Chest Radiology Case Studies

AAPA

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REVIEW A NORMAL CT CHEST LUNG WINDOWS

- NORMAL CT CHEST
- STEPS WHEN REVIEWING IMAGING:
- TYPE OF EXAM / IMAGE
- CLINICAL HISTORY
- COMPARISON (IF AVAILABLE)
- TECHNIQUE
- FINDINGS
- IMPRESSION
-

2

Case 1

- Patient with known tracheostomy has sudden onset shortness of breath and acute hypoxemia

Steps:

- TYPE OF EXAM / IMAGE
- CLINICAL HISTORY
- COMPARISON
- TECHNIQUE
- FINDINGS
- IMPRESSION

- What is in your differential diagnosis?

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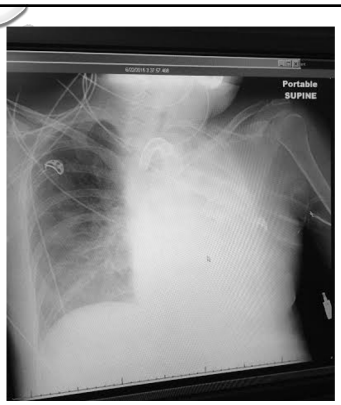

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Case 1

- **DESCRIPTION:**
- DIFFUSE OPACITY OF LEFT LUNG
- LOSS OF COSTOPHRENIC ANGLE ON LEFT
- TRACHEOSTOMY NOTED
- EKG WIRES
- PATIENT APPEARS ROTATED

- **DIFFERENTIAL DIAGNOSIS:**
- LARGE LEFT PLEURAL EFFUSION
- LEFT PNEUMONIA / INFILTRATE
- COMPRESSED ATELECTASIS D/T MUCOUS PLUGGING
- S/P PNEUMONECTOMY

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Case 2

- PATIENT PRESENTS TO ER WITH SEVERE ABDOMINAL PAIN AND BLOATING.

- LOOK AT THE CXR AND DESCRIBE WHAT YOU SEE:

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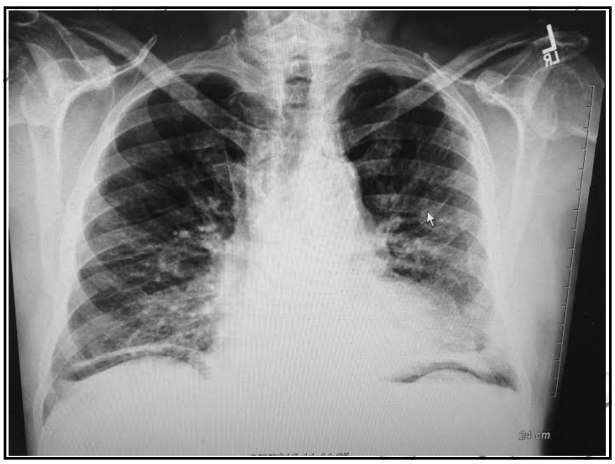

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Case 2

- ENLARGED CARDIAC SILHOUETTE
- BIBASILAR INFILTRATES OR ATELECTASIS
- FREE AIR UNDER BOTH RIGHT AND LEFT HEMI-DIAPHRAGMS

MAKE THE DIAGNOSIS:

PNEUMOPERITONEUM

DIFFERENTIAL DIAGNOSIS: PERFORATED VISCUS/ULCER, S/P LAPAROTOMY/LAPAROSCOPIC SURGERY, BOWEL INJURY AFTER EDG/COLONOSCOPY, RUPTURED DIVERTICULUM

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Case 3

- PATIENT IS A 35 YO MALE WHO HAS BEEN FOLLOWED BY HIS PRIMARY CARE MD FOR CHRONIC PROGRESSIVE SOB AND RECURRENT "CHEST" INFECTIONS OVER THE PAST SEVERAL YEARS. HE WAS REFERRED TO THE PULMONOLOGIST'S OFFICE, WAS FOUND TO BE ACUTELY HYPOXIC, ADMITTED TO THE HOSPITAL AND HAD CXR DONE.
- TAKE A LOOK AT THE CXR AND DESCRIBE IT:

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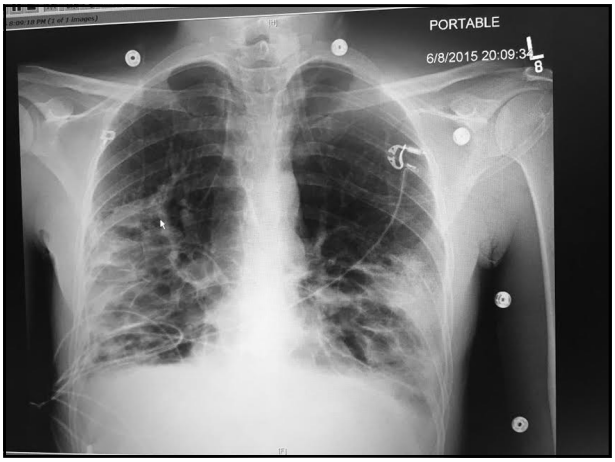

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Case 3

- CXR SHOWS BIBASILAR PATCHY INFILTRATES VS SCARING AND POSSIBLY CAVITARY MASSES/NODULES
- HYPERINFLATION
- EKG WIRES

CT CHEST WAS ORDERED FOR FURTHER EVALUATION:

REVIEW AND DESCRIBE

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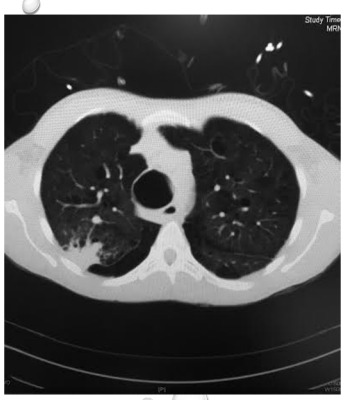

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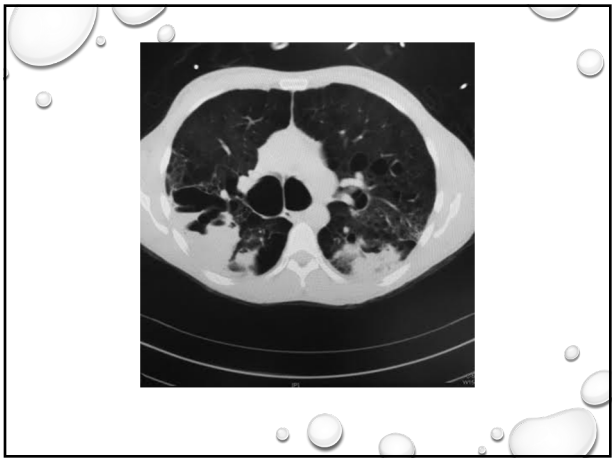

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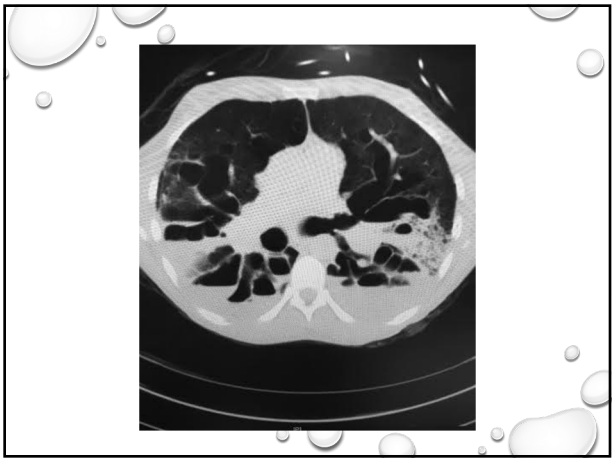

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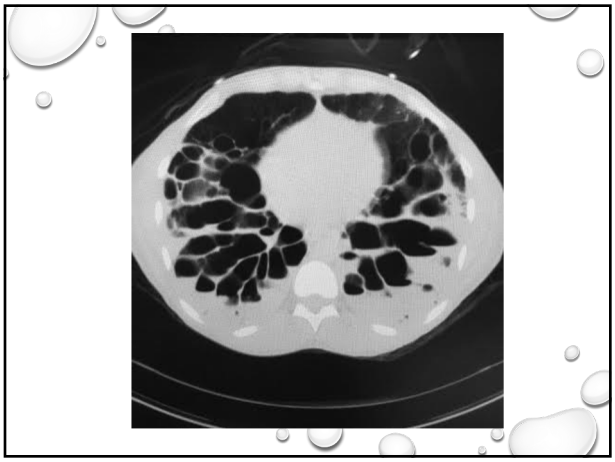

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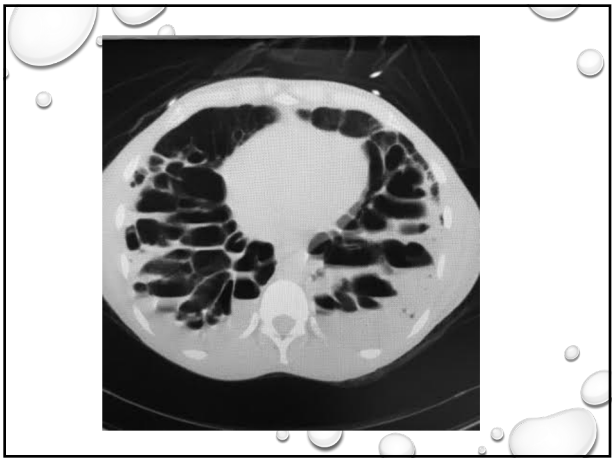

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Case 3

- DESCRIPTION OF THE CT CHEST:
  - Very enlarged/ dilated trachea and right/left main-stem bronchi
    - Tracheomegaly
  - Small right pleural effusion/ fluid in the fissure
  - Multiple areas of cystic bronchiectasis
    - Worse at bases
  - Bibasilar infiltrates
  - Air fluid levels in the cysts or dilated bronchi (concerning for infection)

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Case 3

- MOUNIER – KUHN SYNDROME
  - Tracheobronchomegaly
  - Often times found in middle age men
  - Idiopathic / rare
- WHAT DO YOU SEE ON CT:
  - Atrophy of elastic fibers / smooth muscle within the wall of the trachea and main bronchi causing dilatation
  - Bronchiectasis / tracheal diverticulosis
  - Trachea > 3 cm diameter(measure 2 cm above aortic arch)
- CHRONIC / RECURRENT PULMONARY INFECTIONS
  - Can be similar to bronchiectasis/ COPD

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Case 4

- PATIENT HAD CXR AND WAS FOUND TO HAVE A FOREIGN BODY ON THE FILM
- LOOK CLOSELY AT THE CXR:
- WHAT IS THE FOREIGN BODY?
- WHERE IS IT?
- WHERE SHOULD IT BE?

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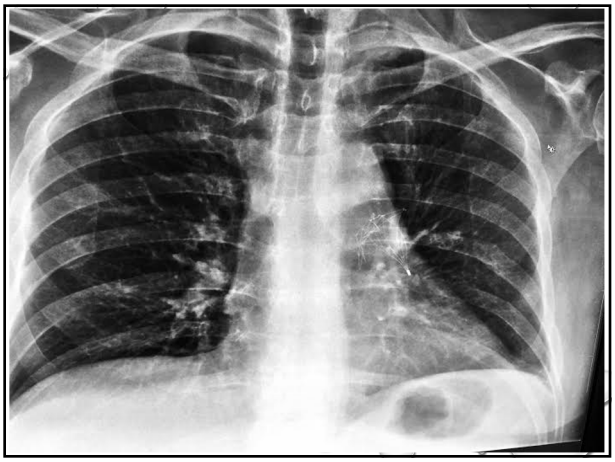

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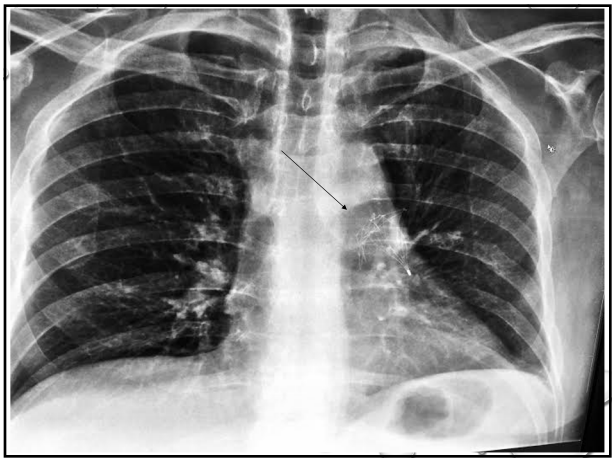

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Case 4

- WHAT IS THE FOREIGN BODY?
  - IVC filter
- WHERE IS IT?
  - Left pulmonary artery
- WHERE SHOULD IT BE?
  - Inferior Vena Cava

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Case 5

- CACHETIC APPEARING MALE PRESENTS TO THE HOSPITAL WITH OCCASIONAL BLOODY SPUTUM AND FEVERS. HE HAS KNOWN RENAL CELL CANCER BUT HAS NOT BEEN COMPLIANT WITH MEDICAL TREATMENT. HE HAS A HISTORY OF SMOKING AND ETOH ABUSE.
- HERE IS HIS CXR, PLEASE DESCRIBE IT

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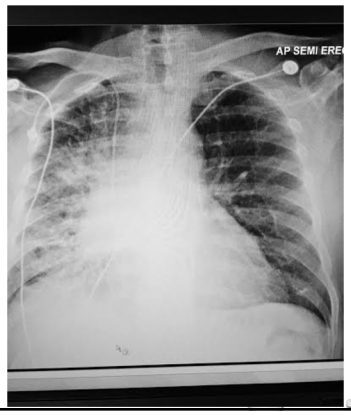

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Case 5

- DESCRIPTION OF CXR:
  - Large right hilar/mediastinal mass with infiltrate
  - Right sided port
  - Volume loss on right side
  - EKG wires
  - Next step . . . CT chest
  - Concerning for progressive cancer, post-obstructive pneumonia

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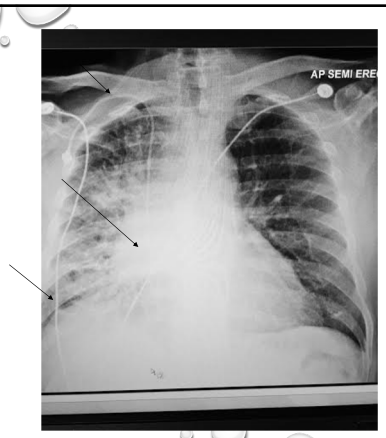

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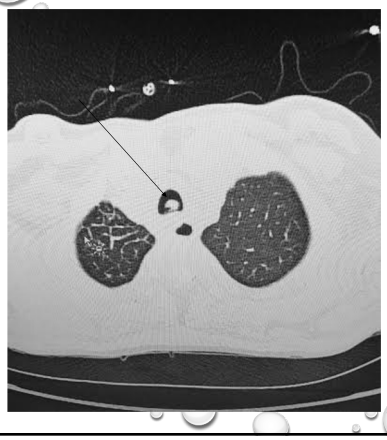

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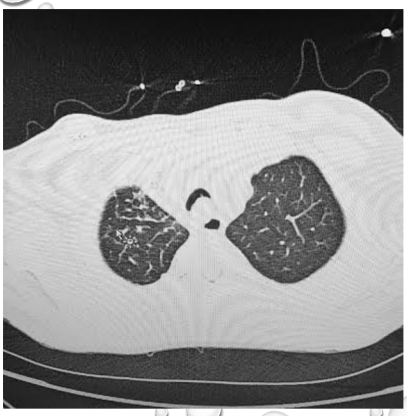

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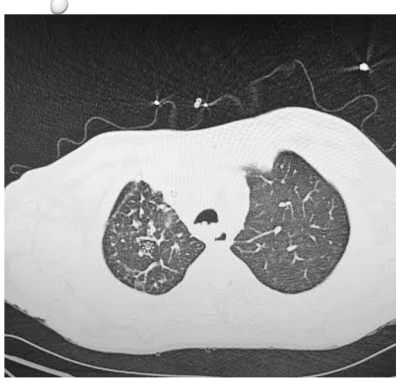

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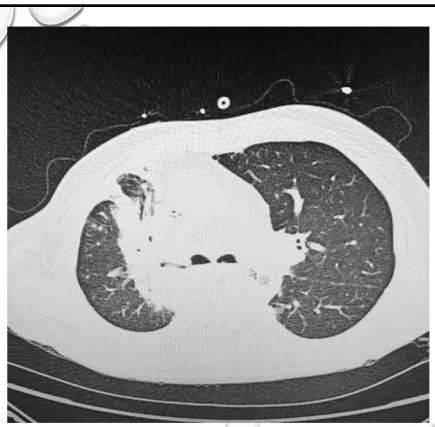

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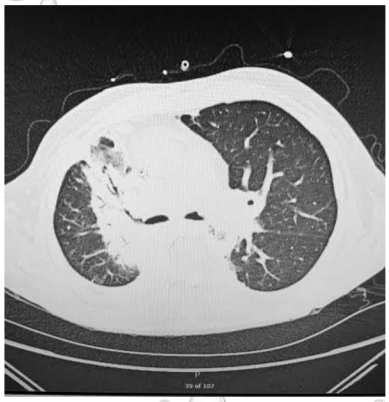

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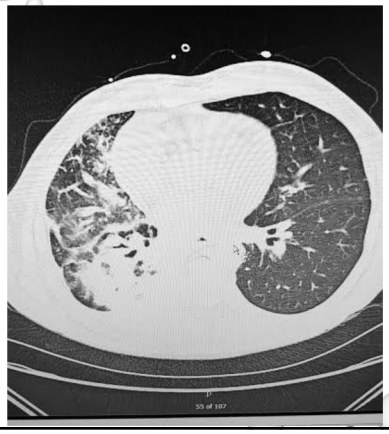

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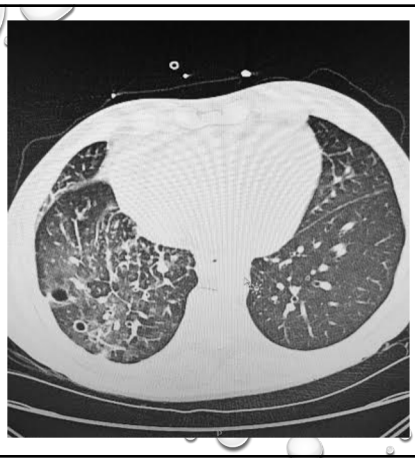

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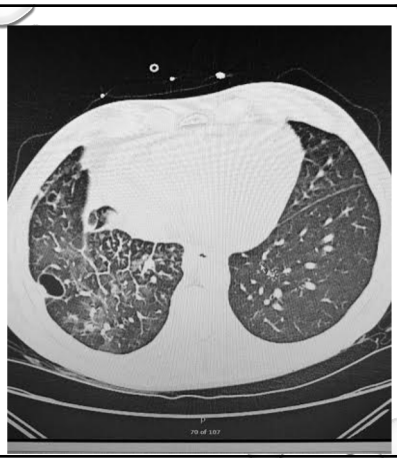

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Case 5

- DESCRIBE THIS CT CHEST:
  - Lesion or mucus in trachea
  - Volume loss of right lung
  - Air bronchograms right lung
  - Small areas of cavitation / cystic lesions
  - Bronchiectasis
  - Dense right opacity RUL and RML
  - Emphysematous changes
  - What would be the next step . . . .

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Case 5

- BRONCHOSCOPY
  - Inspect the airway (d/t leison on CT and hemoptysis)
  - Transbronchial biospy (TBBX) and washings / brushing
    - Looking for malignancy / infection
    - What was seen???

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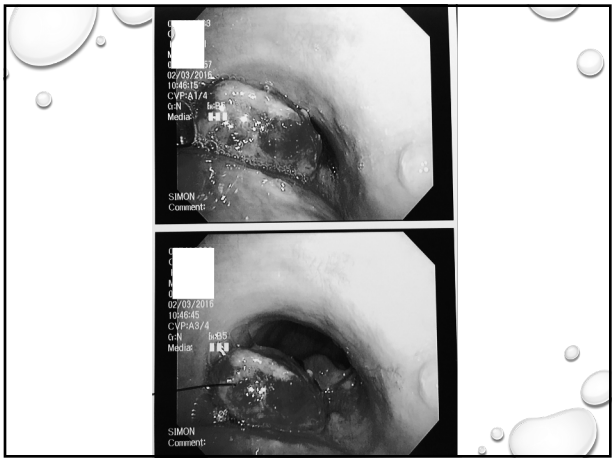

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Case 6

- PATIENT IS A MIDDLE AGED MALE WHO PRESENTS TO ED WITH CHRONIC COUGH, SOB AND OCCASIONAL SPUTUM PRODUCTION. HE ADMITS TO "FEELING HOT" AT NIGHT
- DESCRIBE THE CXR AND FORMULATE A DIFFERENTIAL DIAGNOSIS:

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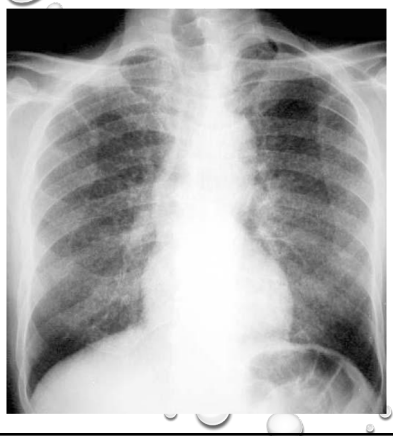

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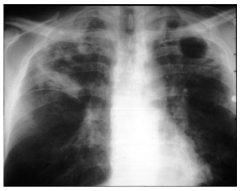
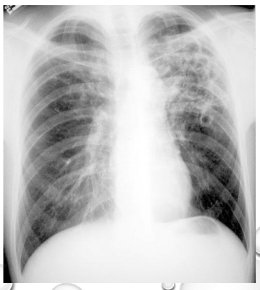
Examples of TB





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Case 6

- DESCRIPTION:
  - Diffuse nodular infiltrates
  - Fullness of the hilar region
  - Mild hyperinflation
  - Gastric air bubble
- DIFFERENTIAL DIAGNOSIS:
  - Miliary TB
  - Pneumocystis jiroveci pneumonia
  - Metastatic disease to lungs
  - Atypical pneumonia
  - Pulmonary fibrosis

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Case 7

- PATIENT PRESENTS TO THE OFFICE WITH PROGRESSIVE SOB AND DYSPNEA. ADMITS TO 10 LB. WEIGHT GAIN OVER THE PAST FEW DAYS AND SOME "SWELLING" IN THE LEGS. DURING THE EXAM PATIENT IS EATING A BAG OF CHIPS.
- PATIENT LATER ADMITS TO RUNNING OUT OF "WATER PILL"
- DESCRIBE THE CXR:
- WHAT IS THE DIFFERENTIAL DIAGNOSIS:

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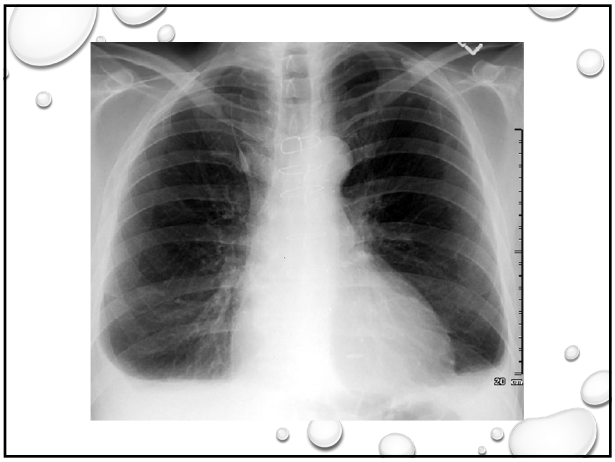

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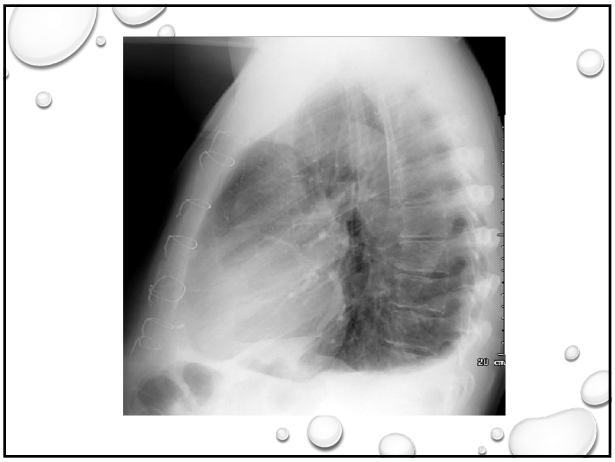

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Case 7

- DESCRIBE THE CXR:
  - Blunting of BOTH costophrenic angles consistent with bilateral small pleural effusions
  - Mediastinal wires
  - Mildly enlarged heart / cardiomegaly
- DIFFERENTIAL DIAGNOSIS:
  - Bilateral small pleural effusions
    - Likely d/t volume overload from non compliance with medication
    - Not large enough for thoracentesis

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Case 8

- ELDERLY FEMALE UNDERWENT CT CHEST
  - EXTENSIVE SMOKING HISTORY

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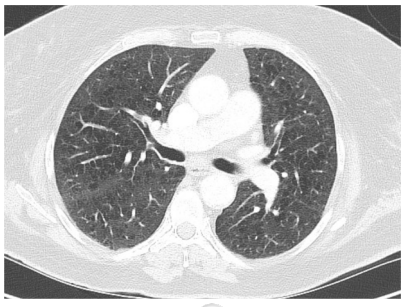
Case 8



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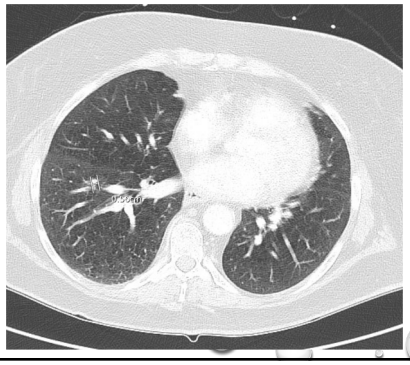
Case 8



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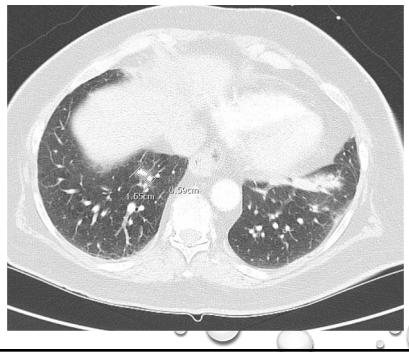

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Case 8

- CT FINDINGS:
  - MODERATE TO SEVERE CENTRILOBULAR EMPHYSEMA. THERE IS BILATERAL LOWER LOBE CONSOLIDATION. THERE IS A COMPONENT OF CONSOLIDATION IN THE RIGHT LOWER LOBE WHICH IS MORE IRREGULAR APPEARING MEASURING ABOUT **1.7 X 0.6 CM** PREVIOUSLY NODULAR OPACITY WAS SUGGESTED ON THE PRIOR CHEST CT. THERE IS A **6 MM NODULE** IN THE RIGHT LOWER LOBE

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Case 8

- IRREGULAR APPEARING
- PATIENT AT HIGH RISK
- NEXT STEP:
  - PET SCAN: HYPERMETABOLIC
  - CT GUIDED BX:
    - ADENOCARCINOMA
  - SURGICAL CANDIDATE??
    - NO BASED ON SPIROMETRY
      - FEV1 38%

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Case 8

- 6 MONTHS LATER PATIENT DEVELOPED WORSENING SOB / DYSPNEA
- FOLLOW UP CXR AND CT

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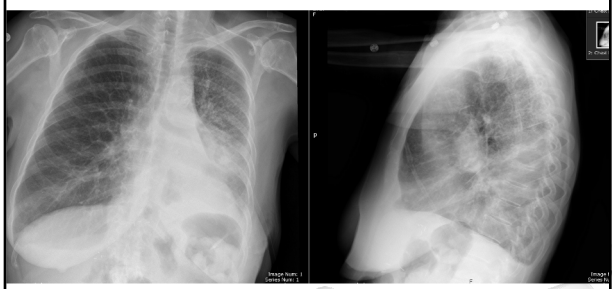
Case 8



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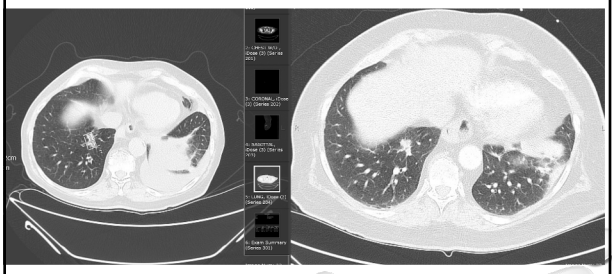
Case 8



most recent CT on left

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Case 8

- PATIENT UNDERWENT LEFT THORACENTESIS
- LEFT THORACENTESIS 3/23 - REACTIVE MESOTHELIAL CELLS / NO MALIGNANT CELLS
- ATYPICAL CELL CLUSTERS: REACTIVE MESOTHELIAL CELLS VERSUS OTHERS. RECOMMEND CYTOLOGIC STUDY TO RULE OUT NEOPLASM.
-

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Case 9

- 27 YO FEMALE WITH PMHX: AVR 5 YEARS AGO PRESENTS WITH SYNCOPE AND WORSENING SOB.
- HAD BEEN IN A MVA 1 DAY PTA.
- IN THE ER PT. WAS FOUND TO BE CYANOTIC WITH AGONAL RESP.
- VS: HR 130-140, BP: 240/140, R: 8
- PATIENT WAS INTUBATED.
- LABS: 7.34/43/81 ON AC VENT., BNP 1251, INR 1.95

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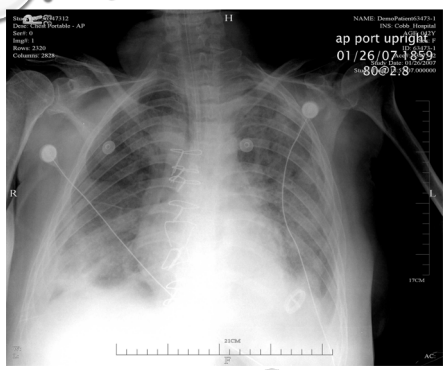

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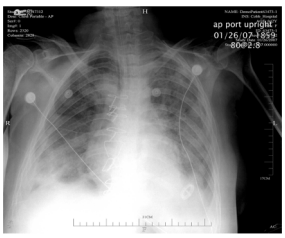
Case 9



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Case 9

- WHAT DO YOU SEE ON THE CHEST X-RAY?
  - Flash pulmonary edema
  - What is the cause?
- WHERE IS THE AORTIC VALUE?
  - Trauma from the MVC dislodged her aortic valve
- SHE WAS TAKEN TO AN OUTSIDE HOSPITAL FOR EMERGENT CT SURGERY

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Case 10

- ELDERLY FEMALE PATIENT PRESENTS TO ED WITH SOB AND DYSPNEA. PMHX IS SIGNIFICANT FOR PARKINSON'S DISEASE. SHE ADMITS TO PROD COUGH AND LOW GRADE FEVERS.
- DESCRIBE THE CXR:
- WHAT IS YOUR DIAGNOSIS:

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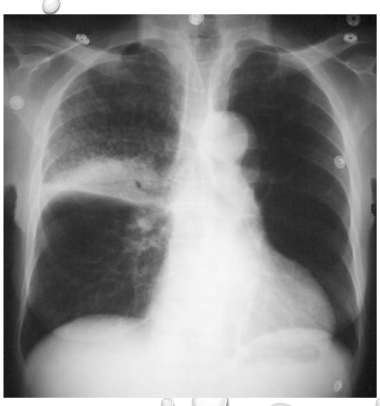

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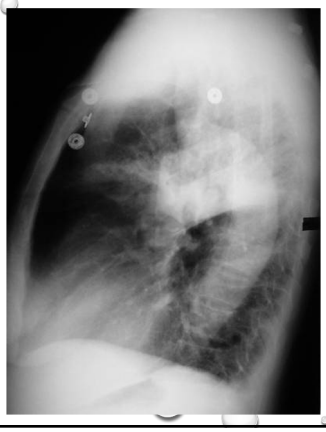

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Case 10

- DESCRIPTION OF CXR:
  - RUL infiltrate / consolidation with air bronchograms
- DIFFERENTIAL DIAGNOSIS:
  - CAP (community acquired pneumonia)
    - Always ask if pt. lives at home vs. nursing home vs. Assisted living facility
  - HAP
  - CAP WITH HIGH RISK FOR MDR PATHOGENS
  - Aspiration pneumonia
    - Obtain Speech language consult

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CURB-65

- THE CURB-65 SCORE IS BASED UPON FIVE EASILY MEASURABLE FACTORS
  - Confusion (based upon a specific mental test or new disorientation to person, place, or time)
  - Urea (blood urea nitrogen in the United States) >7 mmol/L (20 mg/dL)
  - Respiratory rate >30 breaths/minute
  - Blood pressure [BP] (systolic <90 mmHg or diastolic <60 mmHg)
  - Age >65 years
- SCORE OF 2 OR MORE: RECOMMEND ADMITTING TO THE HOSPITAL

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Case 11

- Elderly yo female with PMHx of COPD and chronic respiratory failure presents to the ER with right sided chest pain and non productive cough. She admitted to 20 lb weight loss over the past few months but contributed this to recently being placed on diuretics for her CHF.
- Here is her CXR

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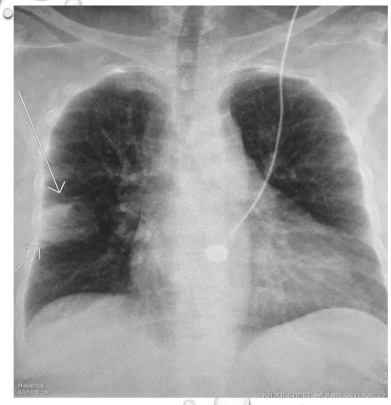

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Case 11

- Describe her CXR
  - What is the most likely diagnosis?
    - Right large mass mid lung (without lateral film difficult to determine if it is in the RUL or RLL
      - Differential diagnosis:
        - Pneumonia
        - Fungal infection
        - Malignancy
- What would be the next step?
  - CT chest

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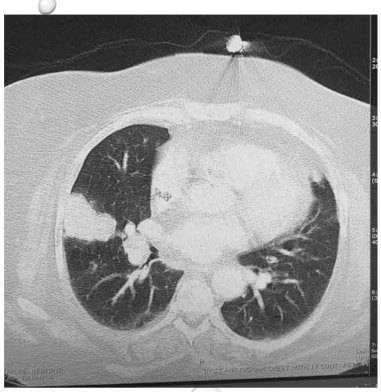

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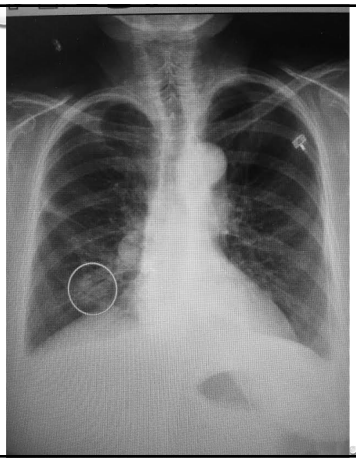
Case 12

Middle aged female presents to ER with cough and shortness of breath

She admits to drinking several glasses of wine on a daily basis

Here is her CXR

69

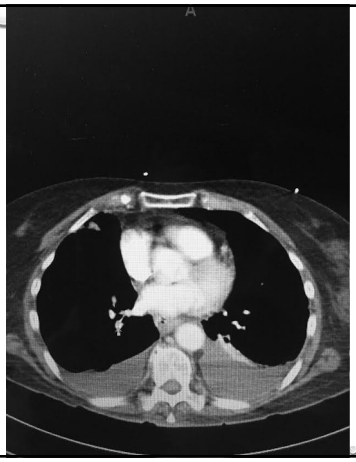


70

Case 12

- Describe her CXR:
  - Airway
  - Lung parenchymal
  - Costophrenic angles
- A CT chest was done for further evaluation
  - What are the findings on CT chest

71



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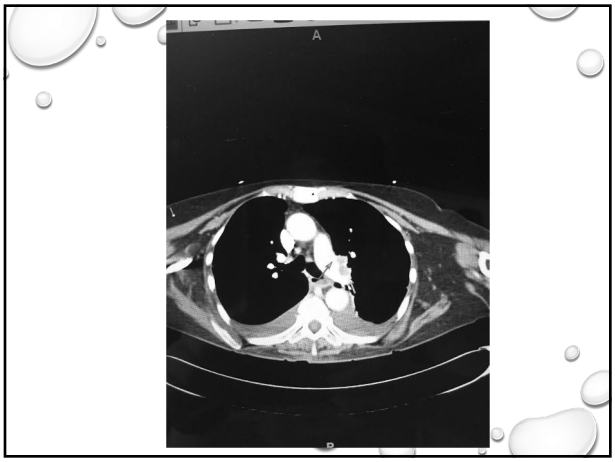

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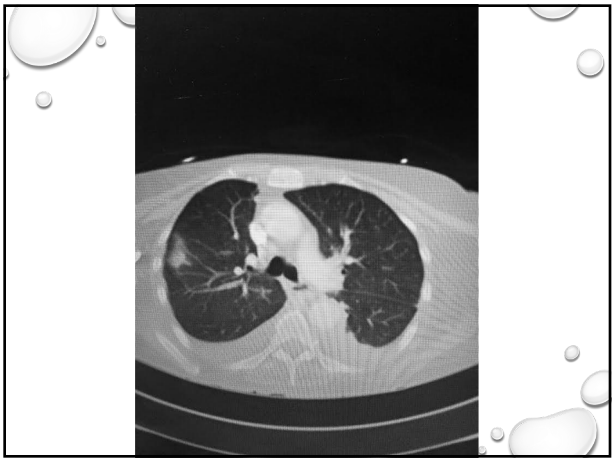


74

Case 12

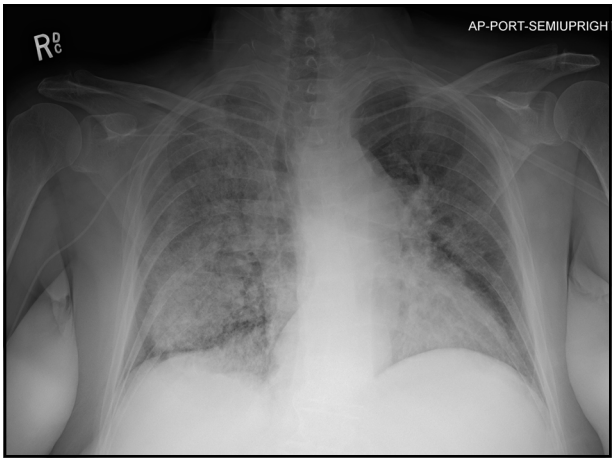
- Findings on CT chest
  - Bilateral pleural effusions
  - RML infiltrate
  - Pulmonary emboli bilaterally

75

Case 13

- Elderly patient initially admitted to the floor for community acquired pneumonia de-saturated on hospital day 2
  - Rapid response called
  - Required non-rebreather
  - EF normal

76



77

Case 13

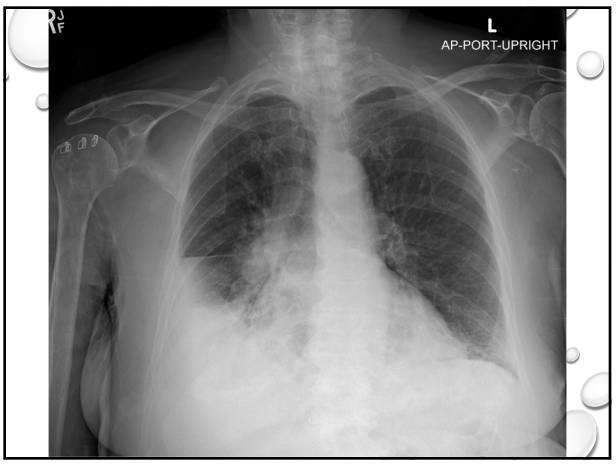
- Bilateral infiltrates
- Right sided PICC (peripherally inserted central catheter)
- Trachea is tortuous
- Diagnosis: ARDS (Acute Respiratory Distress Syndrome)

78

Case 14

- 82 year old female presented to clinic with general malaise x 1 week, nausea, diarrhea
  - Direct admitted to the floor/ward
  - Rapid response call for tachypnea and increasing oxygen requirements (2 L nasal cannula to 6 L nasal cannula)
    - Oxygen saturations 90% on 6L, respiratory rate 30

79



80

Case 14

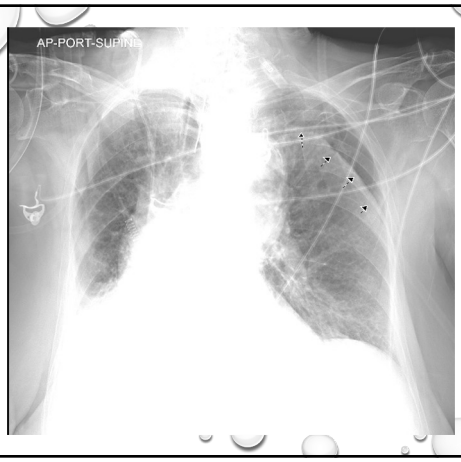
- Right sided opacity
  - Infiltrate
  - Effusion (fluid in the fissure)
  - Likely external clips right shoulder
  - Rotated
- The patient was moved to the ICU for high flow nasal cannula
- She was also found to have new renal failure and lactic acidosis

81

Case 15

- 74 year old male patient, intubated with known history of COPD developed high peak pressures, hypoxia and hypotension
- A CXR was ordered

82

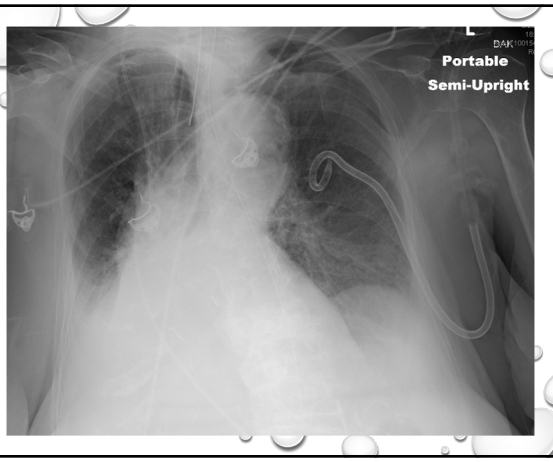


83

Case 15

- Tension pneumothorax
- This can also be diagnosed by physical exam and bedside ultrasound
- Mediastinal shift is noted
- Emergent chest tube (pigtail catheter) is indicated
- If hemodynamic compromise is present, consider needle decompression while setting up chest tube

84



85

Case 15

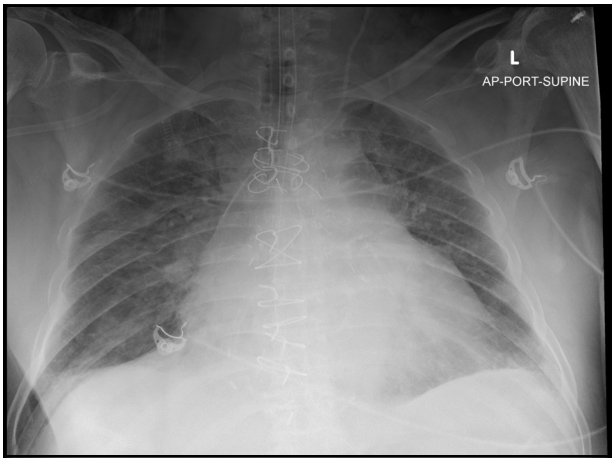
- Pneumothorax is better
- Mediastinal shift is not completely resolved
- Peak pressures on the ventilator decreased and hypotension resolved

86

Case 16

- 82 y/o male with history of significant CAD, CABG in the 1990s, and re-do in 2003, and multiple episodes of PCI and recent hospitalization for flu, complicated by PEA arrest, renal failure and pneumonia is found at rehab pulseless in the bathroom. CPR initiated; he woke up and spoke to nurses. EMS arrived and he arrested again; PEA arrest, intubated in the ED, developed shock. Pulse returned after multiple rounds of epinephrine.

87



88

Case 16

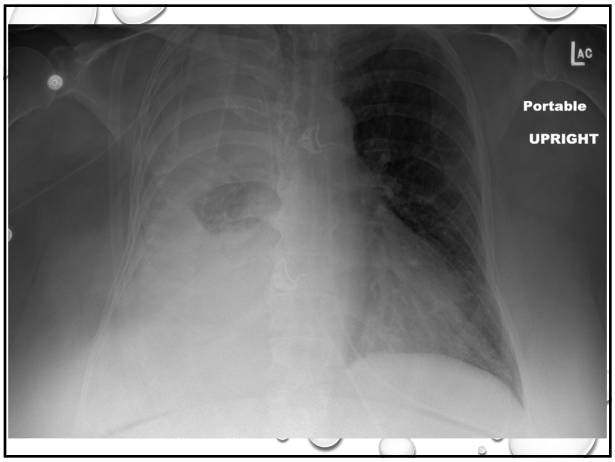
- Endotracheal tube, Orogastric tube
- Left IJ central line
- 3 Sternal wires at top of sternum are broken
- Right ribs broken
- Cardiomegaly
- Pulmonary edema
- Low lung volumes

89

Case 17

- 52 year old female with ETOH cirrhosis, baseline INR of 2.5 and baseline platelets in the 30s who is not a transplant candidate.
- She develops worsening shortness of breath and is placed on Bipap for work of breathing.

90



91

Case 17

- Large right sided pleural effusion nearly opacifying entire right chest
  - She has required 2 thoracenteses during this 10 day hospitalization
    - One of these had to be done with a spinal needle
- Bipap tubing noted over right chest as well
- Area of lucency in right chest could indicate that this is a complex effusion
- The patient required a chest tube with plan to convert to pleurx catheter for palliation

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THE END

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