Pulmonary Parenchymal Opacities Other Than Infection

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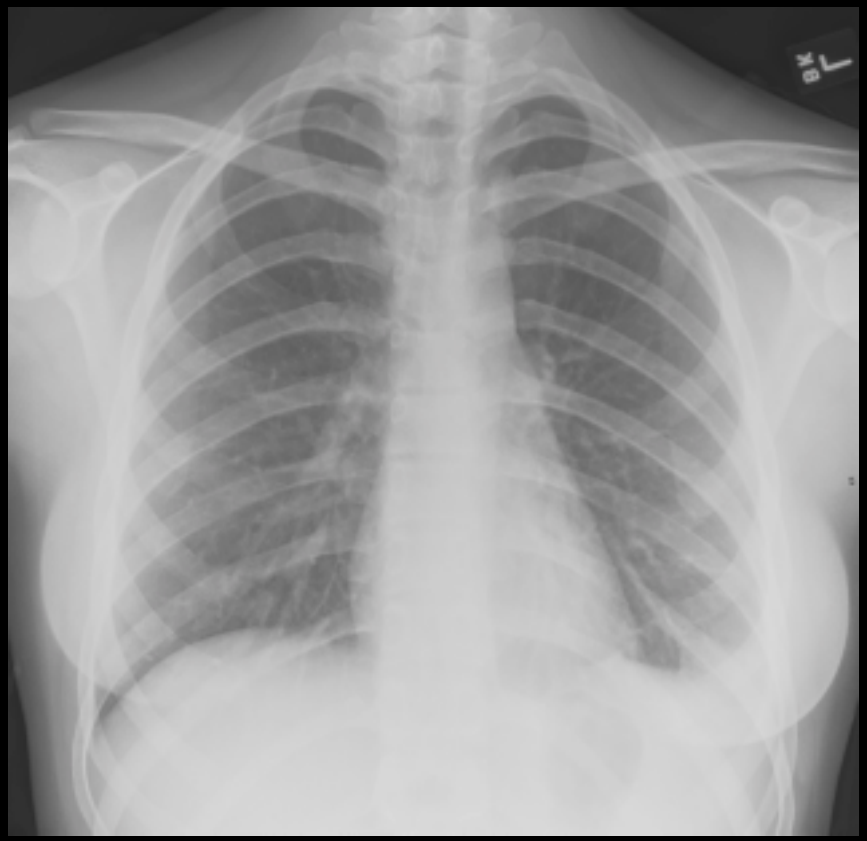
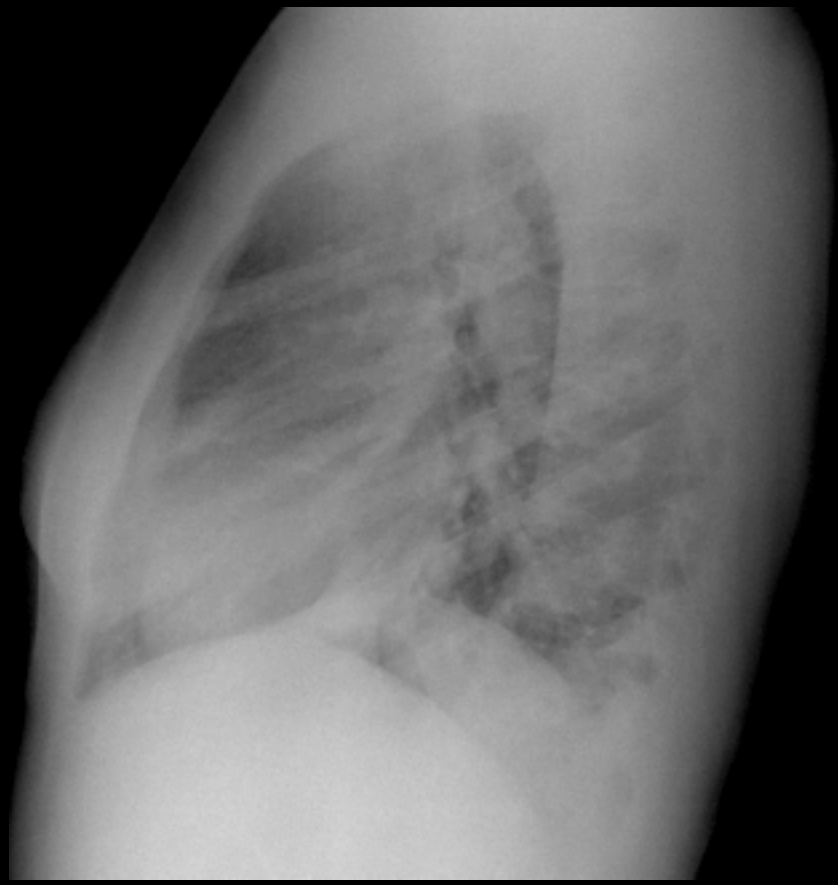
Opacities Other Than Infection

- Multiple choice questions
- Review causes of opacities other than infection
- Three specific cases

Multiple Choice Questions

Seventeen Year Old With Fever





Seventeen Year Old

- Five days of fever and pleuritic chest pain
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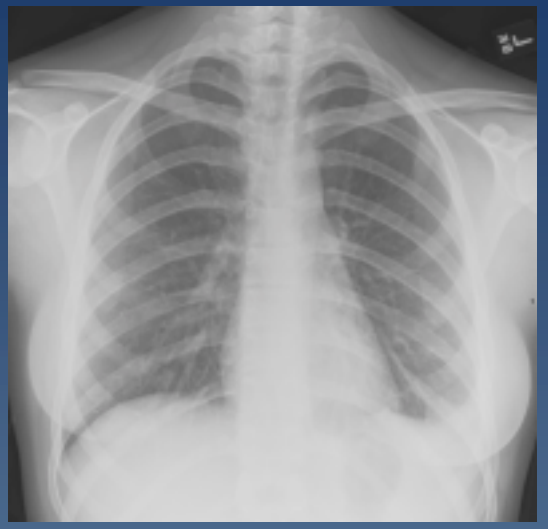
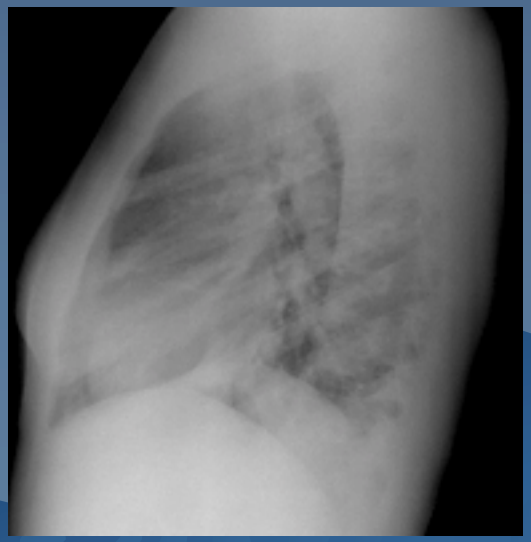
- Recently returned from Australia





Most Likely Diagnosis Other Than Pneumonia?

A. Pulmonary sequestration
B. Pulmonary thromboembolism
C. Aspiration
D. Hypersensitivity pneumonitis

Best Excludes Thromboembolism?

A. Serum D-dimer level
B. Arterial blood gas
C. Nuclear medicine ventilation/perfusion scan
D. Lower extremity Doppler ultrasound

Four Year Old With Low-Grade Fever and Decreased Activity

Most Likely Diagnosis

A. Benign Teratoma
B. Neuroblastoma
C. Bronchopulmonary foregut cyst
D. Pleuropulmonary blastoma

Pleuropulmonary Blastoma

A occurs most often in the second decade of life

B is the same lesion as pulmonary blastoma

C can arise in a previously existing lung cyst

D is a slow growing lesion usually found incidentally

Causes of Opacities Other Than Infection

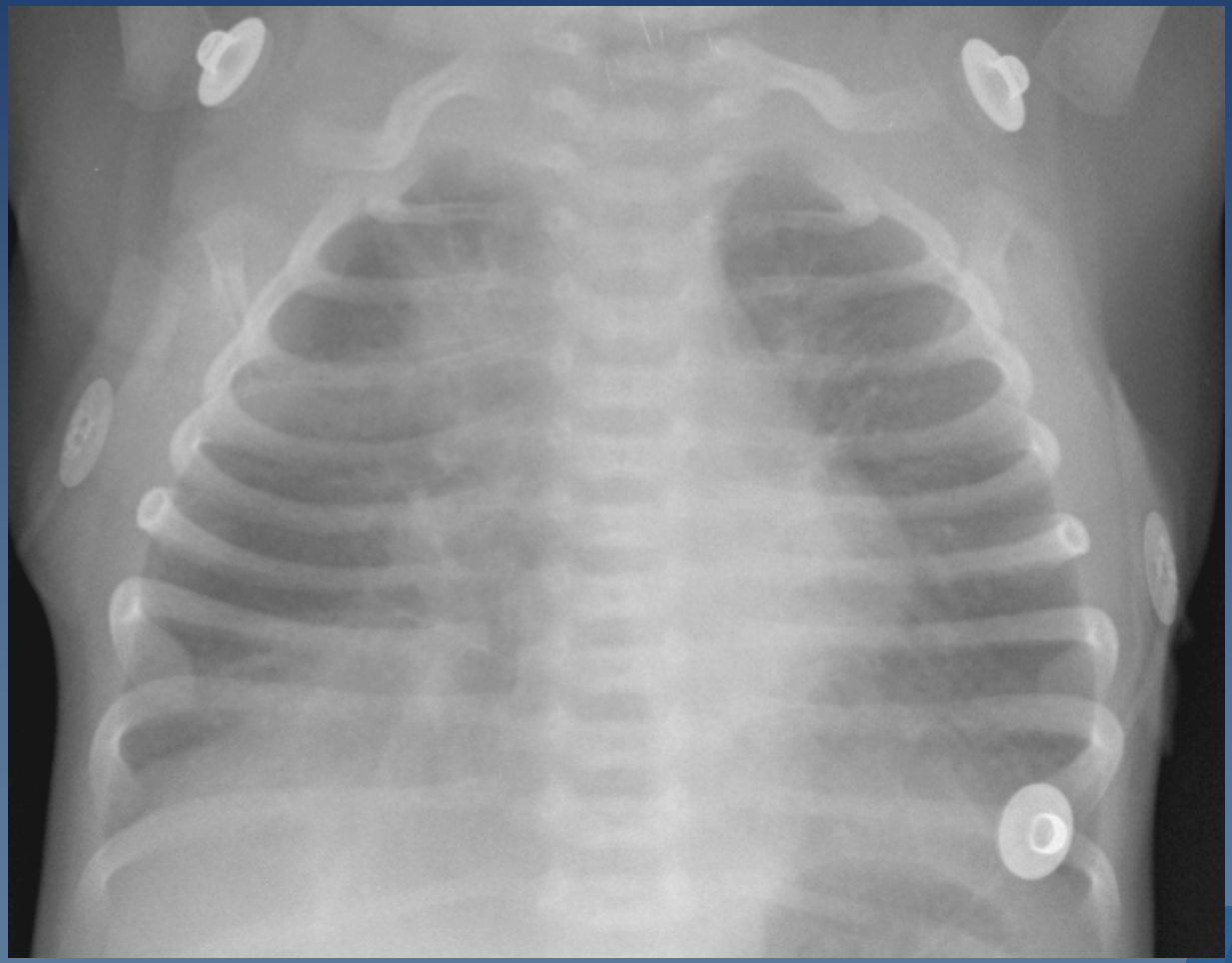
Opacities other than Infection

- Alveolar Space
  - Blood
  - Pus or Protein
  - Water
  - Cells
    - Tumor, Inflammation (aspiration), Repair
- Interstitial Space
  - Fluid

    Pulmonary edema, Lymph
  - Infiltration

    cells, products

Neonatal Pulmonary Hemorrhage



Pulmonary Hemorrhage

- Neonatal
- “Idiopathic”
- Treatment related

Neonatal Pulmonary Hemorrhage

- Usually confluent opacities
- Cannot be distinguished radiographically from pneumonia
- Usually clinically obvious; imaging input and further evaluation rarely impact care

Idiopathic Pulmonary Hemorrhage

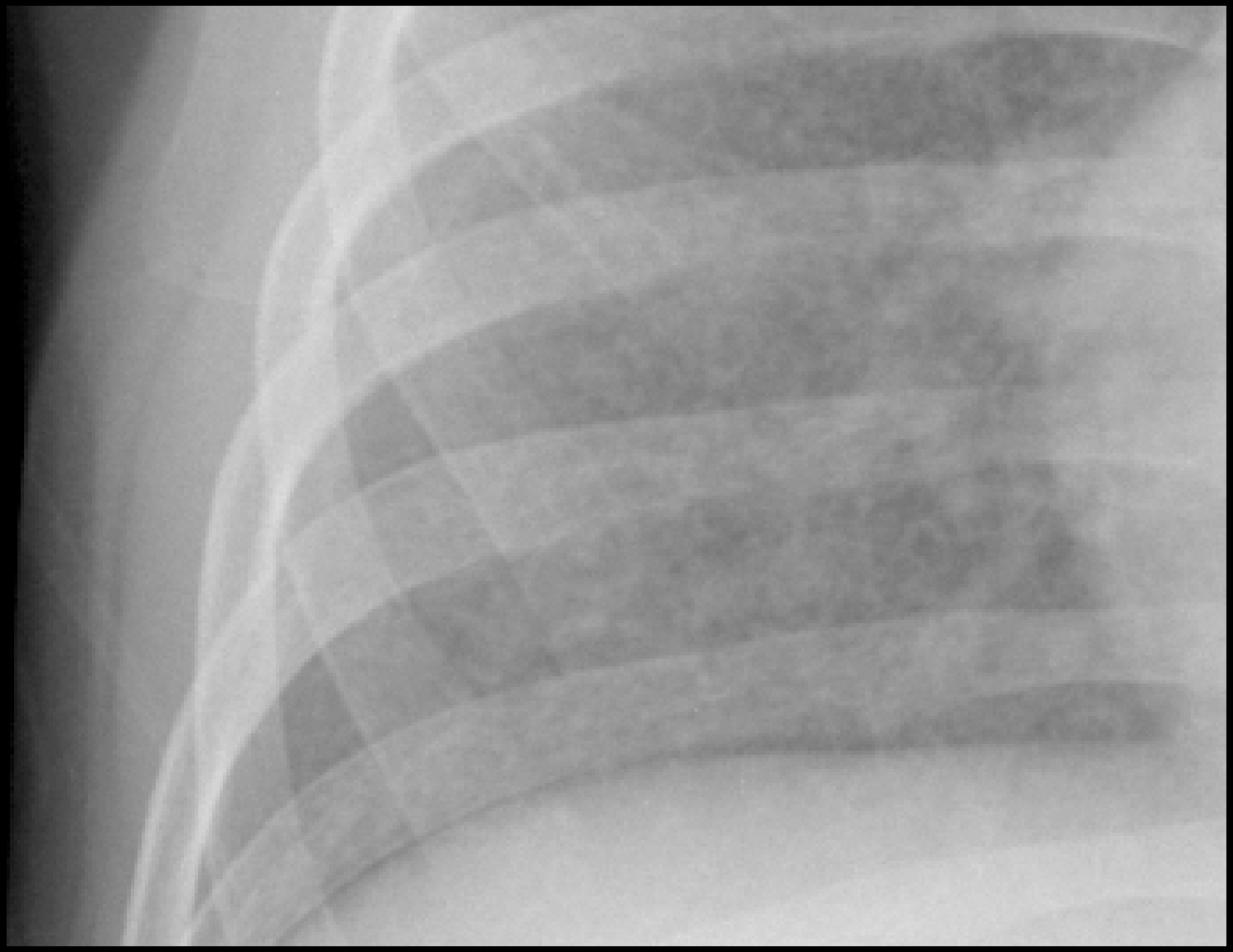
Idiopathic Pulmonary Hemorrhage

- This term preferred to pulmonary hemosiderosis
- Usually 1–7 years old, M=F
- Classic triad: pulmonary infiltrates, iron deficiency anemia, hemoptysis
- Can occur without hemoptysis
- Diagnosis by finding hemosiderin-laden macrophages on bronchoscopy

Idiopathic Pulmonary Hemorrhage

- Diffuse bilateral infiltrates, often symmetrical “bat wing”
- In recurrent cases reticular or nodular diffuse interstitial opacities may develop

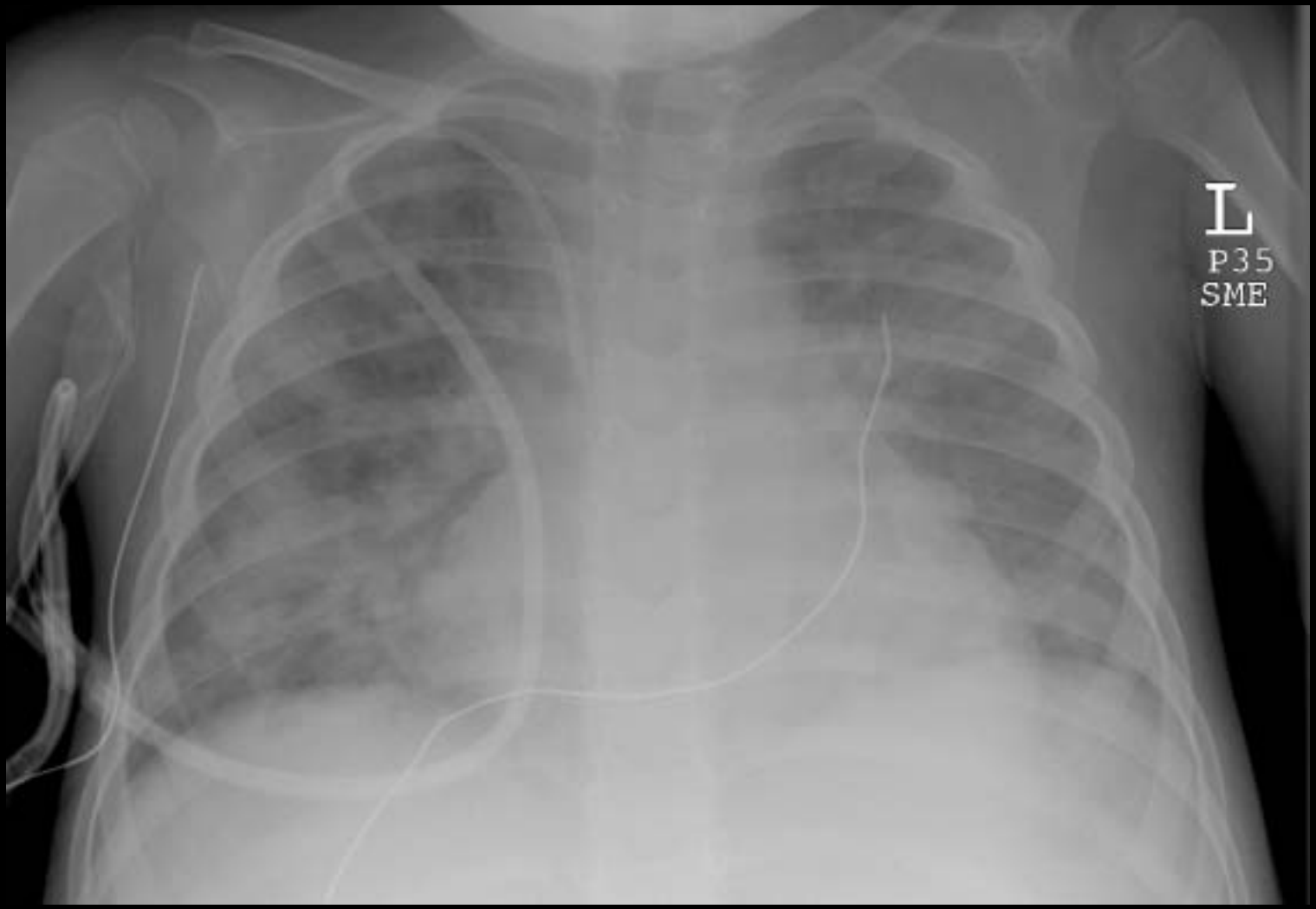
2 years later, after 6 episodes



Pulmonary Hemorrhage

- Acute idiopathic pulmonary hemorrhage of infancy (AIPHI)
  - Possibly associated with mold exposure
- Associated with sensitivity to cow's milk
- Associated with anti basement membrane antibodies
  - Goodpasture's; young adult males
- Associated with other antibodies
  - connective tissue disorders
- Idiopathic

Diffuse Alveolar Hemorrhage Following Bone Marrow Transplantation

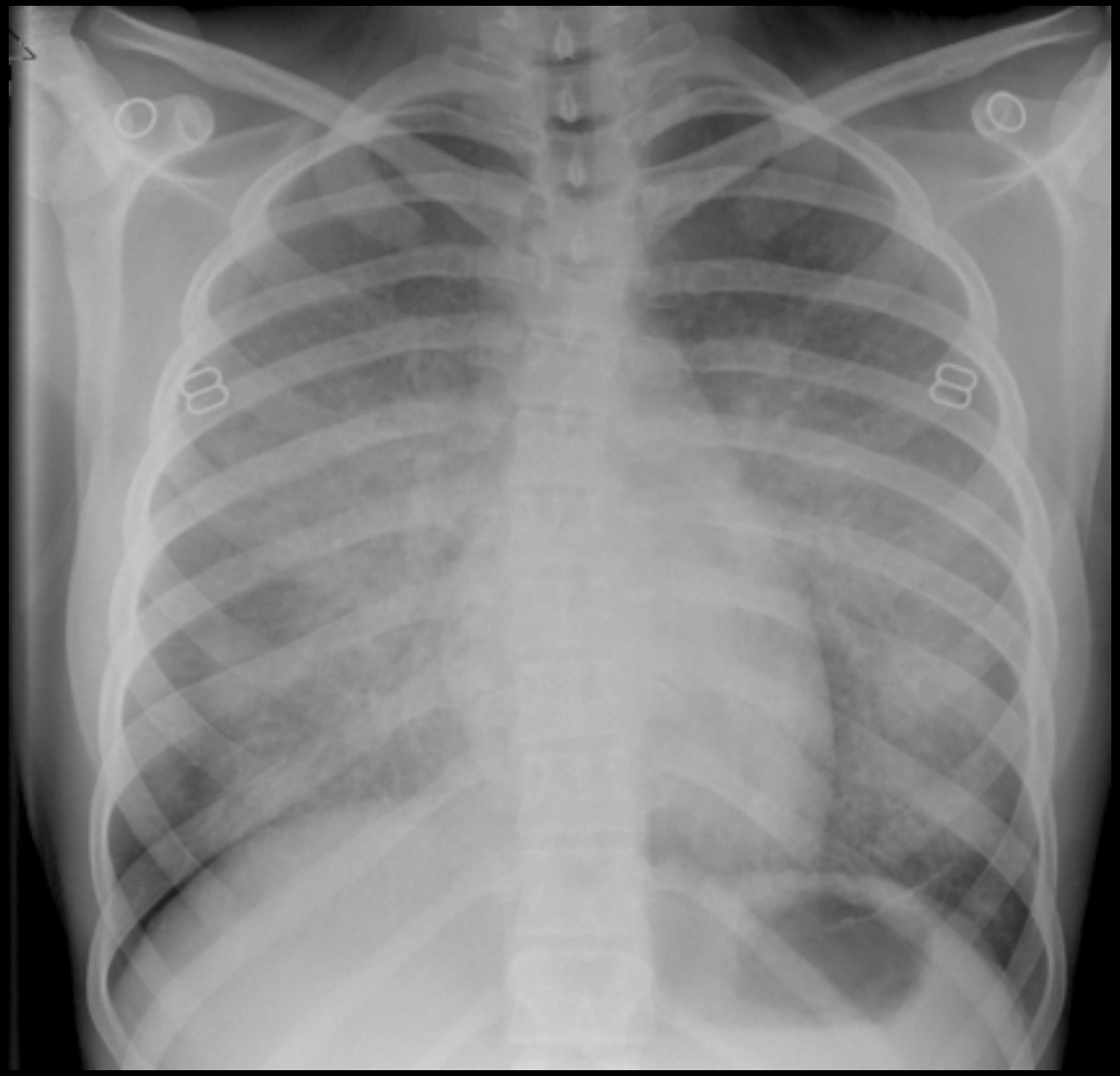


Diffuse Alveolar Hemorrhage Following Bone Marrow Transplantation

- Usually within first month post transplant
- Rapid radiographic and clinical progression
- Frequently simulates pulmonary edema
- Mortality 75%
- Responds to steroids

Diffuse Alveolar Hemorrhage

14 yo With Shortness of Breath



Pulmonary Alveolar Proteinosis

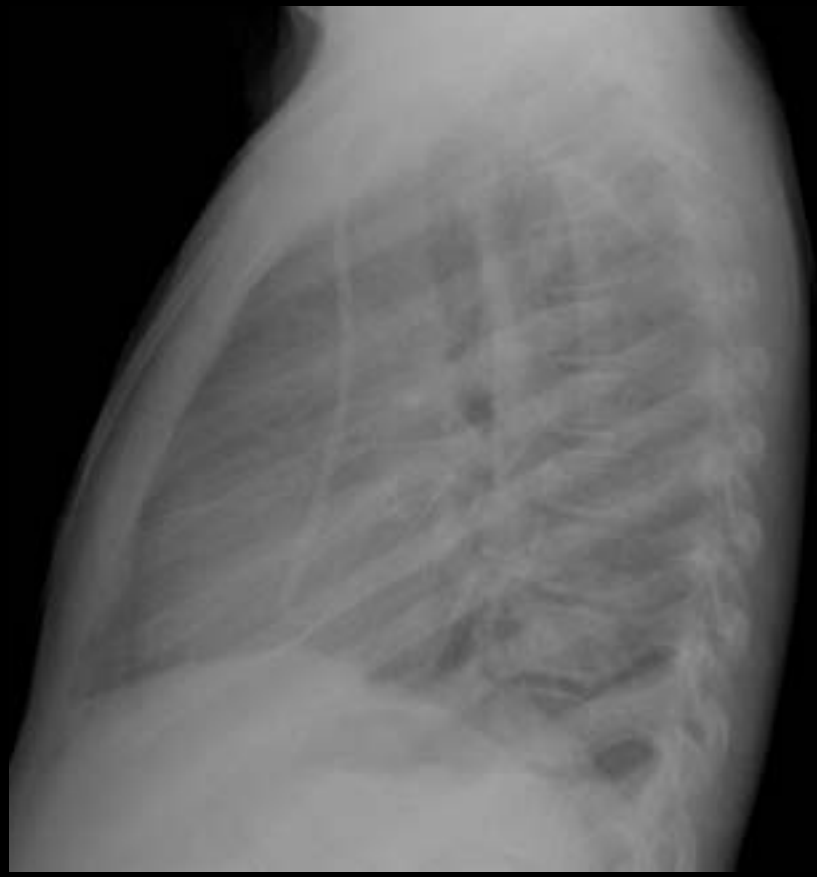
- In infants usually due to surfactant protein dysfunction
  - Congenital
- In older children and adults usually an autoimmune disease with antibodies to granulocyte-macrophage colony stimulating factor (GMCSF)
  - Primary
- Can occur as a complication of other diseases
  - secondary PAP

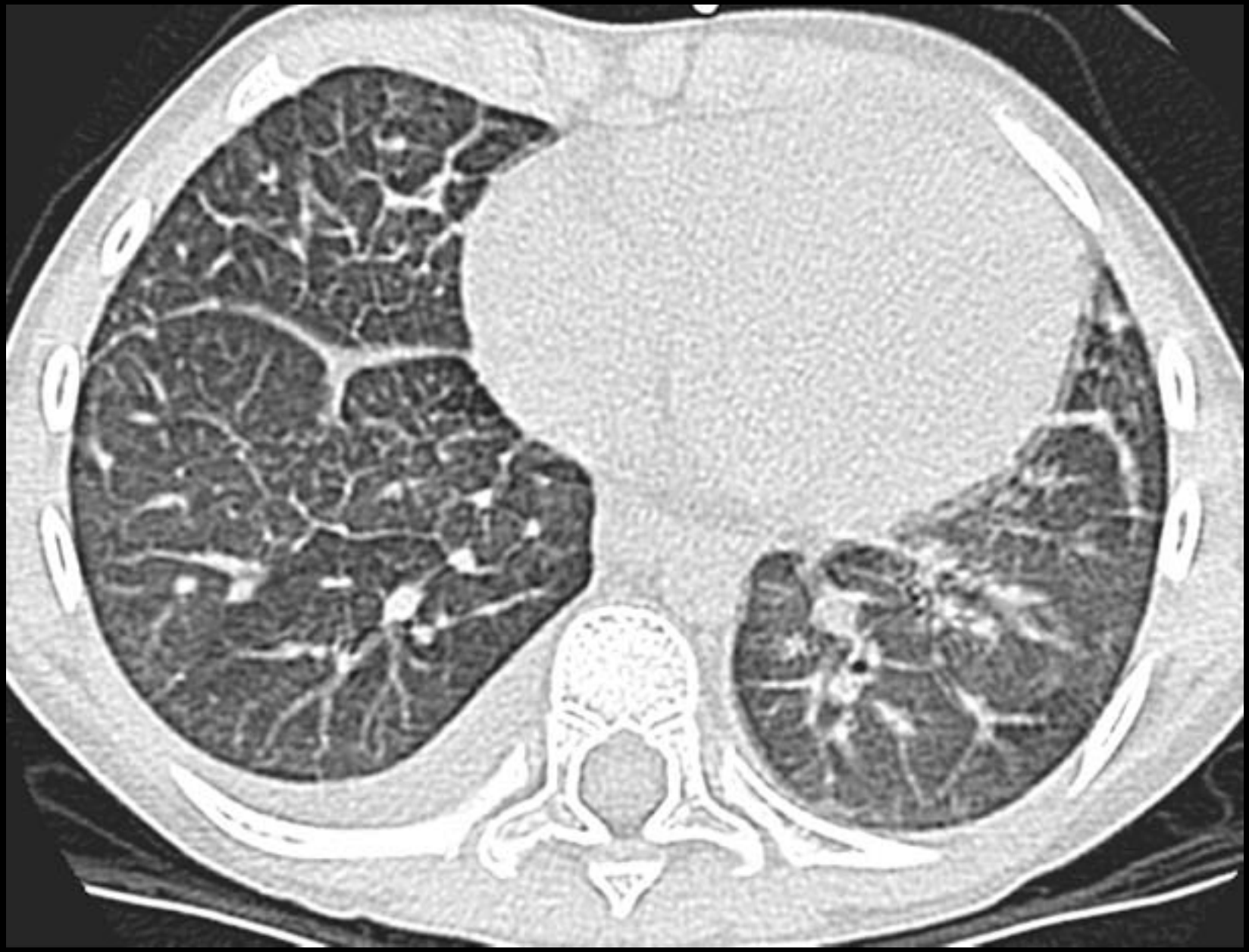
2 Children
3 months and 14 years old with PAP

Pulmonary Alveolar Proteinosis

- No effective treatment for surfactant protein dysfunction
- Other forms can be treated with whole lung lavage
- Treatment of underlying abnormality in cases of secondary PAP

5 year old 60 Days after Bone Marrow Transplant, CMV+





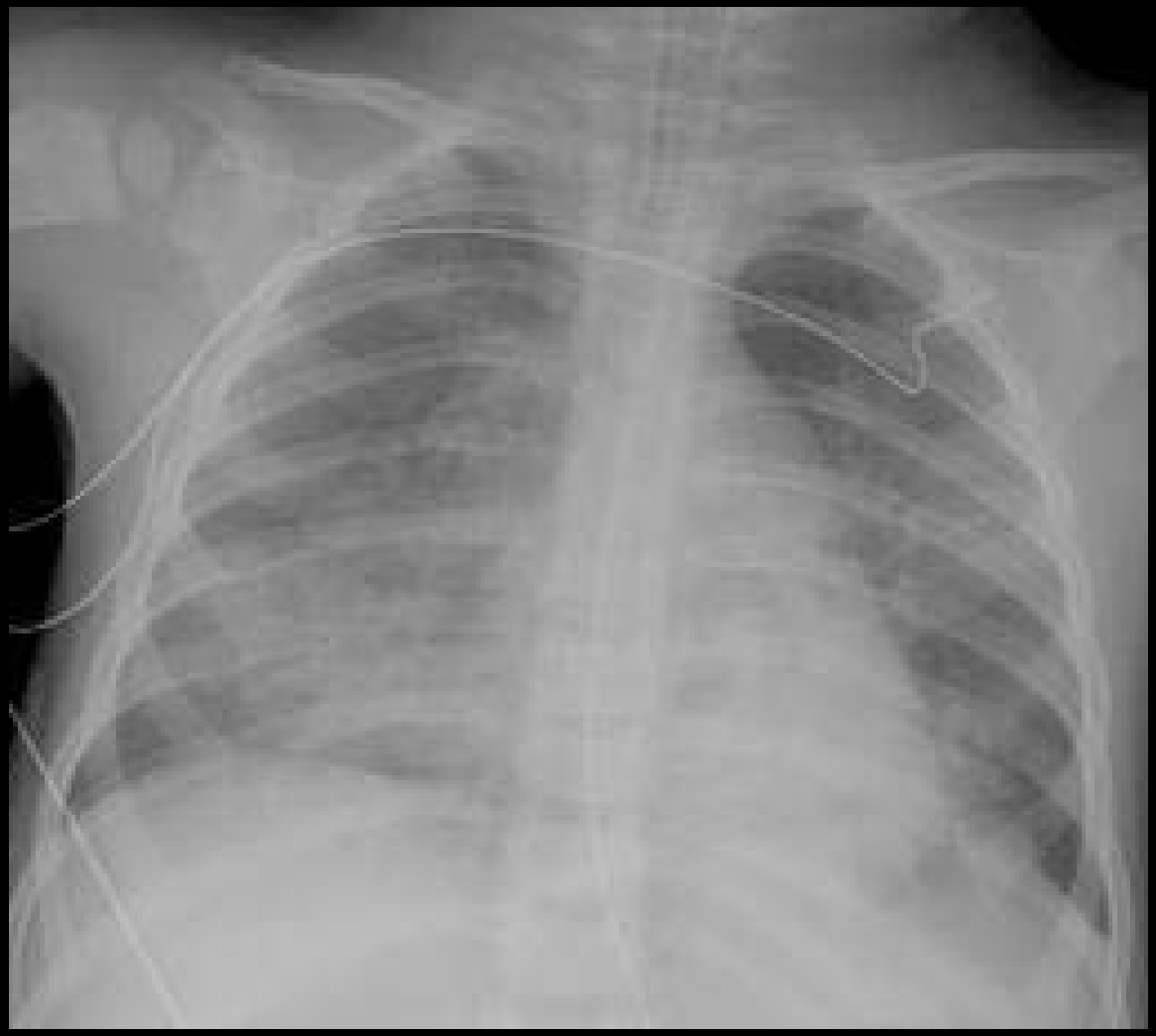
Pulmonary Edema

- Identification on CXR more difficult in children than adults
- Heart size and examination often normal
- Kerley B lines rare
- Noncardiogenic causes more common;
  - near drowning
  - drug reactions

Aspiration/Inhalation

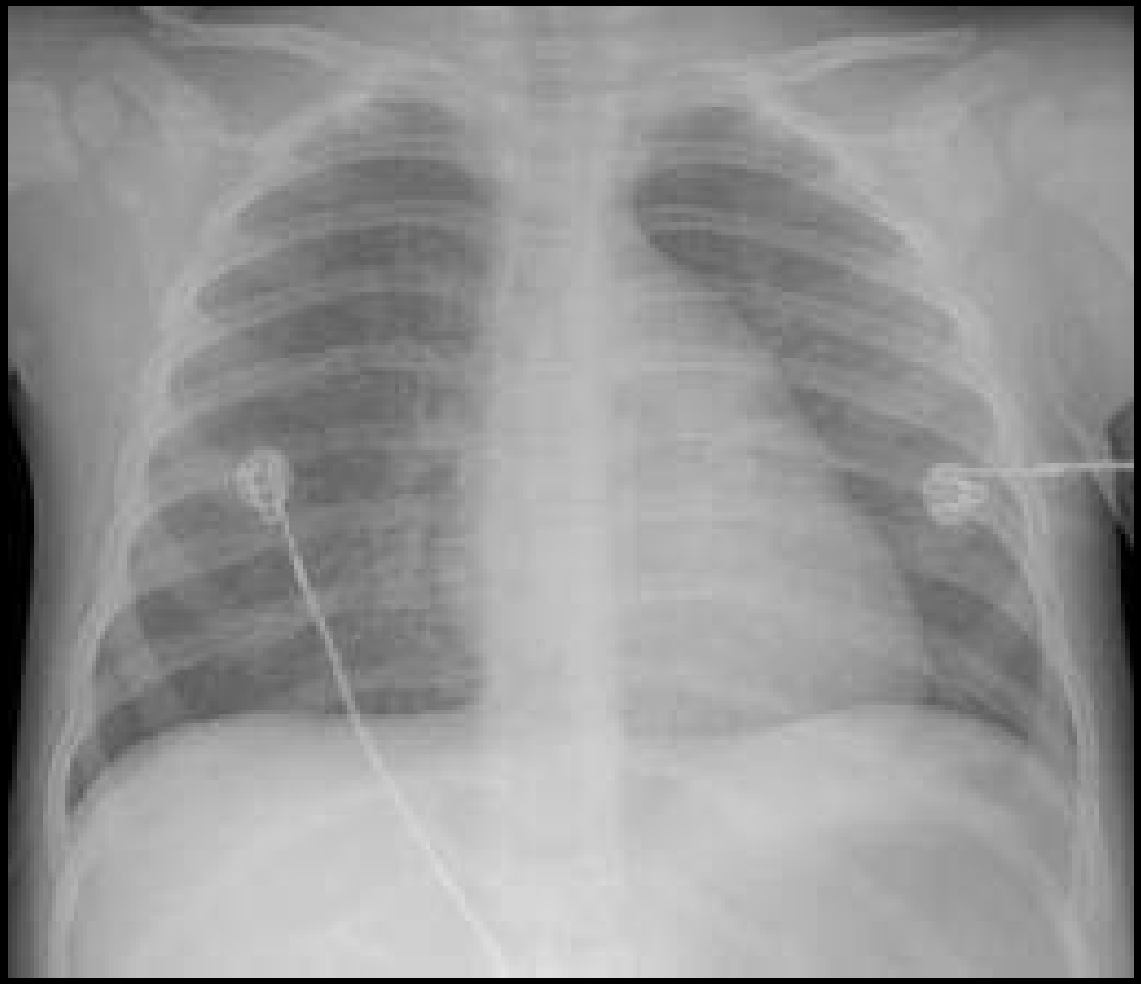
- Gastric contents
- Lipoid pneumonia
- Hydrocarbon aspiration
- Hypersensitivity pneumonitis

19 Month Old in the Emergency Department

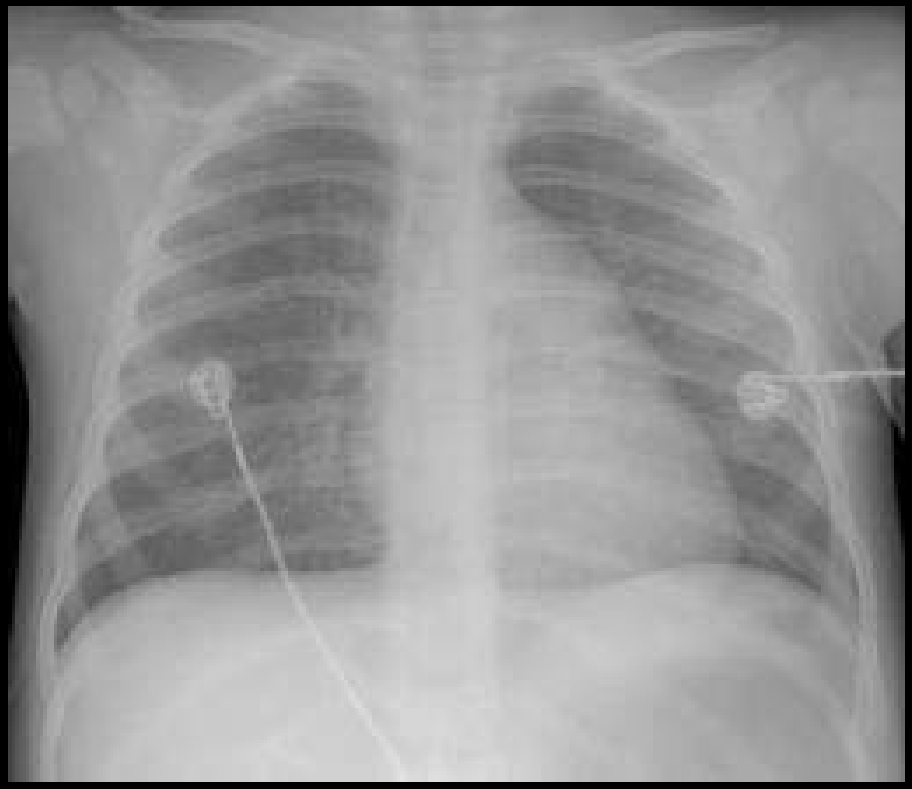


Hydrocarbon Aspiration

- Appearance of parenchymal opacities often delayed
- Appear by 6 hours
- Worst by 24 hours



Hydrocarbon Pneumonitis

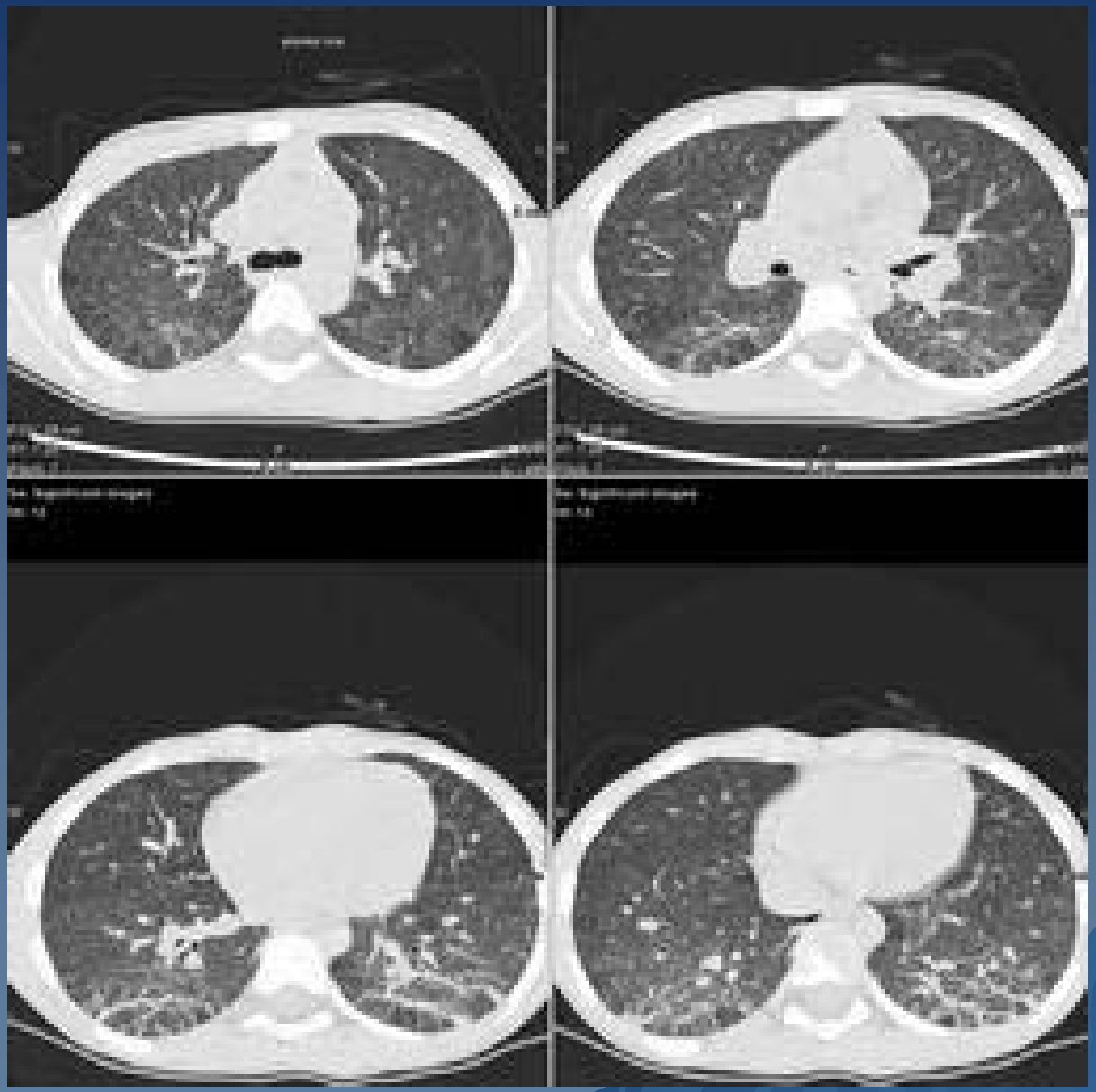


30 min

2 hours

Eight Year Old with Cough

Hypersensitivity Pneumonitis



Hypersensitivity Pneumonitis

Extrinsic Allergic Alveolitis

- Response to the inhalation of organic antigens in a previously sensitized host
- Bird fancier's lung (avian proteins) is most common in children
- Farmer's lung (thermophilic actinomyces)
- Patients usually respond to removal of antigen

Hypersensitivity Pneumonitis

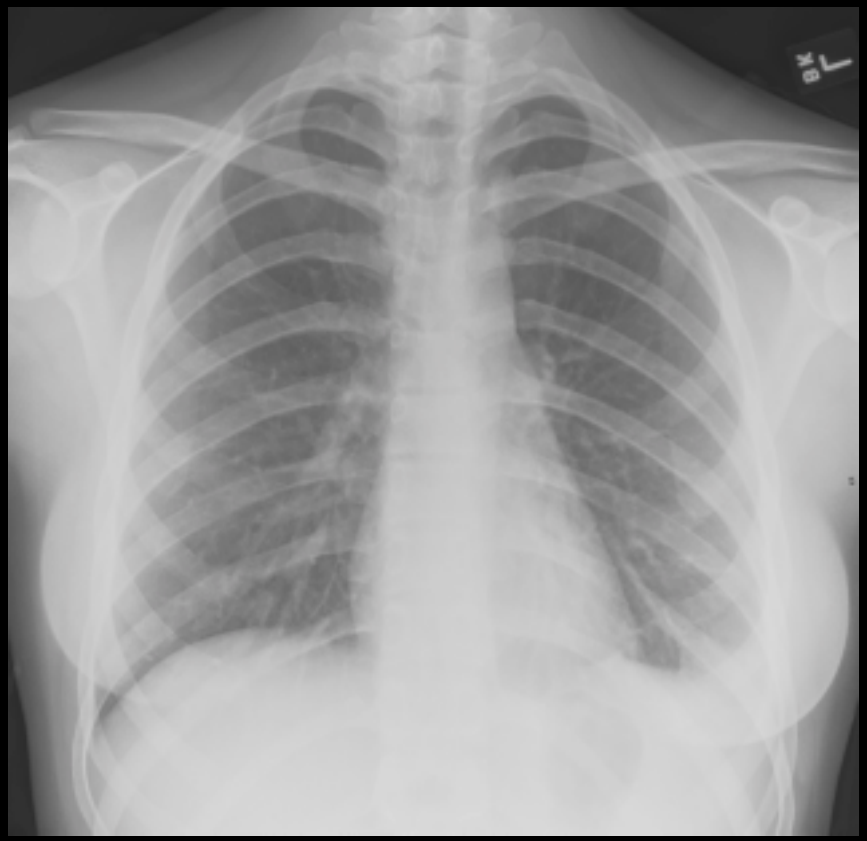
- Variable parenchymal opacities in acute form, often most pronounced in lung bases
- Typical appearance on HRCT with ground glass opacity and centrilobular nodules

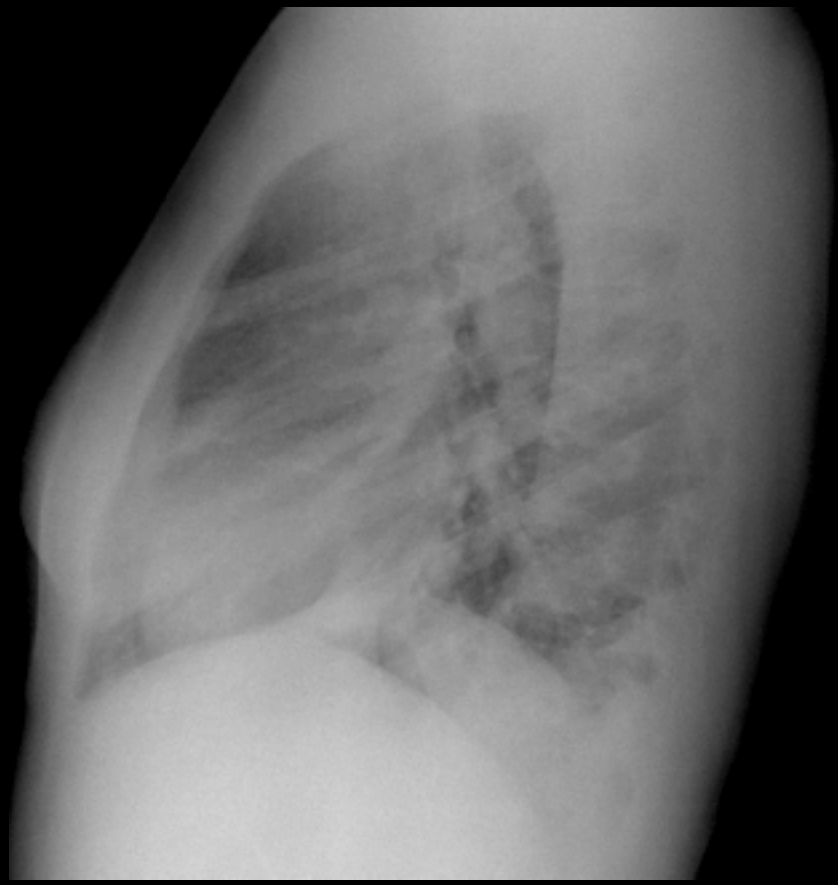
2 yo with shortness of breath

Epithelioid Hemangioendothelioma

Three Specific Cases

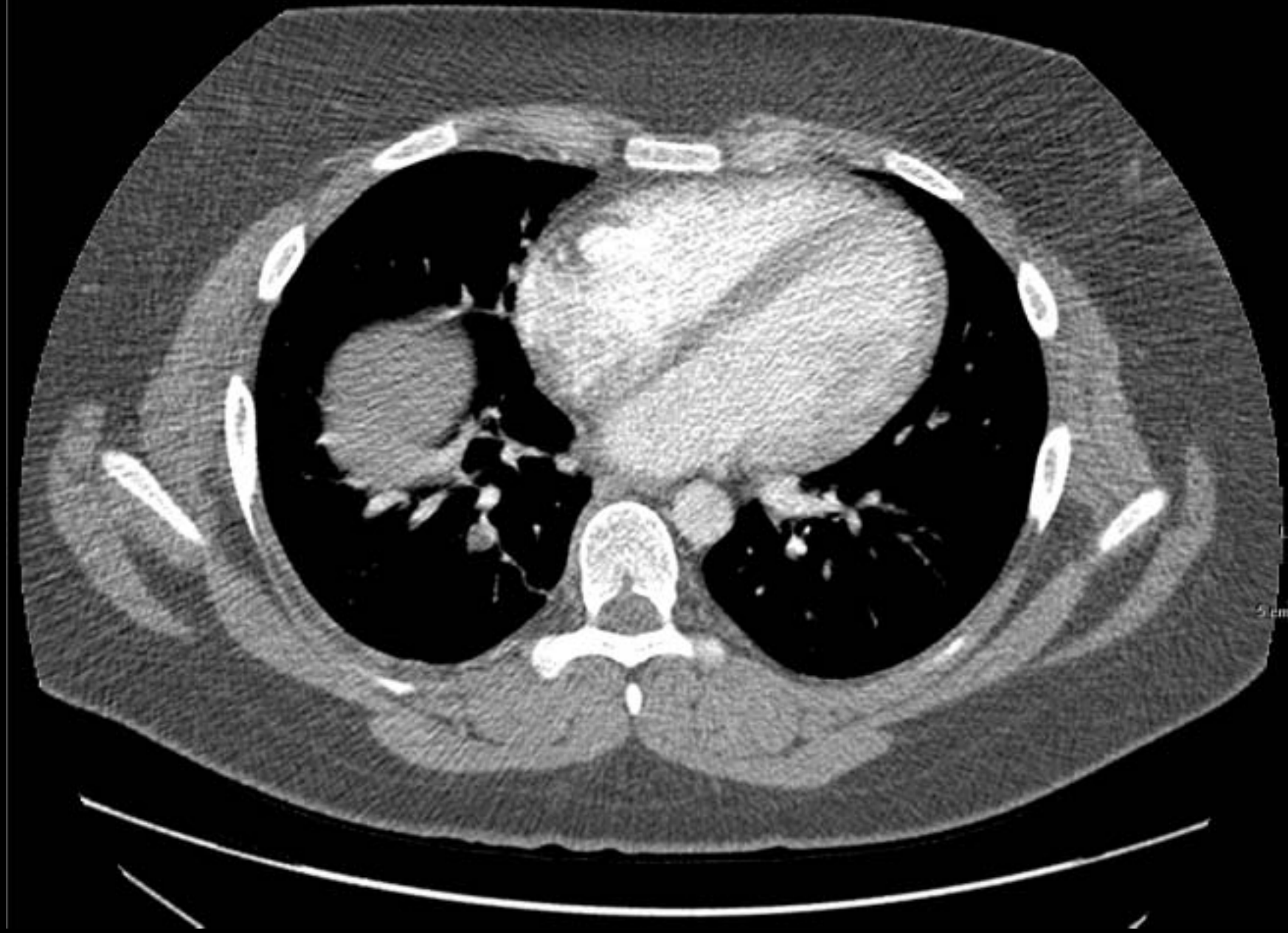
Seventeen Year Old With Fever

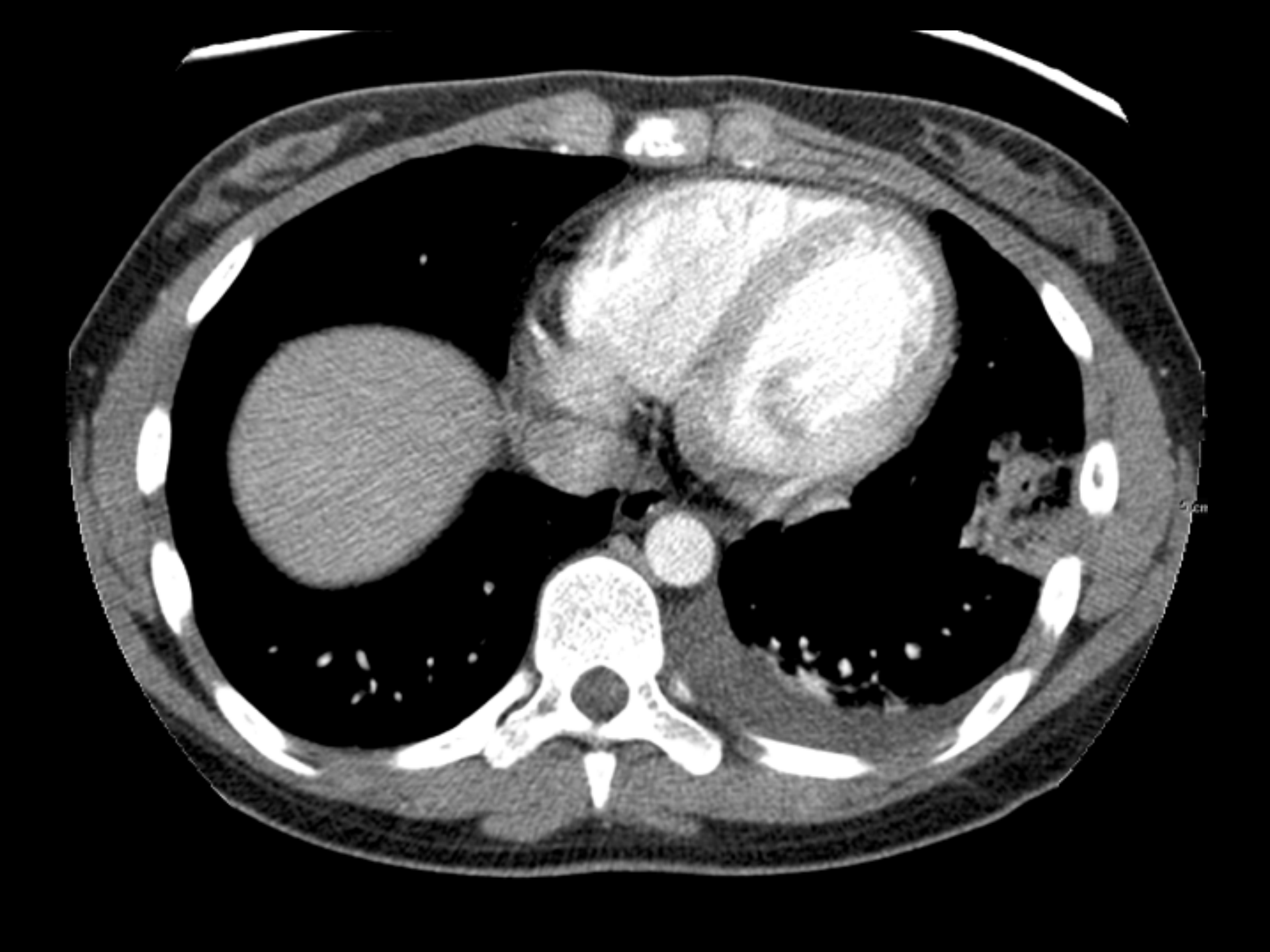




Pulmonary Embolism

- Almost all recommendations are based on adult data
- CTPA is likely less accurate in children than adults
  - Smaller structures
  - Motion
  - Bolus timing
- Vascular US may be more accurate in children than adults






LONG RT
LT IL
6C2-S
H5.0MHz
80mm
PV Vein
High Contrast /V
Pwr=0dB
MI=1.7
54dB
S1/+2/2/ 6
=-10dB
Δ=2
Store in progress
50 pixels

Serum D Dimer

- D dimer, a degradation product of cross-linked fibrin, is generated by lysis of fibrin
- Elevated levels are common, so a postive value has very poor predictive value for thromboembolism (40%?)
- Negative values are more than 95% accurate at excluding thromboembolism in adults

14 yo Post Bone Marrow Transplant

Cryptogenic Organizing Pneumonia

- Also called bronchiolitis oblitterans organizing pneumonia (BOOP)
- Likely a reparative reaction to lung injury
- Most often seen after bone marrow transplant, can occur after mycoplasma infection and in asymptomatic children

Cryptogenic Organizing Pneumonia

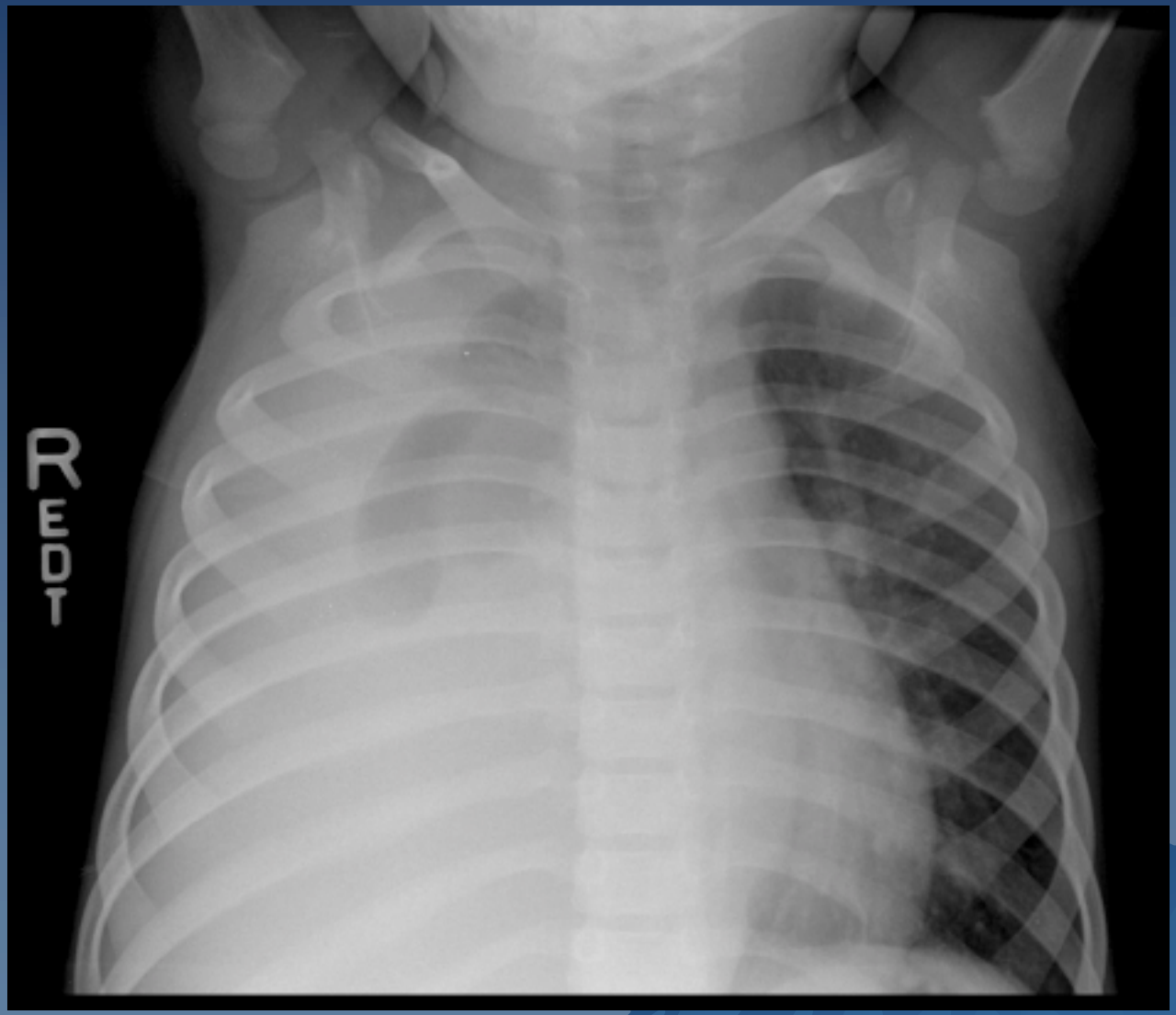
- Highly variable appearance, from scattered small nodules to large cavitating mass
  - Nodular form common in children
- Should be considered when nodular opacities are seen in children post BMT
- Biopsy may decrease inappropriate treatment

Cryptogenic Organizing Pneumonia

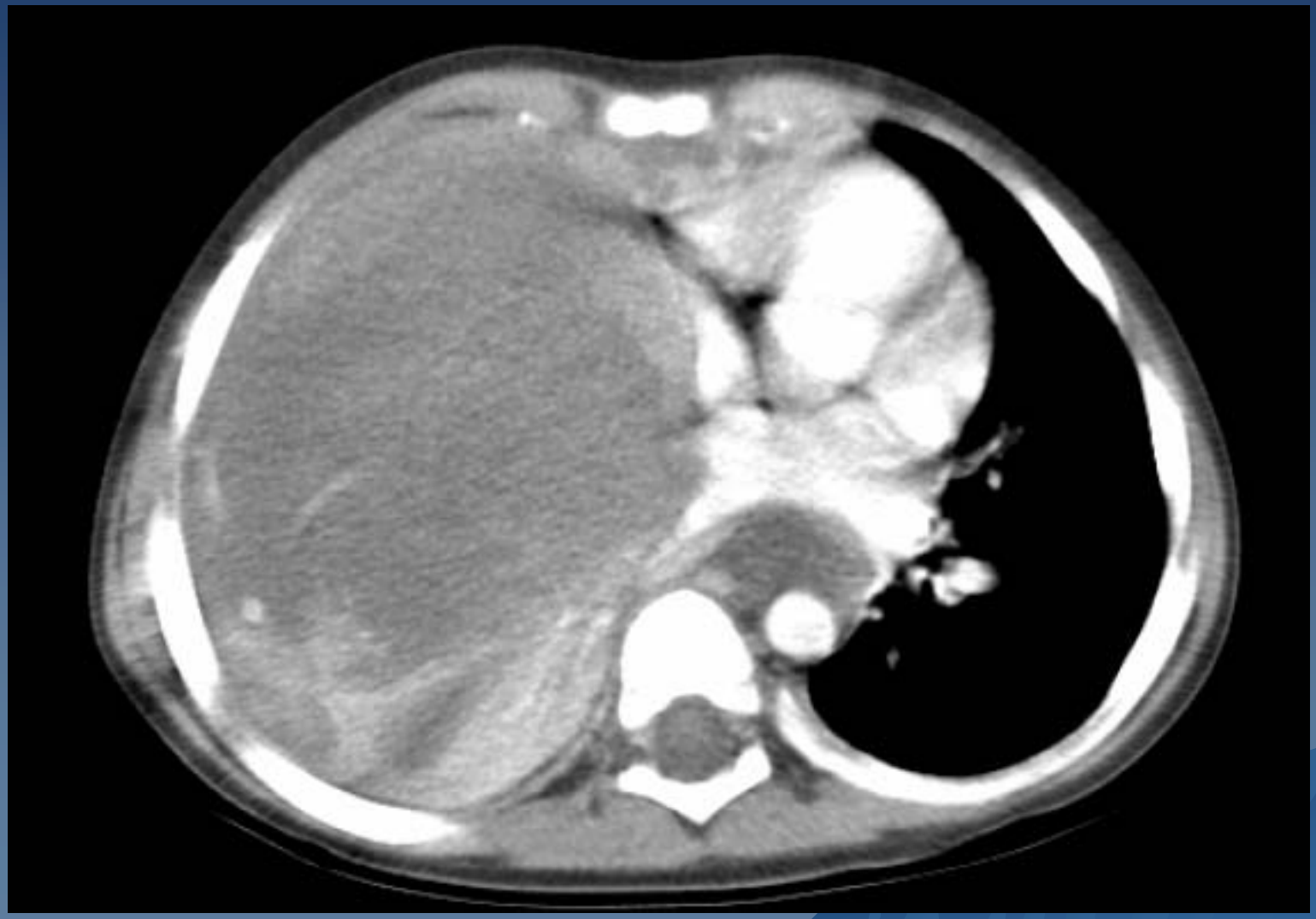
Cryptogenic Organizing Pneumonia

- Steroids and NSAIDs have been used to treat COP
- Response is variable, may persist despite treatment

2 yo with Cough and Chest Pain



Pleuropulmonary Blastoma



Pleuropulmonary Blastoma

- Mesenchymal tumor with features of fetal lung
- Usually presents ≤ 6 years old
- Large, rapidly growing mass
- Contiguous with pleura, often displaces the mediastinum

Pleuropulmonary Blastoma

- Three subtypes
  - Cystic; younger with better prognosis
  - Mixed and solid; older, worse prognosis
- Can arise in preexisting lung cysts
  - PPB is likely responsible for cases reported as rhabdomyosarcomas complicating CCAMs
  - Dysplastic and neoplastic conditions in patient or close relative in 25%
    - Cystic nephroma most common

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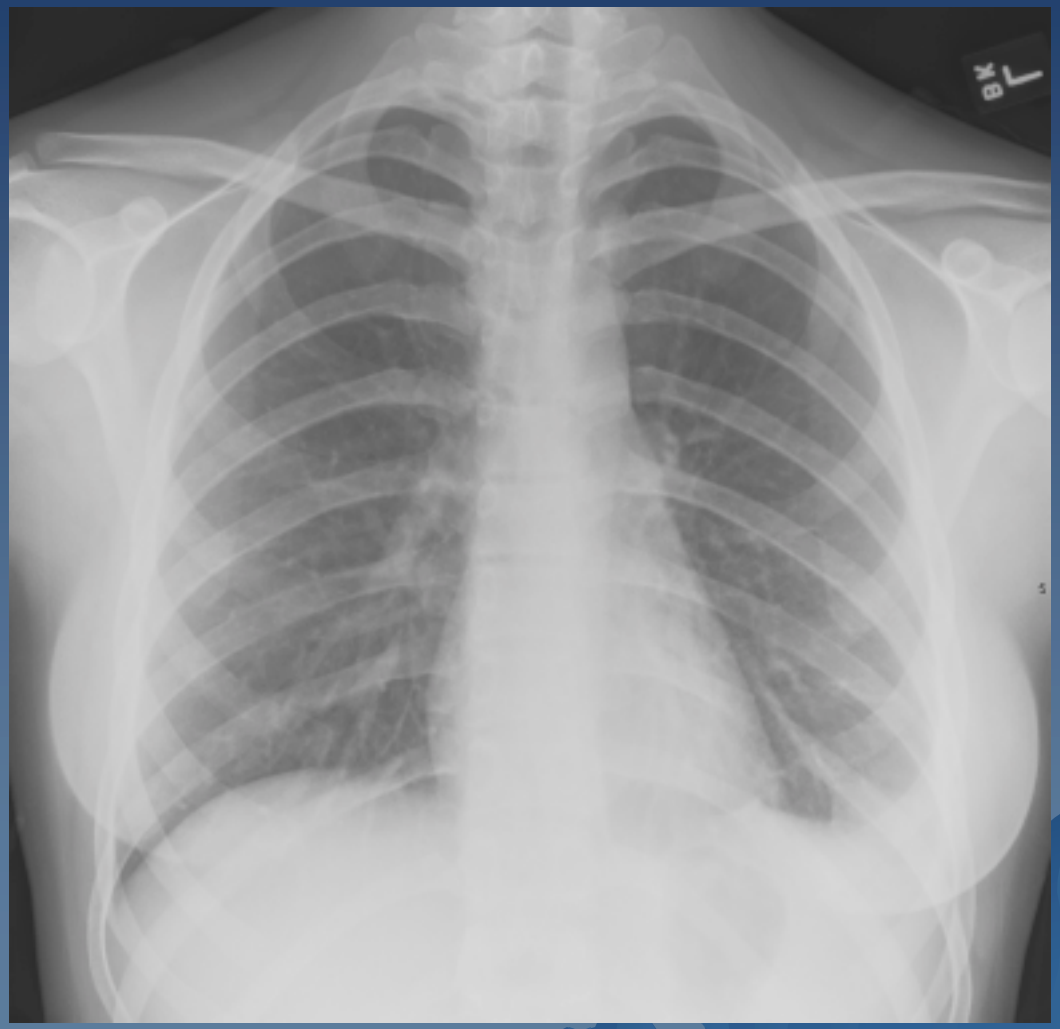

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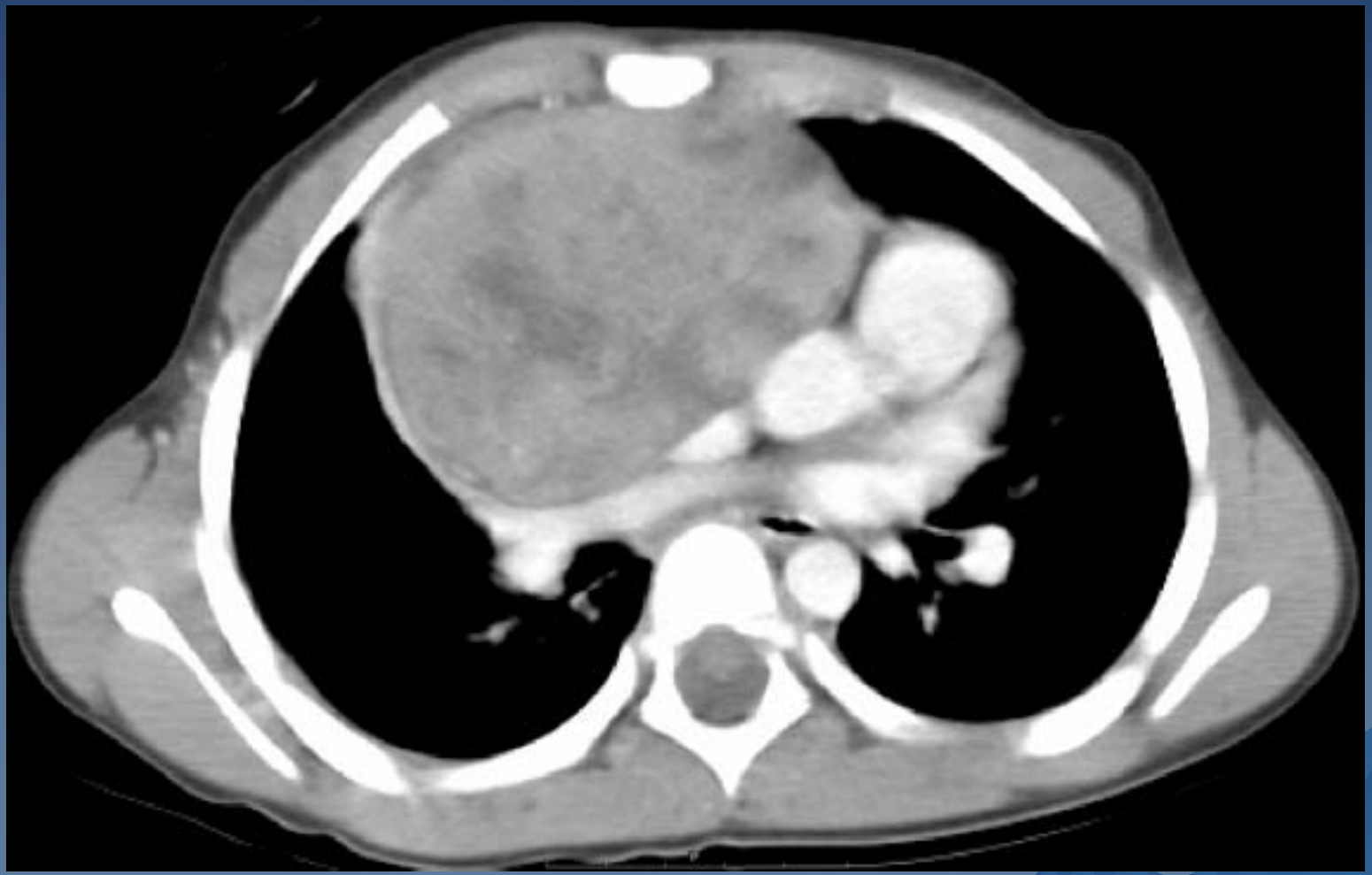

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