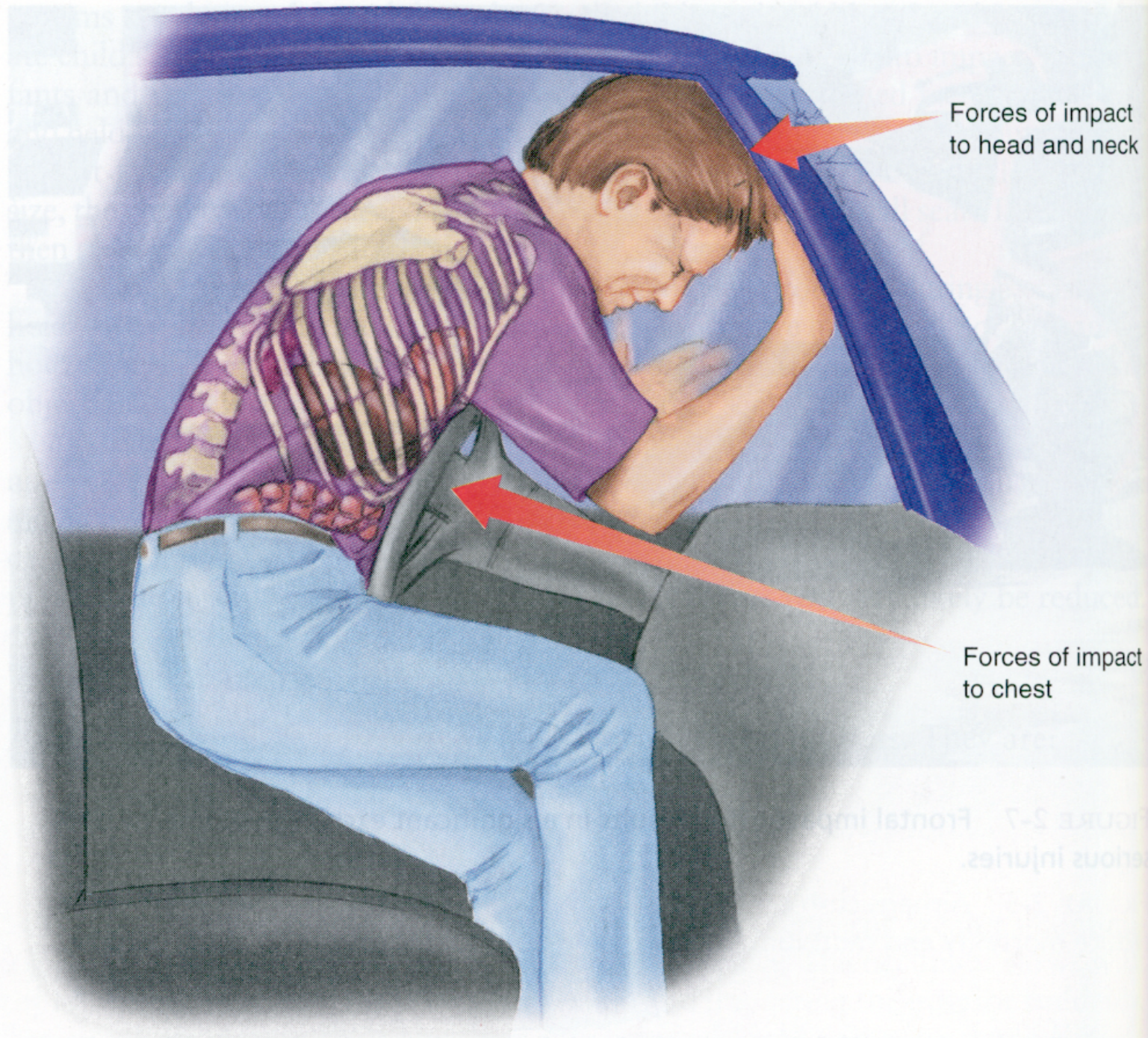
Hemidiaphragms at equal heights

CH



# Simple Pneumothorax

- Progressive Pathology
  - Hole in lung
  - Air accumulates in pleural space
  - Lung collapses, alveoli collapse (atelectasis)
  - $\downarrow$   $O_2$  and  $CO_2$  exchange = V/P mismatch



Forces of impact  
to head and neck

Forces of impact  
to chest

# Simple Pneumothorax: S/S

- Tachycardia, tachypnea, dyspnea, hemoptysis
- Low SpO<sub>2</sub>
- Decreased or absent LS on affected side

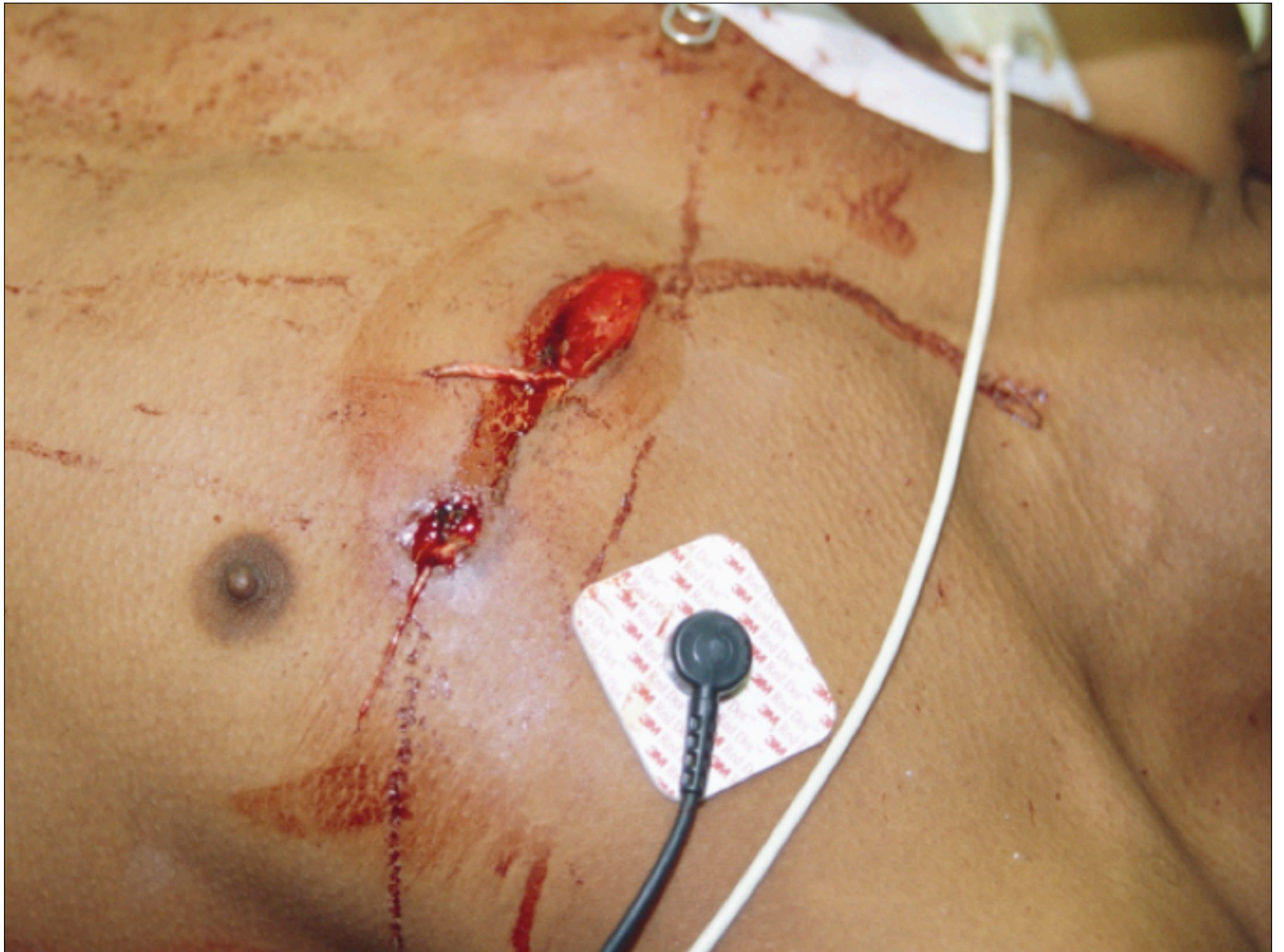
# Treatment

- Consider need for spinal immobilization
- ABC's
  - oxygen
  - PPV may be required
- Proper positioning and keep warm

# Quick-Case 4

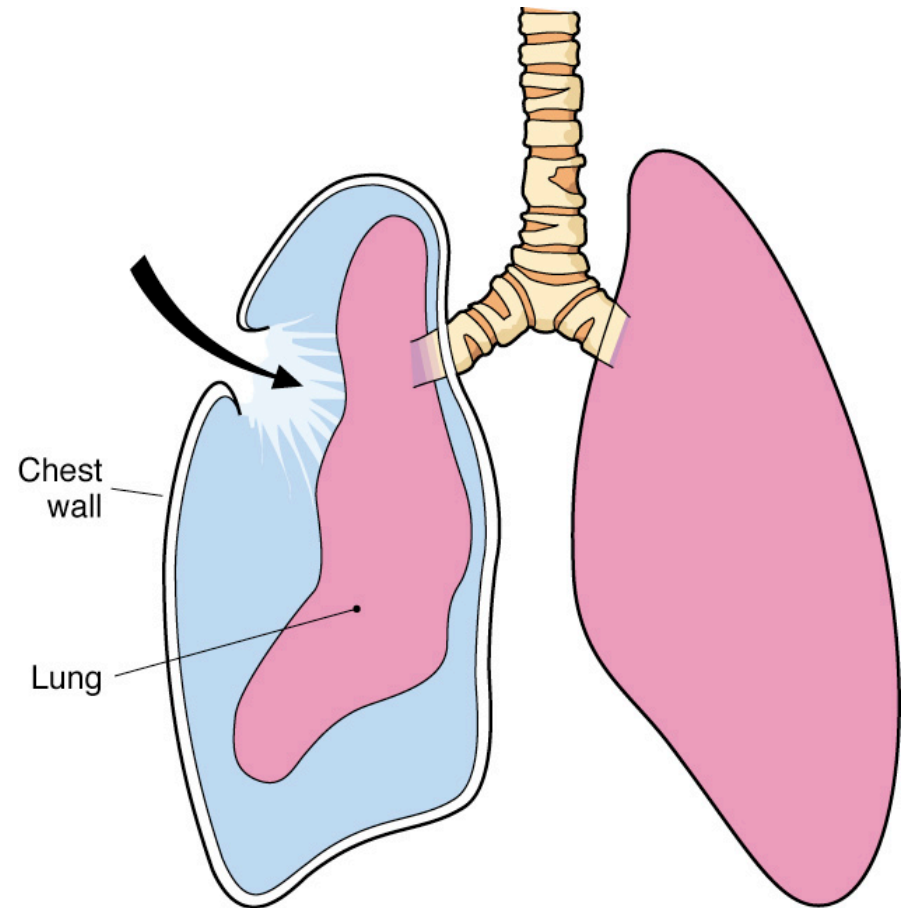
Pneumothorax - closed  
Pneumothorax - open  
Hemothorax  
Tension pneumothorax  
Pericardial tamponade  
Liver injury  
Spleen injury

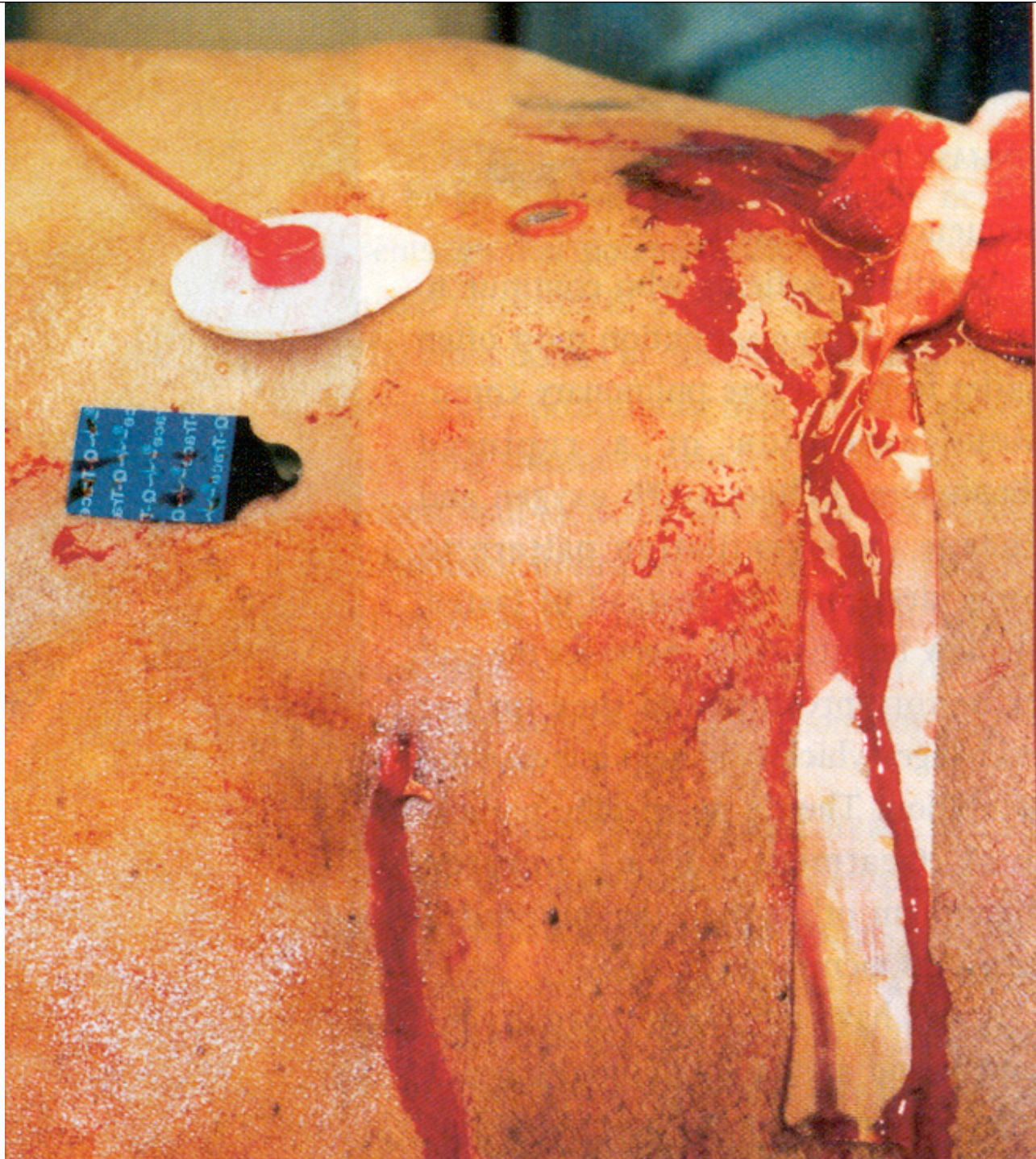
Intraabdominal injury  
Renal injury  
Flail segment  
Pulmonary contusion  
Cardiac contusion  
Fractured ribs  
Traumatic asphyxia

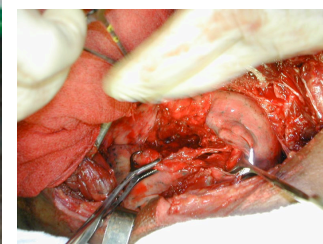


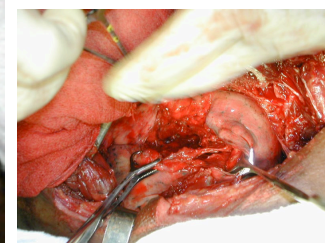
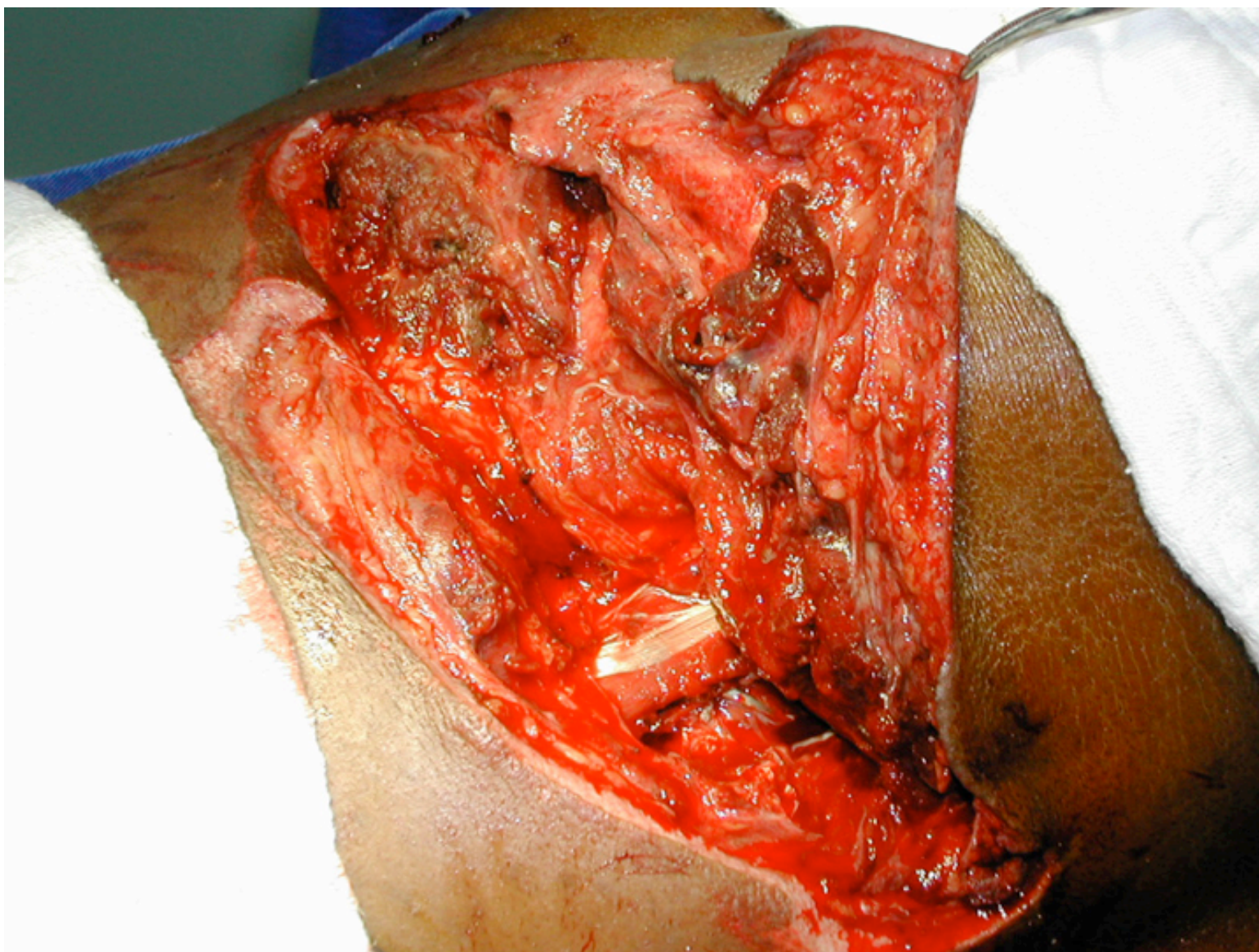
# Open Pneumothorax

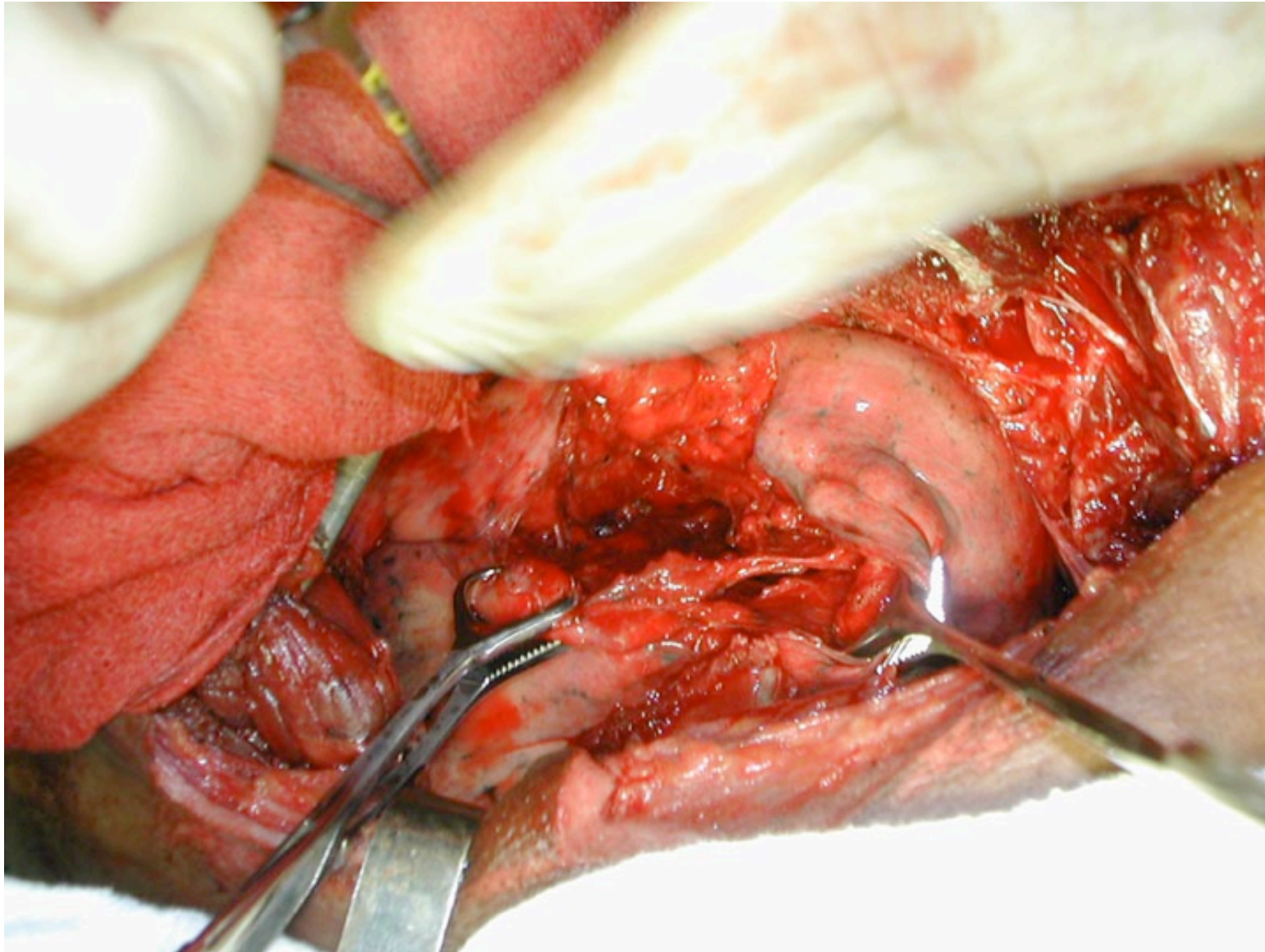
- Open defect in chest wall, communication with atmosphere, prevents neg pressure, collapse of lung, V/P mismatch
- Air will be drawn through wound if wound is  $\frac{2}{3}$  diameter of the trachea or larger

















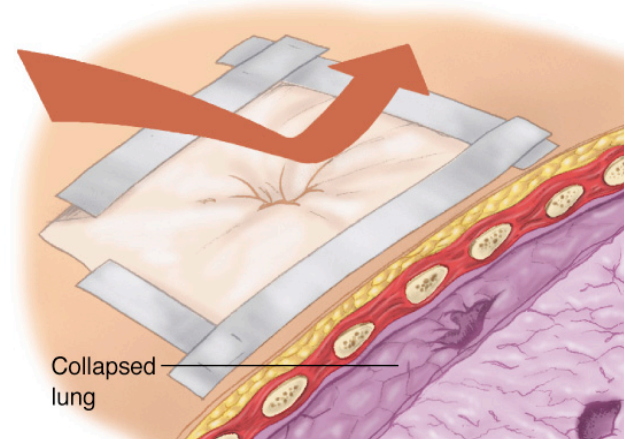
# Open Pneumothorax: S/S

- Penetrating chest trauma, sucking chest wound, frothy blood at wound site
- Tachycardia, dyspnea, tachypnea
- Subcutaneous emphysema
- ↓ BS on effected side

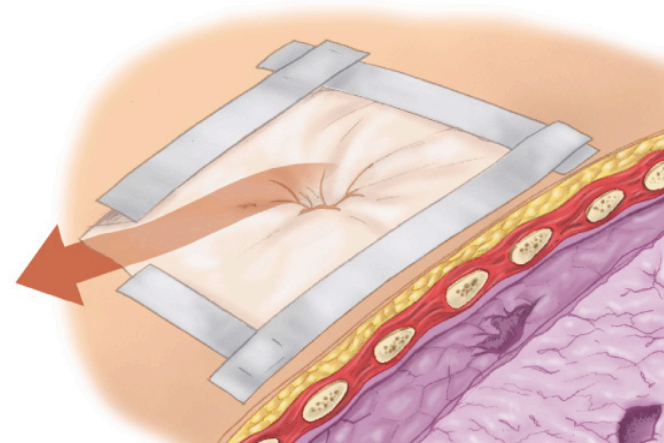
# Tx: Open Pneumothorax

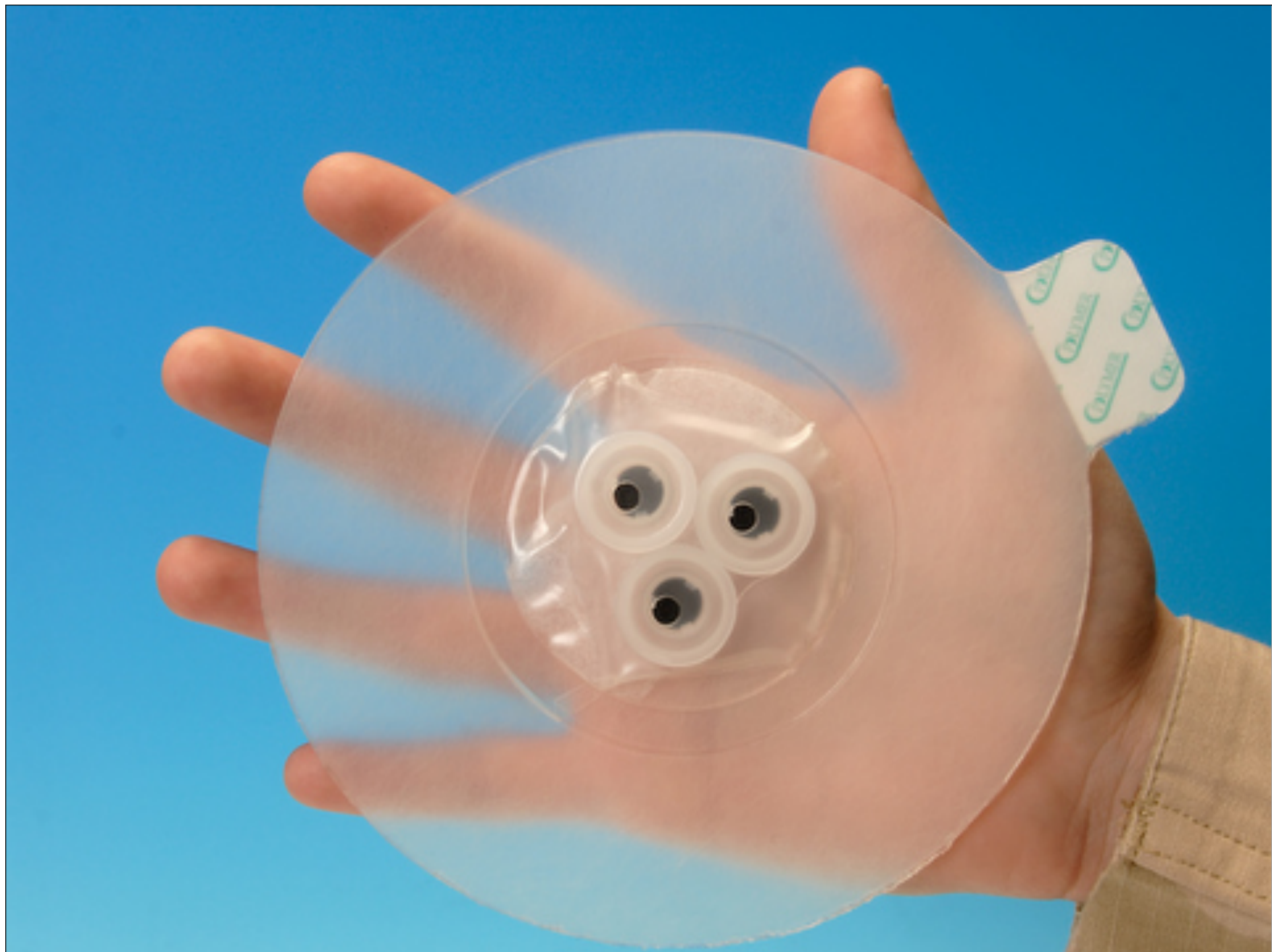
- Same as simple, and:
- Cover site with sterile occlusive dressing taped on three sides
- Progressive airway management if indicated
  - PPV

On inspiration, dressing seals wound, preventing air entry



Expiration allows trapped air to escape through untaped section of dressing





Apprehension,  
agitation

Increasing cyanosis,  
air hunger  
(ventilation severely  
impaired)

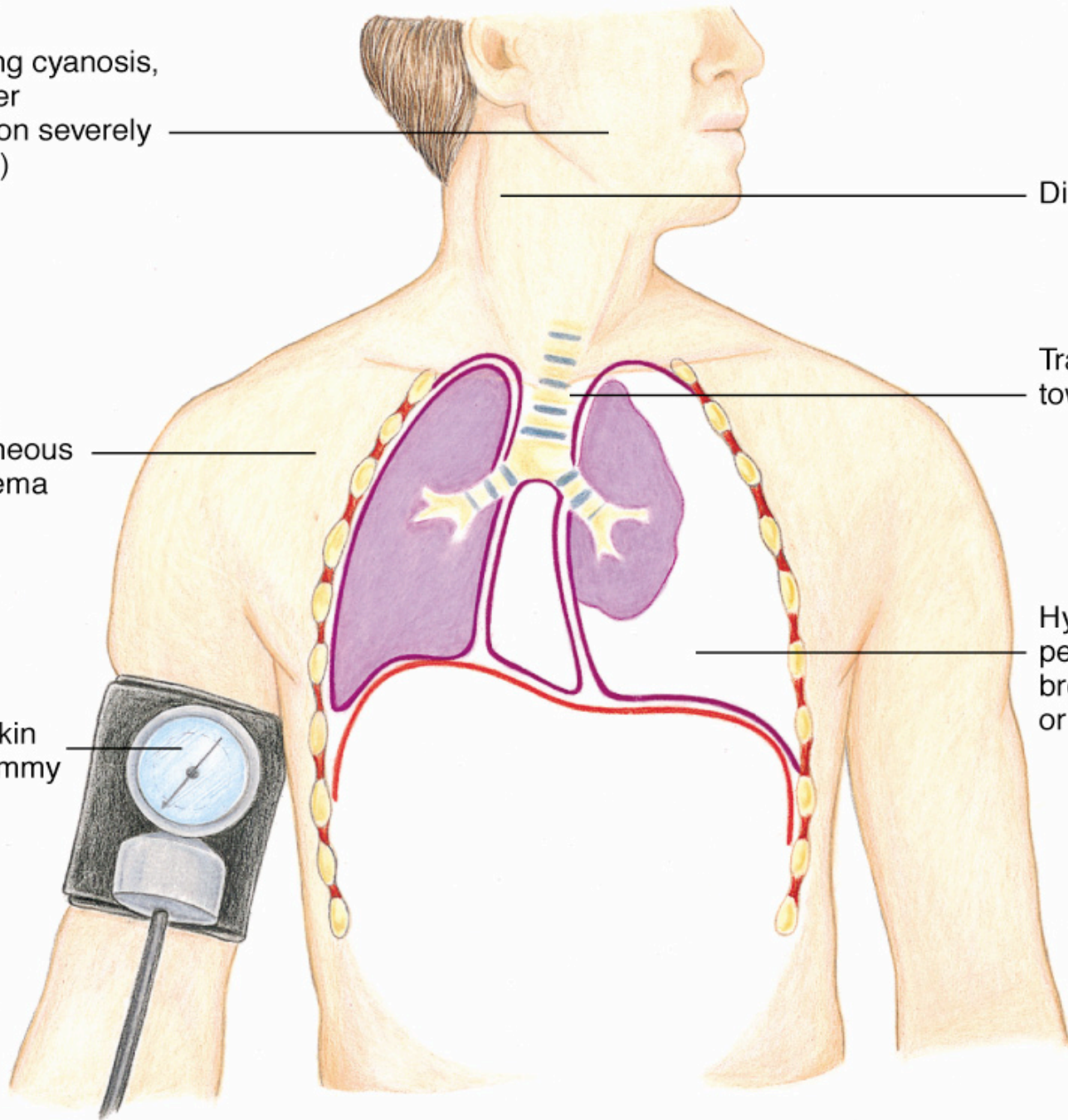
Distended neck veins

Tracheal displacement  
toward uninjured side

Possible  
subcutaneous  
emphysema

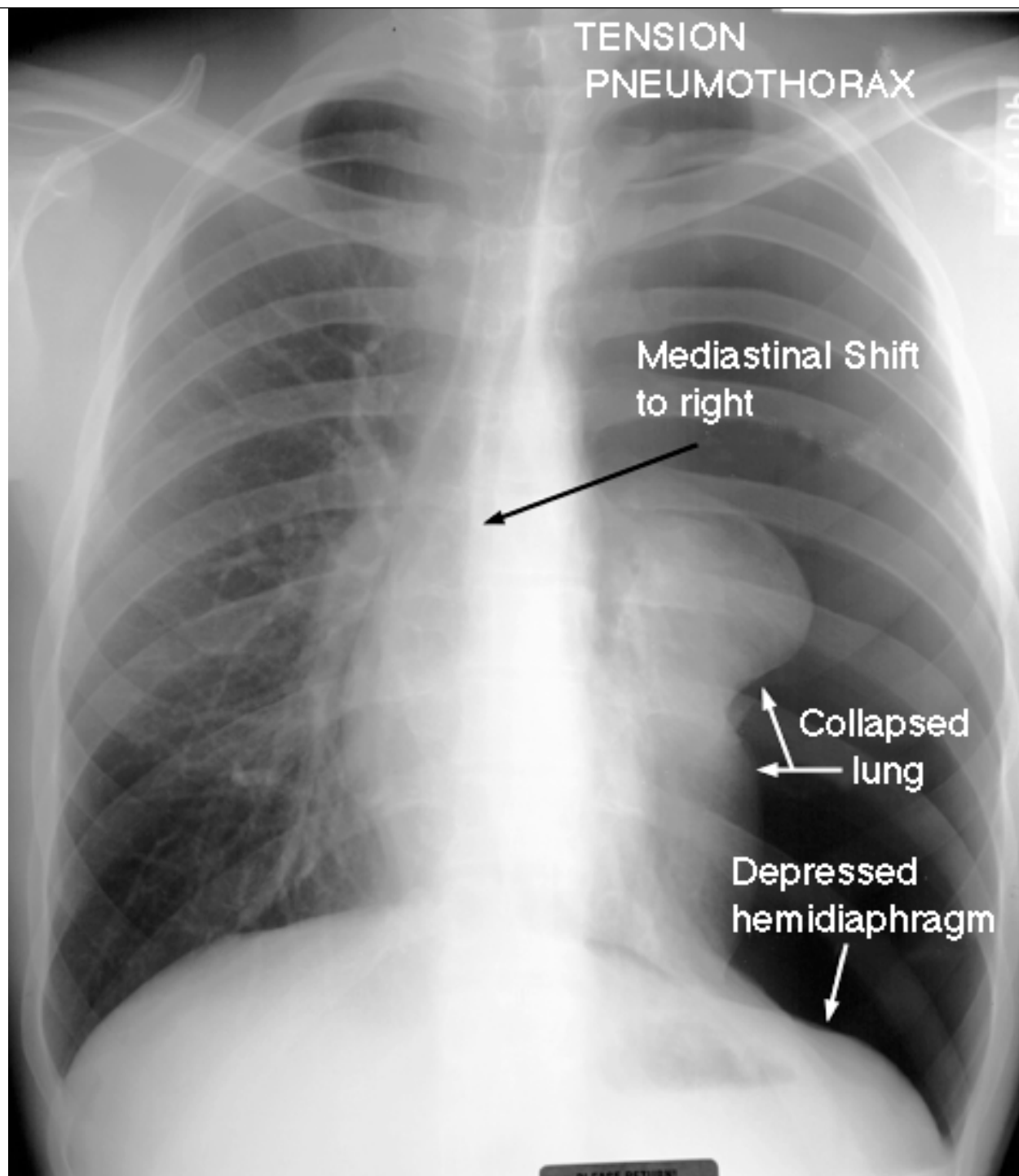
Hyperresonant  
percussion note;  
breath sounds  
or absent ↓

Shock; skin  
cold, clammy



# S/S: Tension Pneumothorax

- Dyspnea
  - Tachypnea at first
- Tachycardia
- Diaphoresis
- Diminished then absent lung sounds on the injured side
- JVD
- Hypotension
- AMS
- Cyanosis
- Diminishing LS on the unaffected side
- Tracheal Shifting

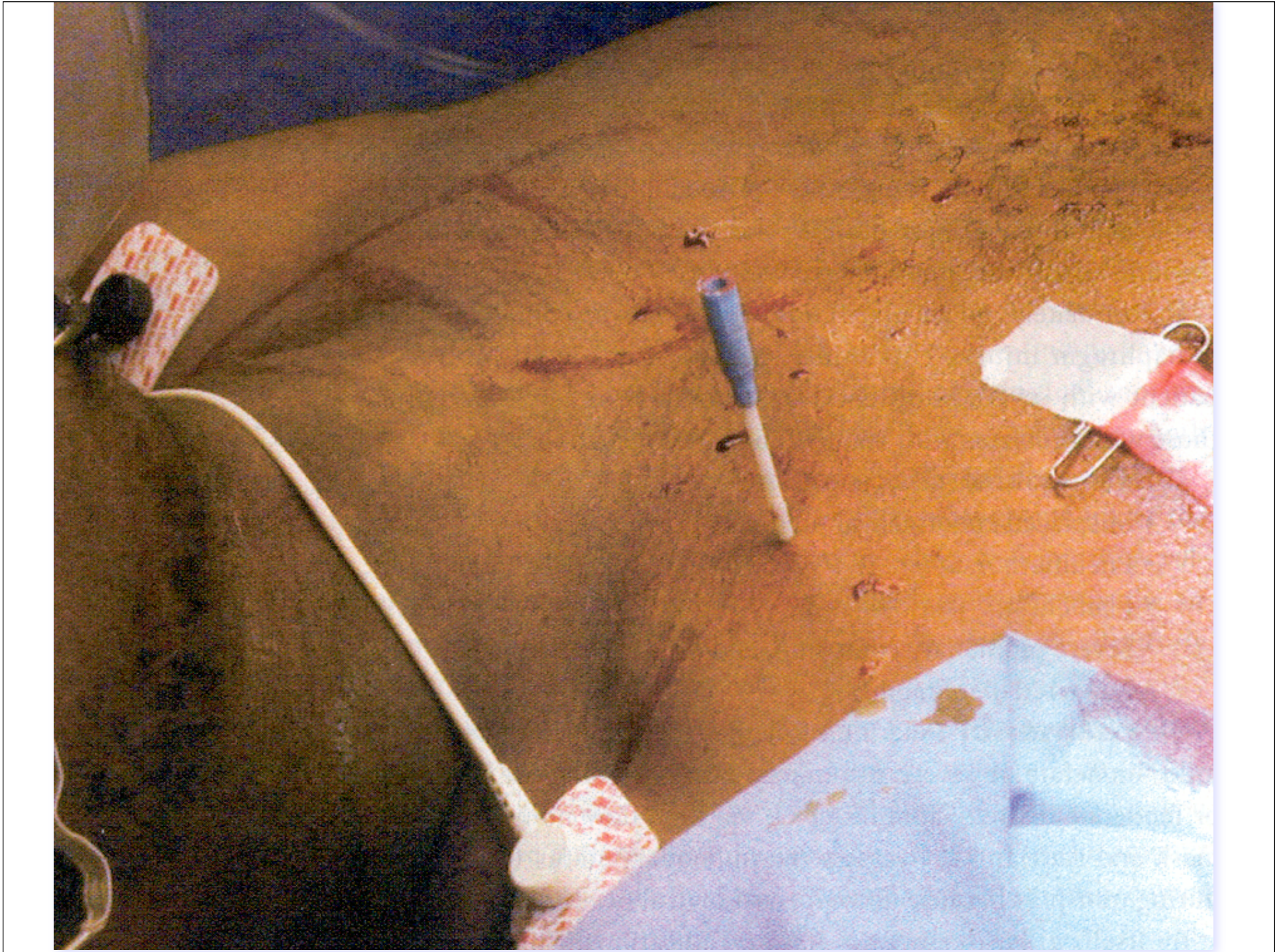






# Tx: Tension Pneumo

- Lift occlusive dressing
- PPV
- ALS/Drive fast!
- Required treatment is pleural decompression



# Quick-Case 5

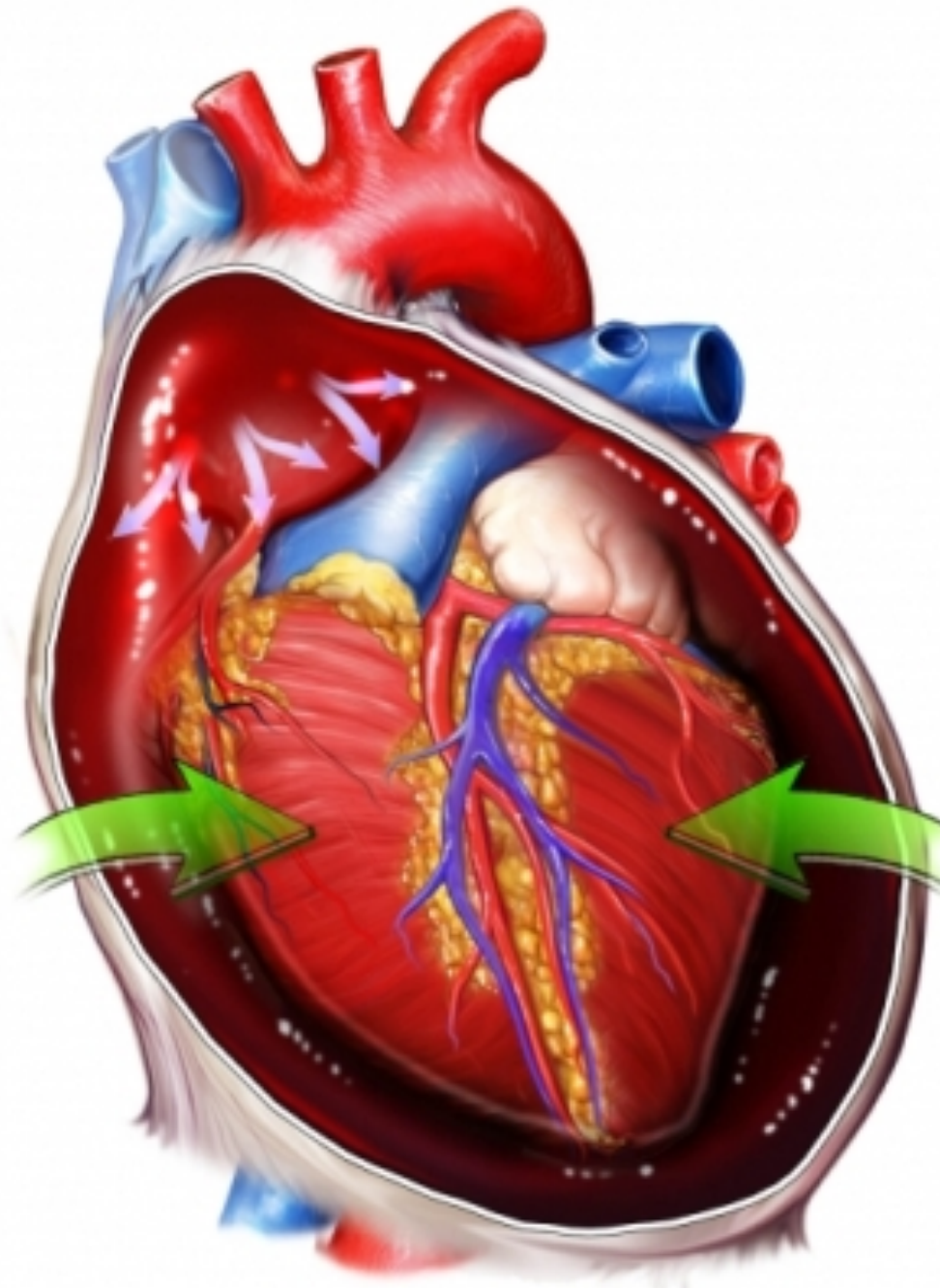
Pneumothorax - closed  
Pneumothorax - open  
Hemothorax  
Tension pneumothorax  
Pericardial tamponade  
Liver injury  
Spleen injury

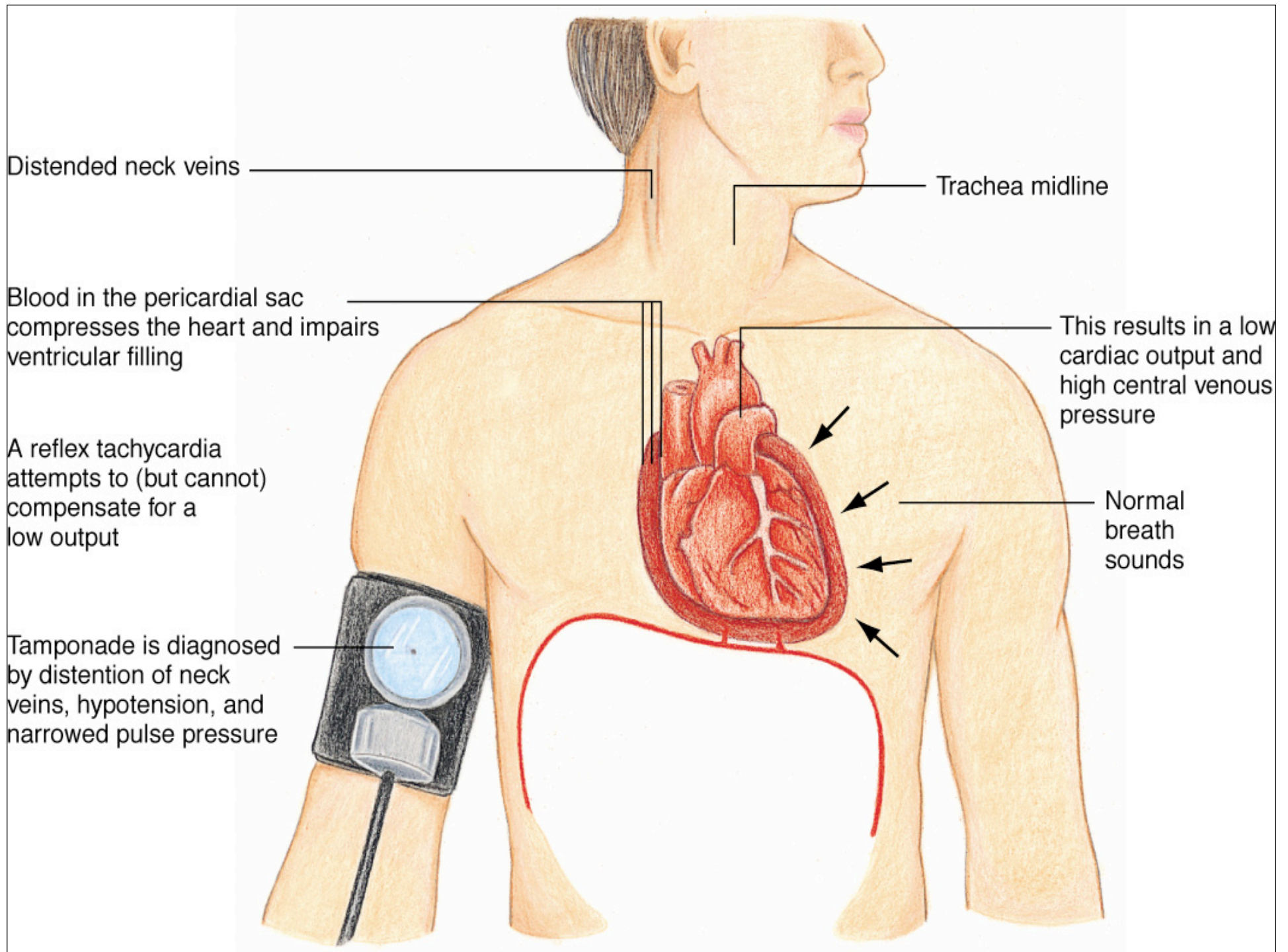
Intraabdominal injury  
Renal injury  
Flail segment  
Pulmonary contusion  
Cardiac contusion  
Fractured ribs  
Traumatic asphyxia

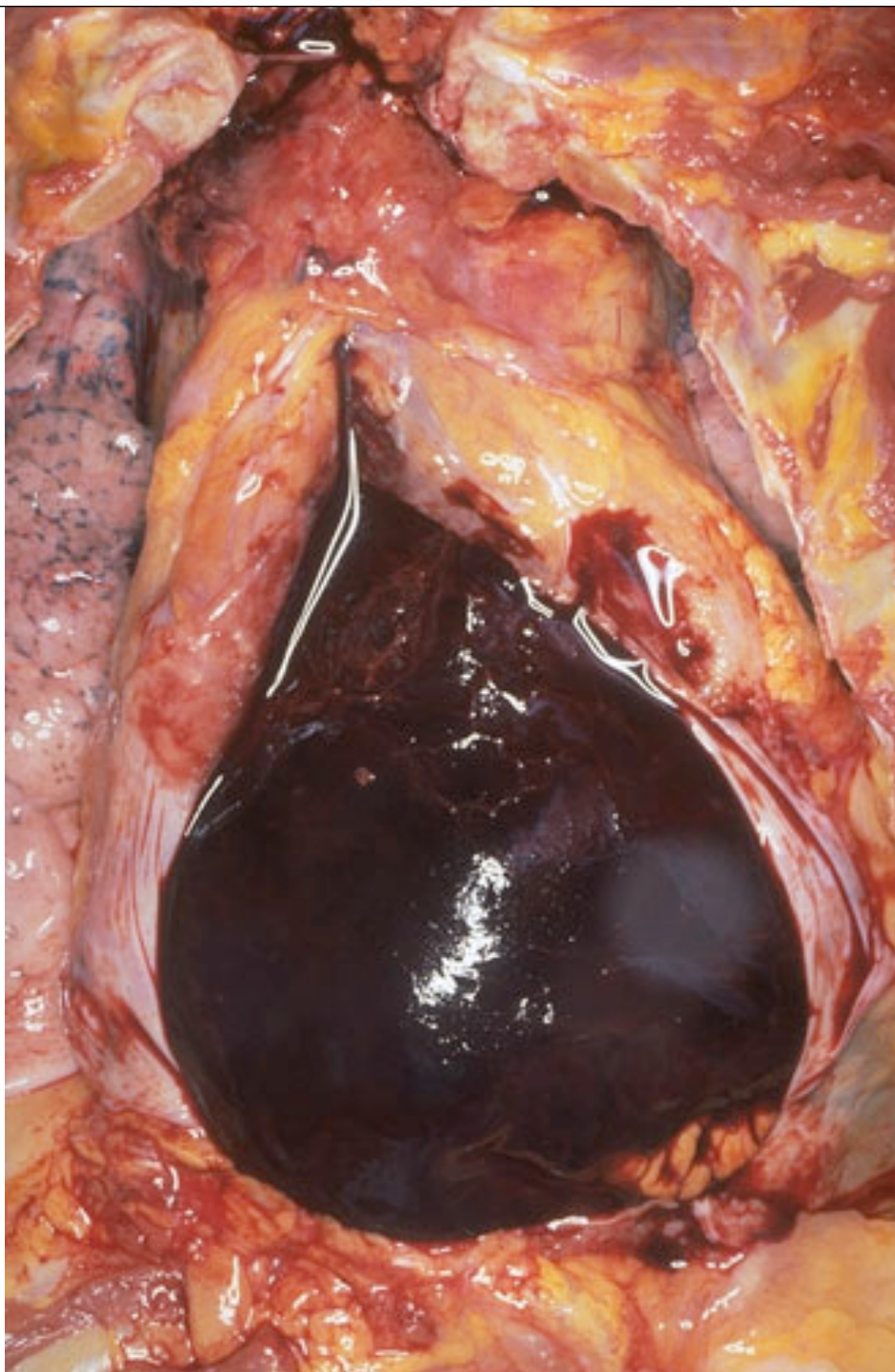


# Pericardial Tamponade

- Excessive fluid in the pericardial sac
- Rare in blunt trauma, less so in penetrating
  - 80-90% of stab wounds to heart result in tamponade
  - 20 % of gunshot wounds to heart result in tamponade
- Pericardium is inelastic
  - 50 cc of blood can compromise CO

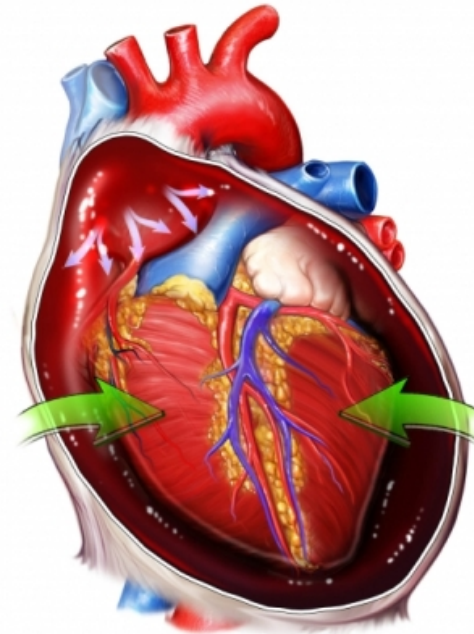






# Pericardial Tamponade: S/S

- Dyspnea
- Beck's Triad
  - JVD
  - Distant heart tones
  - Hypotension or narrowing pulse pressure
- Shock
- Pulsus Paradoxus
  - Drop in SBP  $> 10$  during inspiration



# Treatment

- Consider need for C-spine
- ABC's
  - oxygen
- Proper positioning and keep warm



# Case 6

Pneumothorax - closed  
Pneumothorax - open  
Hemothorax  
Tension pneumothorax  
Pericardial tamponade  
Liver injury  
Spleen injury

Intraabdominal injury  
Renal injury  
Flail segment  
Pulmonary contusion  
Cardiac contusion  
Fractured ribs  
Traumatic asphyxia



# Traumatic Asphyxia

- Sudden, severe crushing of chest results in retrograde blood flow
- Mortality dependant on concomitant injury
- S/S
  - Facial and upper ext/chest edema, ecchymosis, erythema, cyanosis, etc
  - Subconjunctival hemorrhage





# Treatment

- C-spine
- ABC's
  - oxygen, PPV if necessary
- Proper positioning and keep warm
- Treat associated injuries

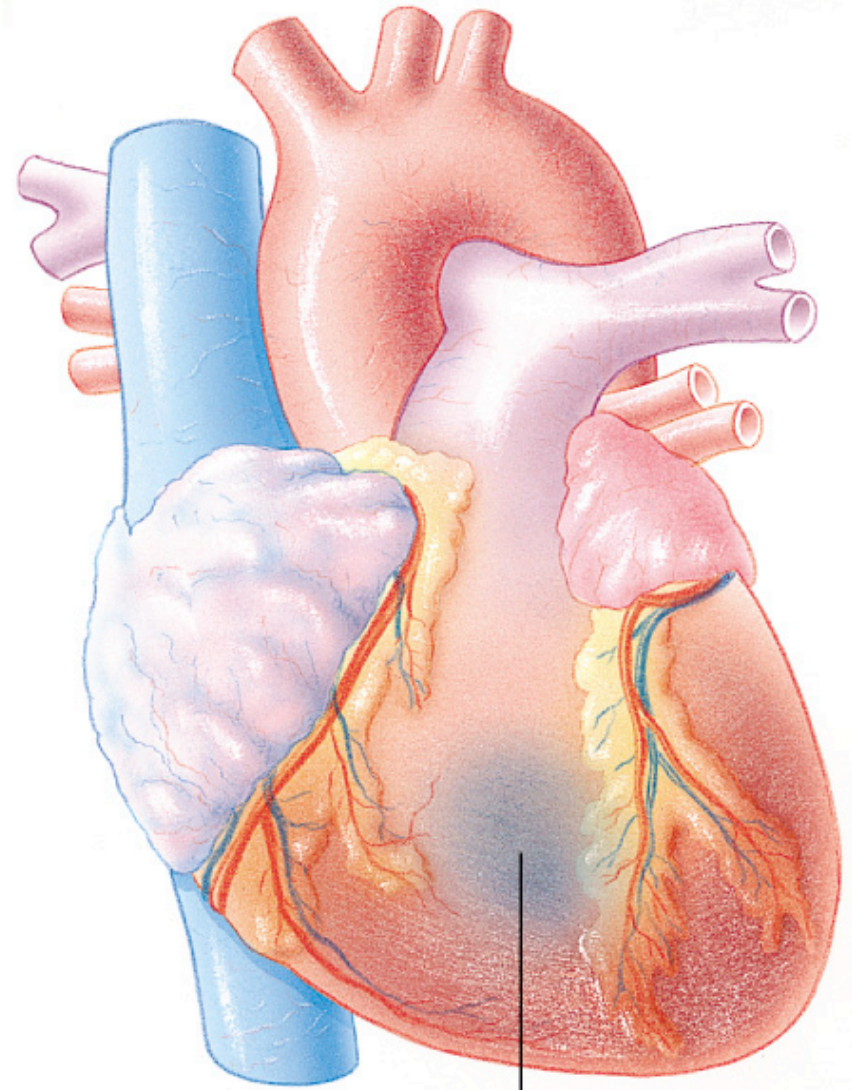
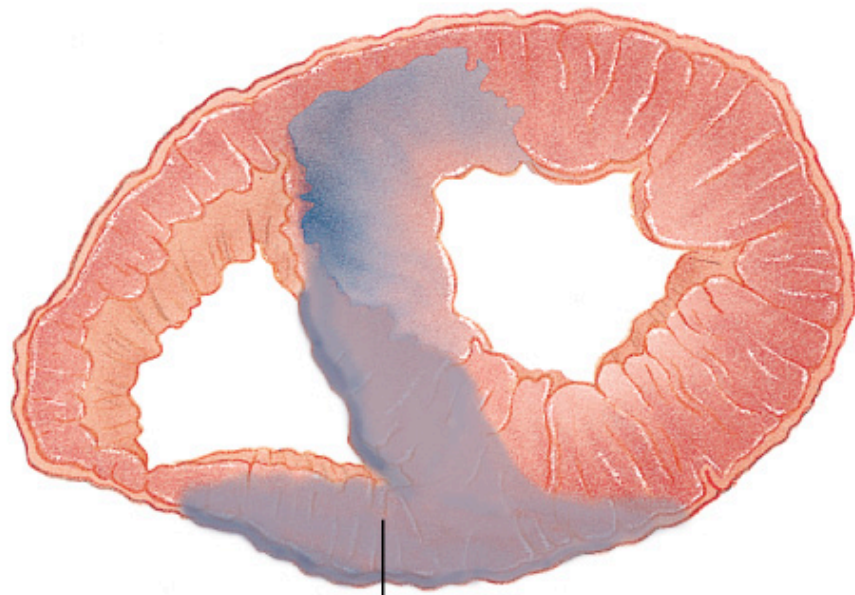
# Case 7

Pneumothorax - closed  
Pneumothorax - open  
Hemothorax  
Tension pneumothorax  
Pericardial tamponade  
Liver injury  
Spleen injury

Intraabdominal injury  
Renal injury  
Flail segment  
Pulmonary contusion  
Cardiac contusion  
Fractured ribs  
Traumatic asphyxia

# Myocardial Contusion

- BCT resulting in a bruise on the myocardium
- Morbidity = 16-76% of pts c BCT



Contusion

# Myocardial Contusion

- Right Atrium and ventricle is commonly injured
  - Conduction defects
  - Reduced strength of cardiac contractions
  - Reduced cardiac output

# Myocardial Contusion: S/S

- BCT
- Tachycardia
- Retrosternal CP, nonpleuritic, anginal in character

# Treatment

- Consider need for C-spine
- ABC's
  - oxygen
- Proper positioning and keep warm

# Case 8

Pneumothorax - closed  
Pneumothorax - open  
Hemothorax  
Tension pneumothorax  
Pericardial tamponade  
Liver injury  
Spleen injury

Intraabdominal injury  
Renal injury  
Flail segment  
Pulmonary contusion  
Cardiac contusion  
Fractured ribs  
Traumatic asphyxia

# Renal Trauma: S/S

- MOI
  - contusions, abrasions, etc
- Blood
  - from urethra
  - in urine

# Renal Trauma: Treatment

- Spinal precautions needed?
- ABC's
- Treat for shock
- Rapid transport

# Case 9

# Genitalia Trauma: Treatment

- Spinal precautions needed?
- ABC's
  - DP to stop bleeding
  - No packing of vagina in F's