

AMSER Case of the Month

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4 y/o F presenting with shortness of breath and fever

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Patient Presentation

- **HPI:** The 4 year old presented to an urgent care with fever, mild generalized abdominal pain and fatigue. Pneumonia was suspected and the urgent care recommended an ED visit. Family declined to go to the ED and the patient instead received a prescription for azithromycin. Symptoms did not improve with antibiotics, and the patient began to develop a slight cough and mild shortness of breath
- **ROS:** Otherwise negative
- **PMH:** Constipation controlled with Miralax, recent hospitalization for RSV, Immunizations up to date, age appropriate development
- **Exam:** BP 108/60 | HR 121 | T 101.9 °F | RR 22
 - Breath sounds diminished over left lower 2/3 of the chest
 - Abdomen soft, non-tender, no palpable hepatomegaly or splenomegaly

Pertinent Labs

- **CBC:** WBC elevated 14.2k with neutrophilia of 9.10k, Hb 9.6
- **CMP:** Na 133 (L), K 3.6 (L), Cl 94 (L)
- **CRP:** 19.6 (H)
- **Lipase:** WNL
- **Rapid strep:** negative
- **COVID/flu/RSV:** negative
- Respiratory viral panel and blood cultures pending

What Imaging Should We Order?

ACR Appropriateness Criteria

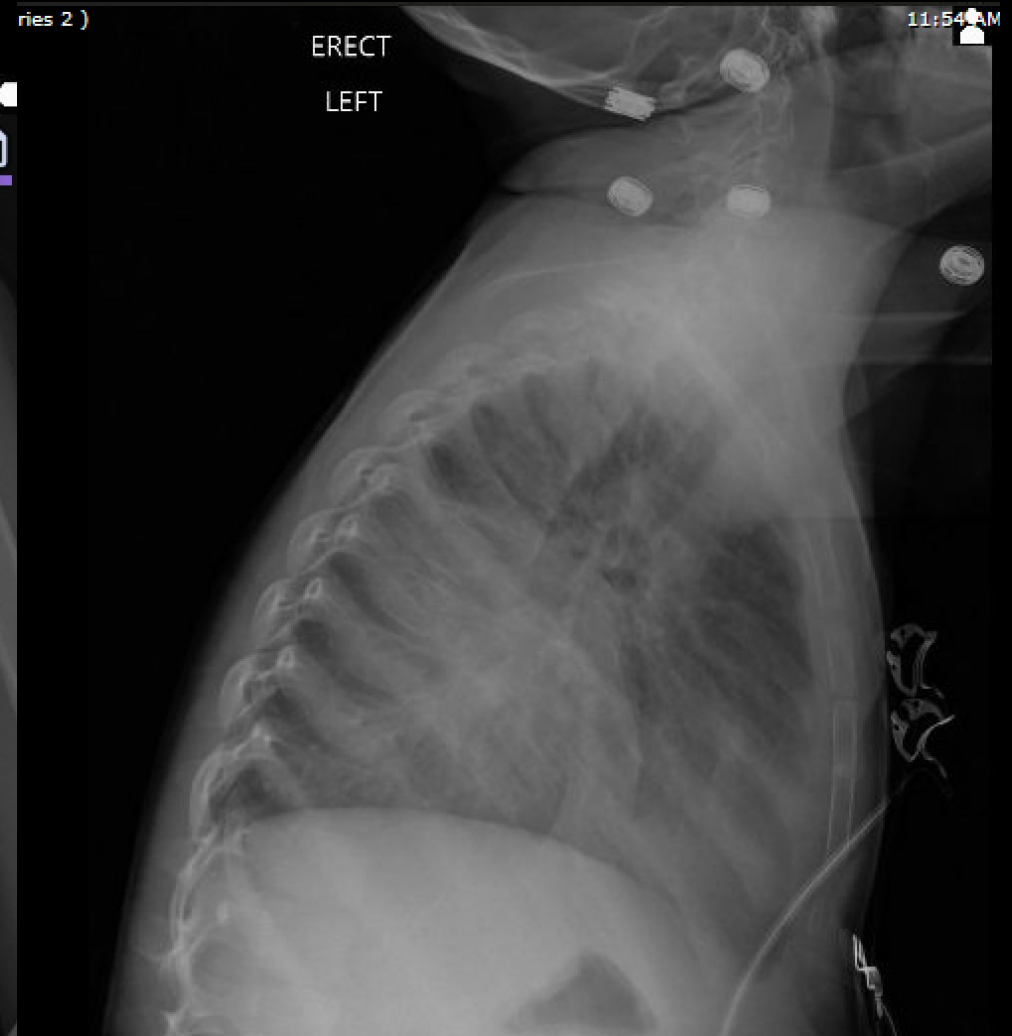
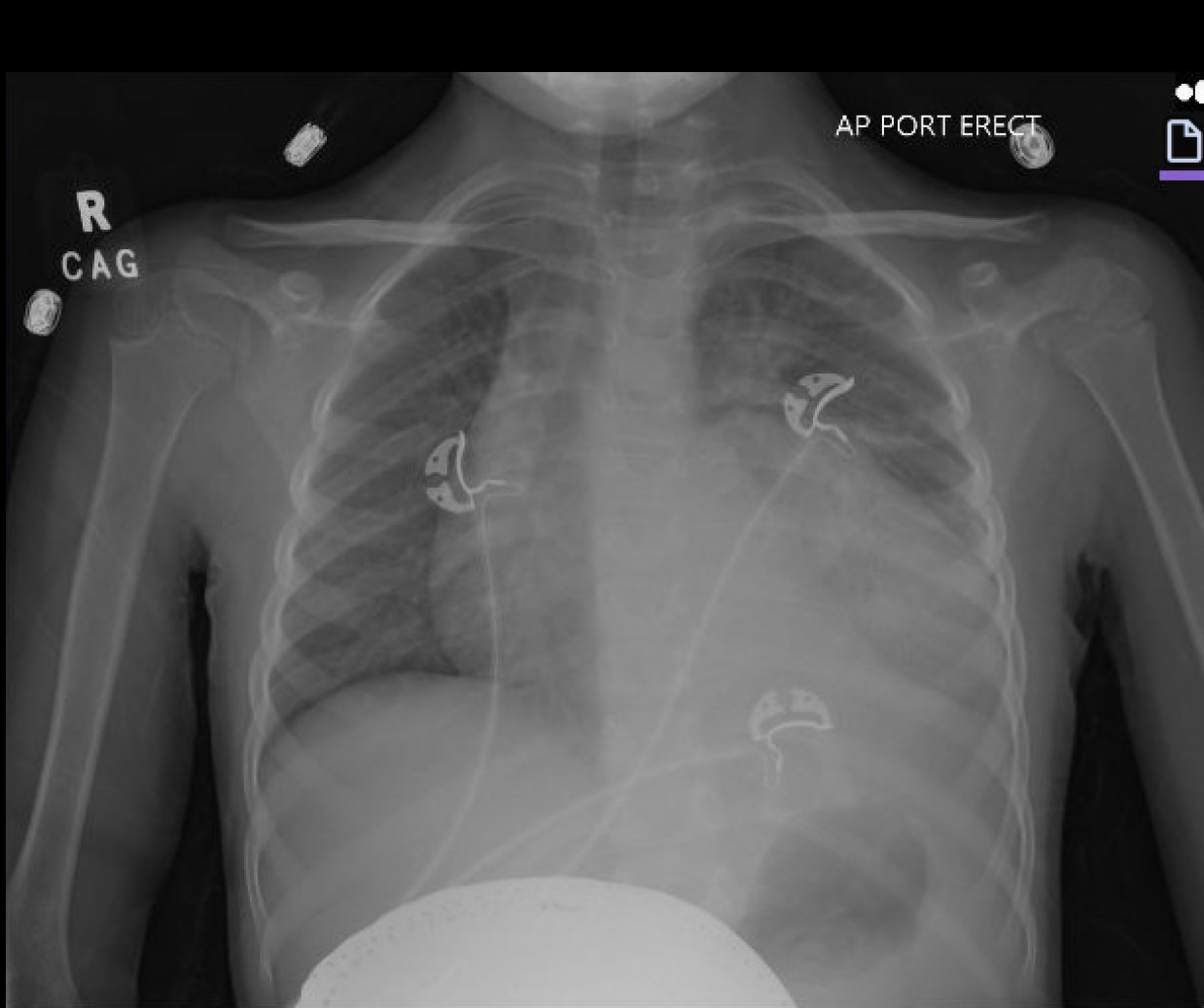
Variant 2:

Child. 3 months of age and older. Immunocompetent. Community-acquired pneumonia that does not respond to initial outpatient treatment or requires hospital admission. Initial imaging.

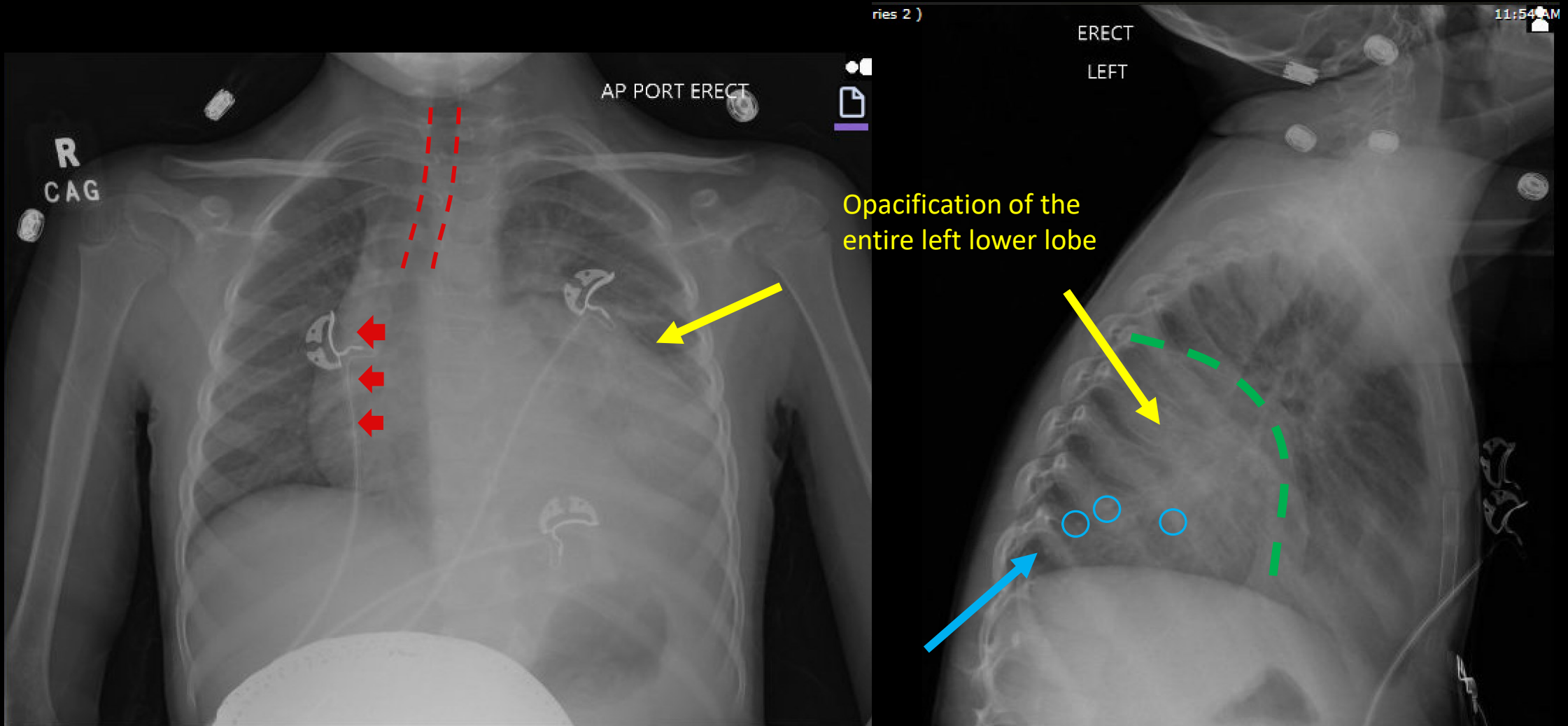
Procedure	Appropriateness Category	Relative Radiation Level
Radiography chest	Usually Appropriate	☢
US chest	May Be Appropriate	○
CT chest with IV contrast	Usually Not Appropriate	☢☢☢☢
CT chest without and with IV contrast	Usually Not Appropriate	☢☢☢☢
CT chest without IV contrast	Usually Not Appropriate	☢☢☢☢
MRI chest without and with IV contrast	Usually Not Appropriate	○
MRI chest without IV contrast	Usually Not Appropriate	○

This imaging modality was ordered by the admitting physician

Findings: Chest radiograph (unlabeled)



Findings: Chest radiograph (labeled)



Rightward shift of the cardiomedastinal silhouette

Subtle radiodensities

Superior bowing of the fissure

ACR Appropriateness Criteria

Variant 2:

Indeterminate mediastinal mass on radiography. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
MRI chest without and with IV contrast	Usually Appropriate	○
MRI chest without IV contrast	Usually Appropriate	○
CT chest with IV contrast	Usually Appropriate	☼☼☼
CT chest without IV contrast	Usually Appropriate	☼☼☼
US chest	Usually Not Appropriate	○
Image-guided transthoracic needle biopsy	Usually Not Appropriate	Varies
CT chest without and with IV contrast	Usually Not Appropriate	☼☼☼
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☼☼☼☼☼



This imaging modality was ordered by the primary team

Findings: CT chest with IV contrast (unlabeled)



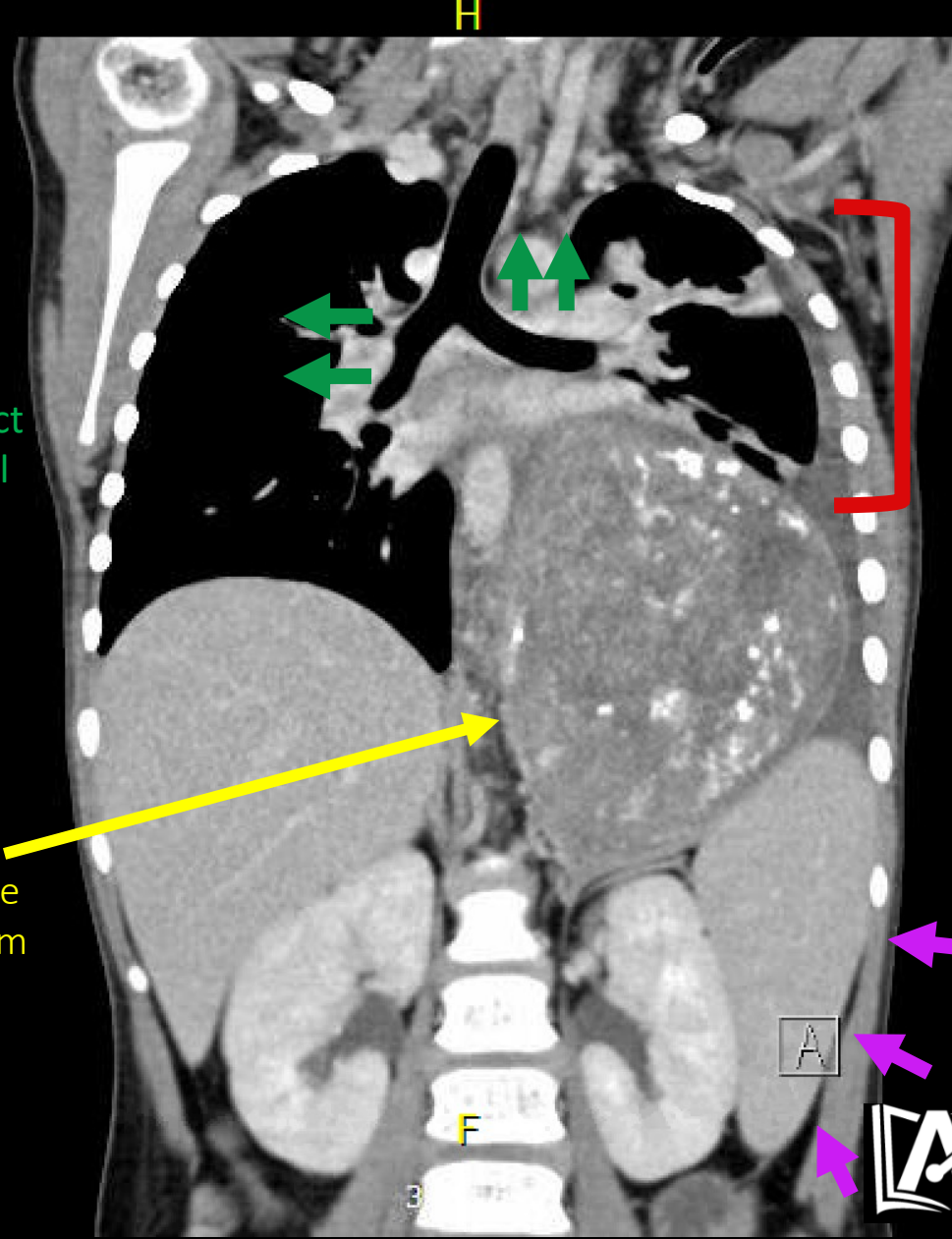
Findings: CT chest with IV contrast (labeled)



Rightward and upward mass effect on the mediastinal structures

Heterogeneously-enhancing left paraspinal mass in the posterior mediastinum

Contains scattered internal calcifications



Compressive atelectasis of the left lower lobe with pleural effusion

Splenomegaly

Final Dx:

Neuroblastoma

Neuroblastoma

- An embryonal neuroendocrine tumor arising from neural crest derived cells
- The most frequently occurring extracranial childhood tumor, typically occurring in infants and young children
 - Mean age of dx is 17 months, 95% of cases dx before age 10
- Can occur anywhere along the sympathetic nervous system
 - Adrenal glands (35%)
 - Extra-adrenal paraspinal ganglia (30%)
 - Mediastinum (20%)
- Typically presents with pain and symptoms of mass effect, may be accompanied by unique syndromes
 - Opsoclonus-myoclonus: rapid involuntary eye and limb movements
 - Raccoon eyes: Proptosis and periorbital ecchymoses due to orbital metastases
 - Pepper syndrome: hepatomegaly due to adrenal tumor with extensive liver metastases

Neuroblastoma: Imaging and Diagnosis

- Radiographically appears as a non-specific soft tissue mass with internal calcifications
 - May be accompanied by lytic bone metastases with periosteal reaction
- CT or MRI of the primary tumor often demonstrates a heterogeneous mass with calcifications and areas of necrosis
 - Often seen encasing vessels and accompanied by enlarged lymph nodes
 - MRI and CT should be used to evaluate areas of possible invasion or metastasis, especially neural foramen and spinal canal invasion
- The diagnosis of neuroblastoma is confirmed on histology via biopsy
- Patients with a confirmed diagnosis of neuroblastoma should be evaluated for metastatic disease with I-123 MIBG scan
 - Sensitive and specific for neuroendocrine tumors

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