Operative Exposures of the Thoracic Cavity in Trauma

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Case Presentation

- xx-year-old
- Level I Trauma Activation

- Multiple Stab Wounds
  - One in Zone I of the Neck, in midline
  - 3 on left arm into the deltoid muscle
Primary Survey

- A: Speaking, no stridor
- B: Bilateral breath sounds
- C: No major external bleeding
- D: GCS 15, moving all extremities

- Vital Signs:
- E-FAST: Absent lung sliding in right chest
Secondary Survey

- Xx stab wounds mentioned above
- No other injuries
- Right Chest tube: xxx cc, BP drops to xx/xx
- MTP Initiated
- Patient taken to OR
Operative Course

• Median Sternotomy

• Rapid bleeding with large mediastinal hematoma

• Digital control obtained

• Vascular clamp applied
Operative Course (Continued)

- PEA arrest
- Pericardiotomy
- Open Cardiac Massage for $xx$ minutes
- Vital signs return
Massive transfusion protocol continued

Patient remained hypothermic, coagulopathic

After 3 hours, left chest tube/mediastinal tube output >2 liters

Patient taken back to OR
Overview

- Background
- Review of Anatomy
- Diagnosis (Suspicion)
- Surgical Approaches
Things We Won’t Talk About

- Penetrating Neck Trauma
- Management Approaches to Thoracoabdominal Wounds
- Debate About Utility of Resuscitative Thoracotomy
- How to Fix Stuff
Background

- 3000 B.C. – Reports of Thoracic Trauma in Edwin Smith Surgical Papyrus
Background

- 760 B.C. – *Iliad*
- “Full on his breast the Trojan arrow fell, but harmless bounded from the plated steel.”
- Soldiers treated in barracks – First Trauma Centers

“*Achilles Slays Hector*” – Peter Paul Rubens
Background

• **400 B.C.** – Hippocrates discusses drainage of empyema
  • On post-procedure day #10, would instill a mix of warm wine and oil into the pleural cavity

• **200 A.D.** – Galen
  • Various reports of managing gladiator injuries
Background

• 1535 – Cabeza de Vaca removes arrowhead from the chest of a Native American

Background

- 1926 – Dshanelidze reports first aortic repair
- 1934 – Blalock first reports aortic repair in US
Are you awake?

Of course! I don't sleep! What's up?

Got a guy stabbed in the chest. BP 40/20, HR 140's. Doesn't look good...

Stop texting me and get him to the OR!!!
What are the vitals?

Where are the holes?

What kind of workup do I have time to obtain?
Diagnosis

• E-FAST

• Chest X-Ray

• CT Chest with IV Contrast (CTA/CTV)

• Swallow

• Endoscopy
Surgical Approaches

- Left Anterolateral Thoracotomy
- Right Anterolateral Thoracotomy
- Clamshell Thoracotomy
- Right Posterolateral Thoracotomy
- Left Posterolateral Thoracotomy
- Median Sternotomy
  - +/- Neck Extension
- Trap Door
- Supraclavicular Incision
Left Anterolateral Thoracotomy
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Left Anterolateral Thoracotomy

- Supine Position

- Left 4th intercostal space
  - 3rd to control proximal subclavian artery

- Most common in resuscitative thoracotomy

- Can be extended into clamshell
Left Anterolateral Thoracotomy

- **Rapid Access**

- **Structures Encountered:**
  - Heart
  - Left Lung
  - Left Subclavian Artery
  - Descending Aorta
  - Pulmonary Hilum
Right Anterolateral Thoracotomy
Right Anterolateral Thoracotomy

- Supine Position
- Mainly used as part of Clamshell
- Structures Encountered:
  - Right Lung
  - SVC
  - IVC
  - Right Subclavian Artery
Clamshell Thoracotomy
Clamshell Thoracotomy
Right Posterolateral Thoracotomy
Right Posterolateral Thoracotomy

- Pericardium
- Esophagus
- Intercostal V
- Azygos vein
- Thoracic Spine
Right Posterolateral Thoracotomy

- Left lateral decubitus position (right side up)
- Incision below scapula
- Structures encountered:
  - SVC
  - IVC
  - Azygous vein
  - Esophagus
  - Right lung and hilum
  - Trachea
  - Left mainstem bronchus
Left Posterolateral Thoracotomy
Left Posterolateral Thoracotomy

- Right lateral decubitus position (left side up)

- Incision below scapula

- Structures encountered:
  - Descending aorta
  - Distal esophagus
  - Left pulmonary hilum
Median Sternotomy
Median Sternotomy
Median Sternotomy

- Supine Position
- Incision in midline
- Structures encountered:
  - Heart
  - Ascending aorta and arch
  - Pulmonary artery, vein
  - Innominate artery, vein
  - Proximal neck vessels
Median Sternotomy

Extension into neck

Extension into abdomen
Supraclavicular
Supraclavicular
Questions? www.downstatesurgery.org