This Talk Will Employ Audience Response

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Today’s Talk

• General principles of reading chest radiographs will not be covered due to time limitations

• The goal will be to cover radiology findings that will affect management during the night or while on-call.

• Additional chest radiology resources are available:
  https://courses.washington.edu/med610/radiology
A Case

You put a central line into a 24 year-old woman with Down’s Syndrome and sepsis. The line goes in smoothly with no problems threading the wire or passing the catheter. You order a post-procedure chest radiograph which shows the following:
Her Chest Radiograph
After Reviewing The Chest Film, What Should You Do Next?

1. Tell the nurse it’s okay to use the line
2. Order a blood gas off the line and the wrist
3. Remove the line
4. Ask vascular surgery to pull the line
5. Ask IR to help confirm line position

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After Reviewing The Chest Film, What Should You Do Next?

1. Tell the nurse it’s okay to use the line
2. Order a blood gas off the line and the wrist ★
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4. Ask vascular surgery to pull the line
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Issue 1:
Lines and Tubes
Where Your Triple Lumen Catheter Tips Should Be

Caval-atrial Junction
Can You Use This Line?

Right Internal Jugular Line
Can You Use This Line?

1: Yes
2: No

Situs Inversus
Determining If The Line Is In the Artery Or Vein

- Draw simultaneous blood gases off the central line and the radial artery and compare the results.
- Transduce a pressure waveform (best done during line placement before the guidewire is inserted).
Feeding Tube Positioning

- Midline Course
- Below Diaphragm
- Heads left first then goes right
- Tip points away from G-E junction

Gastric versus duodenal placement does not change risk of aspiration
An Example Of Bad Feeding Tube Placement

Tip loops back into the esophagus
Endotracheal Tubes

Tip below the clavicles (or < 6 cm above the carina)

Tip 2-4 cm above the carina
A Case

A 36 year-old woman with a history of unprotected intercourse with multiple partners and injection drug use presents with a sudden worsening of dyspnea that had been developing, along with a dry cough, over a three week period.
The Chest Film
After Reviewing The Chest Film, What Should You Do Next?

1. Consult pulmonary for bronchoscopy
2. Order a CT pulmonary angiogram
3. Order an upright chest radiograph
4. Start ceftriaxone and azithromycin
5. Start oseltamivir
After reviewing the chest film, what should you do next?

1. Consult pulmonary for bronchoscopy
2. Order a CT pulmonary angiogram
3. Order an upright chest radiograph
4. Start ceftriaxone and azithromycin
5. Start oseltamivir
Issue 2:
Air That Should Not Be There
Some Pneumothoraces Are Obvious
Some Are Less Obvious

If Unsure: expiratory films, non-contrast CT or ultrasound
Pneumothorax Can Look Different In Supine Patients

To confirm the presence of pneumothorax: repeat the film with the patient in an upright position.
What’s Wrong In This Chest Radiograph?

Pneumomediastinum
What’s Wrong In This Chest Radiograph?

Pneumopericardium
What’s Wrong In This Film?

Pneumoperitoneum

Generally denotes an abdominal emergency (i.e., call the surgeons!)

Can be seen following PEG placement or laparoscopic surgery
A Case

A 62 year-old man with a long-standing smoking history presents with severe dyspnea over two days duration. He denies fevers but notes the presence of productive cough. He has never had pulmonary function testing. His exam is noteworthy for scattered expiratory wheezes and decreased breath sounds over the right upper lung zone.
His Chest Film
After Reviewing The Chest Film, What Should You Do Next?

1. Order a contrast-enhanced Chest CT
2. Order lateral decubitus films
3. Perform right-sided tube thoracostomy
4. Start IV ceftriaxone and azithromycin
5. Start IV steroids
After Reviewing The Chest Film, What Should You Do Next?

1. Order a contrast-enhanced Chest CT
2. Order lateral decubitus films
3. Perform right-sided tube thoracostomy
4. Start IV ceftriaxone and azithromycin
5. Start IV steroids
Issue 3:
Lobar and Whole Lung Collapse
Features Of Lung Or Lobar Collapse On Chest Films

- Tracheal deviation *TOWARD* the collapse
- Mediastinal shift *TOWARD* the collapse
- Elevated hemidiaphragm
- Decreased vascular markings on side of collapse
- Opposite lung herniates across midline
- Hilar mass or other evidence of cancer
The Unilateral Lung Whiteout

Differential Diagnosis
Massive pleural effusion
Whole lung collapse
Distinguishing Lung Collapse From Big Effusions

In whole lung collapse, the trachea and mediastinal structures deviate *towards* the opacified side whereas in very large effusions they may move *away* from the opacified side of the chest.
Right Middle Lobe Collapse On PA Or AP Films

Opacity over the right heart border
Right Middle Lobe Collapse On A Lateral Film

The dashed lines show the normal middle lobe borders. The thin sliver of opacity is the collapsed middle lobe.
Right Lower Lobe Collapse On PA Or AP Films

- Medial portion of right diaphragm is obscured (orange)
- Increased lucency over lower right part of chest (yellow)
- Extra shadow near right side of heart (black)
Right Upper Lobe Collapse On PA Or AP Films

- Opacity over superior right chest
- Tracheal deviation to the right (←)
- Upward and medial shift of minor fissure
Left Upper Lobe Collapse On PA On AP Films

- Hazy opacity over superior aspect of left chest
- The opacity silhouettes the left upper heart border (black arrow)
- Trachea and heart deviate to the left
Left Lower Lobe Collapse On PA Or AP Films

Triangular opacity within the cardiac shadow (arrows)

Obscured left hemidiaphragm

Trachea and heart shift to the left
A Case

A 55 year-old man presents with increasing dyspnea and left-sided pleuritic pain one day after he fell off his horse. A chest radiograph is obtained with him in the semi-recumbent position.
His Chest Radiograph
After Reviewing The Chest Film, What Should You Do Next?

1. Order a Chest CT
2. Order lateral decubitus radiographs
3. Start him on ampicillin/sulbactam
4. Perform a diagnostic thoracentesis
5. Consult the pain service for an epidural catheter
After Reviewing The Chest Film, What Should You Do Next?

1. Order a Chest CT
2. **Order lateral decubitus radiographs**
3. Start him on ampicillin/sulbactam
4. Perform a diagnostic thoracentesis
5. Consult the pain service for an epidural catheter
Issue 4: Pleural Effusions
The Lung Does Not Always Extend To The Chest Wall

This is called “Pleural Separation.” It denotes that fluid, a mass, or other material are in the pleural space.
The Classic Appearance Of A Pleural Effusion

- Meniscus Sign (----)
- Homogeneous appearance with no lung markings seen in the opacity
- Obscures the hemi-diaphragm and (often) heart border
A Less Classic Appearance: Loculated Effusion
The Layering Effusion in Supine Patients

- In supine patients, fluid layers behind the lung
- The effusion appears as greater unilateral opacification *without* silhouetting the lung vessels
- Can confirm with upright or decubitus film or bedside ultrasound
A Case

A 65 year-old man is admitted for an evaluation of chest pain. His ECG and serial cardiac enzymes were negative. You are called to see him at night because he is having more chest pain. His oxygen saturation is 92% on ambient air. You review the chest radiograph from the ED.
His Chest Radiograph
After Reviewing The Chest Film, What Should You Do Next?

1. Administer intravenous furosemide
2. Start intravenous levofloxacin
3. Order a stat echocardiogram
4. Order a CT aortogram
5. Order a CT pulmonary angiogram
After Reviewing The Chest Film, What Should You Do Next?

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2. Start intravenous levofloxacin
3. Order a stat echocardiogram
4. Order a CT aortogram
5. Order a CT pulmonary angiogram
Let’s Review The Chest Radiograph
Issue 5:
Chest Pain Radiographs You Should Not Miss
The Normal Aorta

- The aortic arch should:
  - Be left of midline
  - Not be too prominent
- The aorta should follow a relatively straight course to the abdomen
- The descending aorta may arc leftward in elderly patients ("ectatic aorta")
Examples Of Aneurysms and Dissections

Dissections and aneurysms can look alike. Clinical history and CT imaging are needed to differentiate.
65 year-old man with chest pain 3 days after a fall

The Diagnoses:
Subcutaneous air (likely pneumothorax)
55 year-old woman
back pain,
dyspnea, fever
Don’t Forget To Look At The Retrocardiac Space!
Back to the film...
Thank You!!!

Best of Luck With Internship!