MS COW 5

History

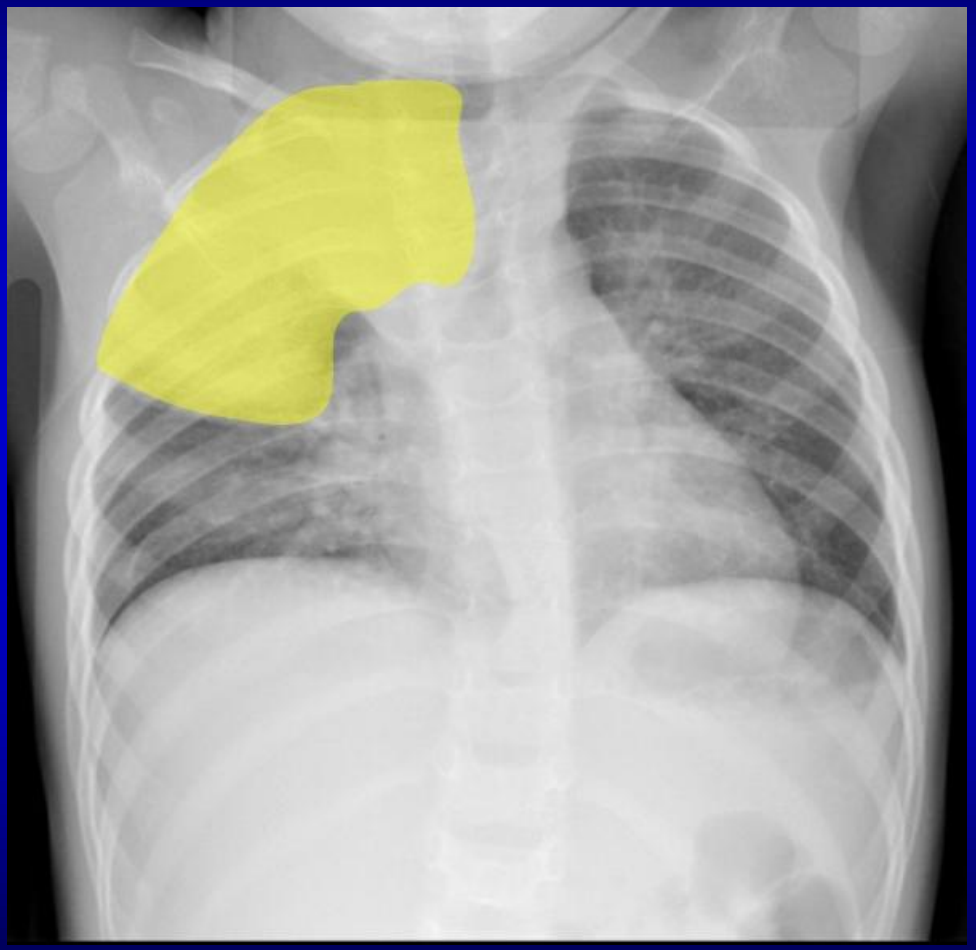
- 2 year old boy, previously healthy. Mom started noticing that he had some decreased energy over the last two weeks and also that he was having intermittent episodes of coughing.

- Grandma came over for a visit and noticed that the patient's right eye looked a little "droopy".

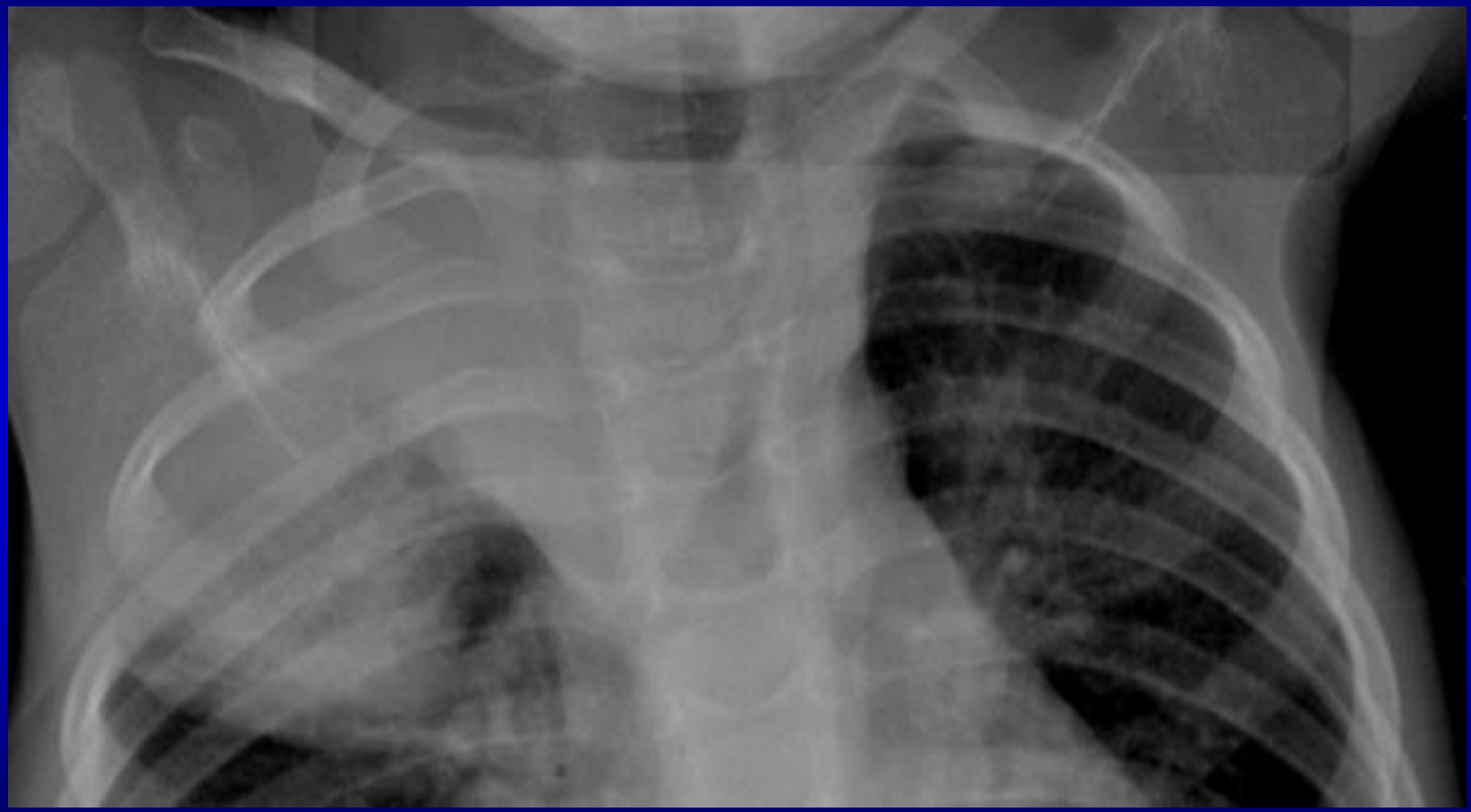
Initial chest x-ray

Initial chest x-ray

- Right upper lobe opacity!
- What is it doing to the trachea? The ribs?

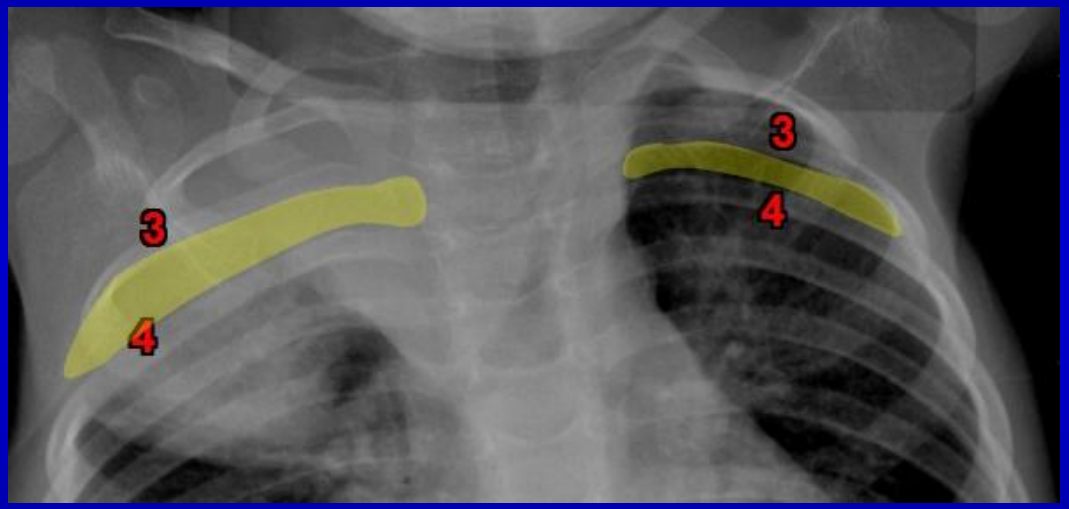


Closer look

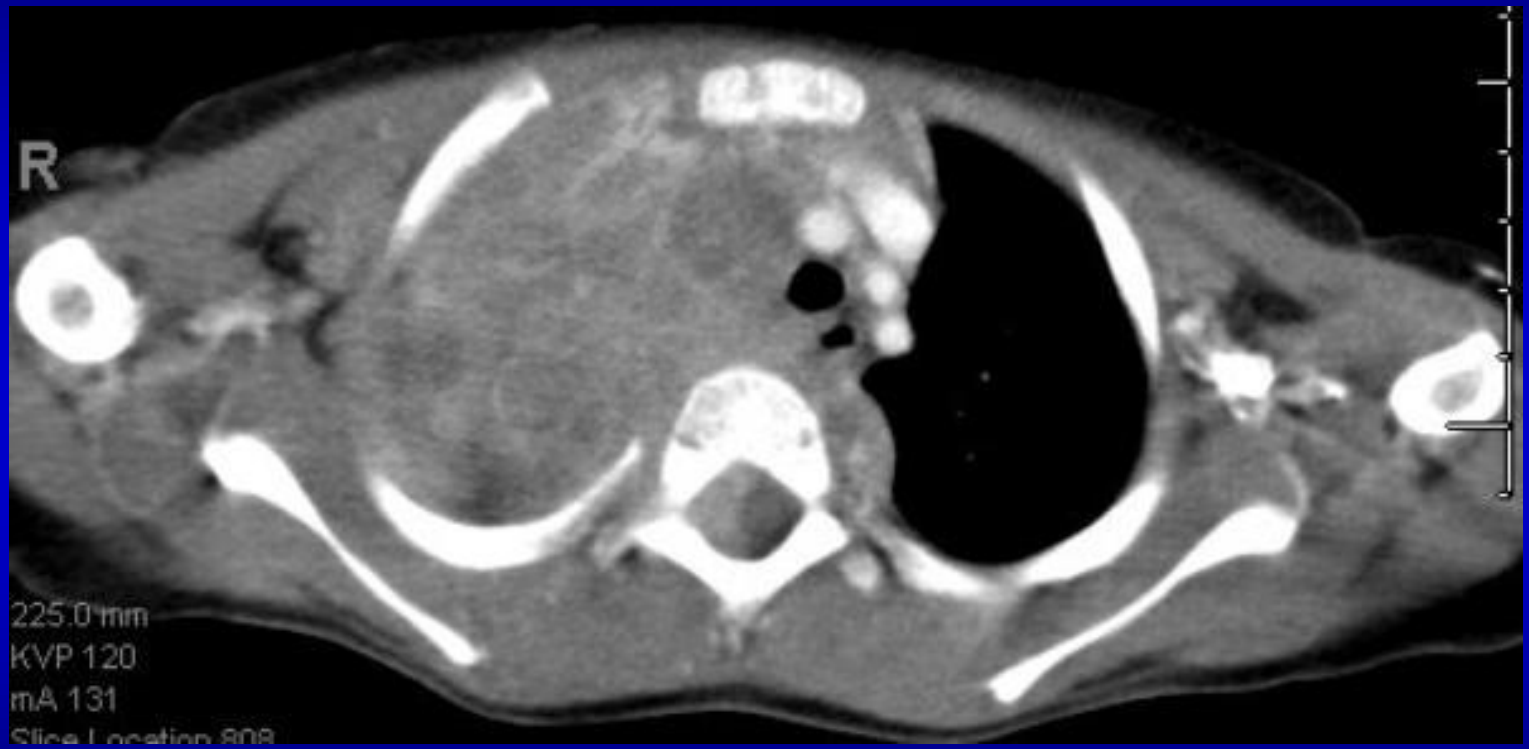


Closer look

- The space between the right posterior 3rd and 4th ribs is increased compared to the left side.
- Pneumonia and other lung processes won't cause the ribs to spread.
- This tells you that this is a mass and likely is located in the posterior mediastinum.

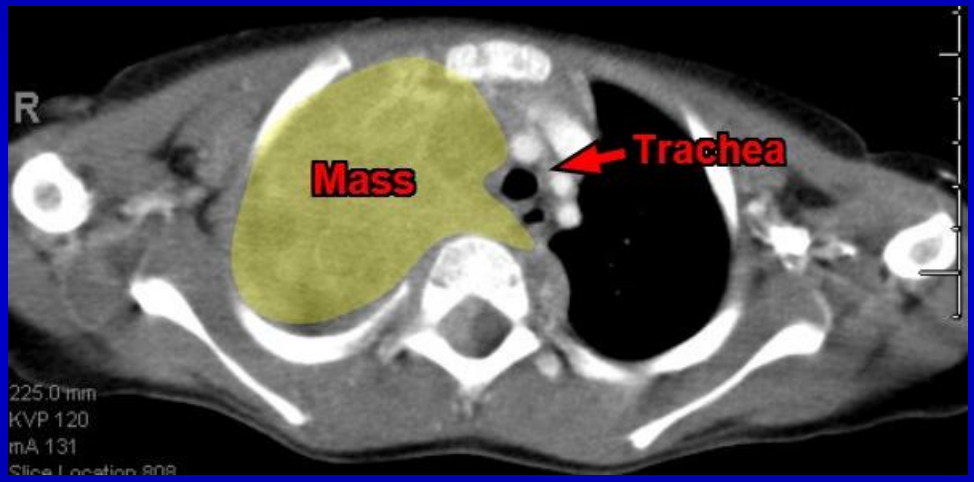


Axial CT image

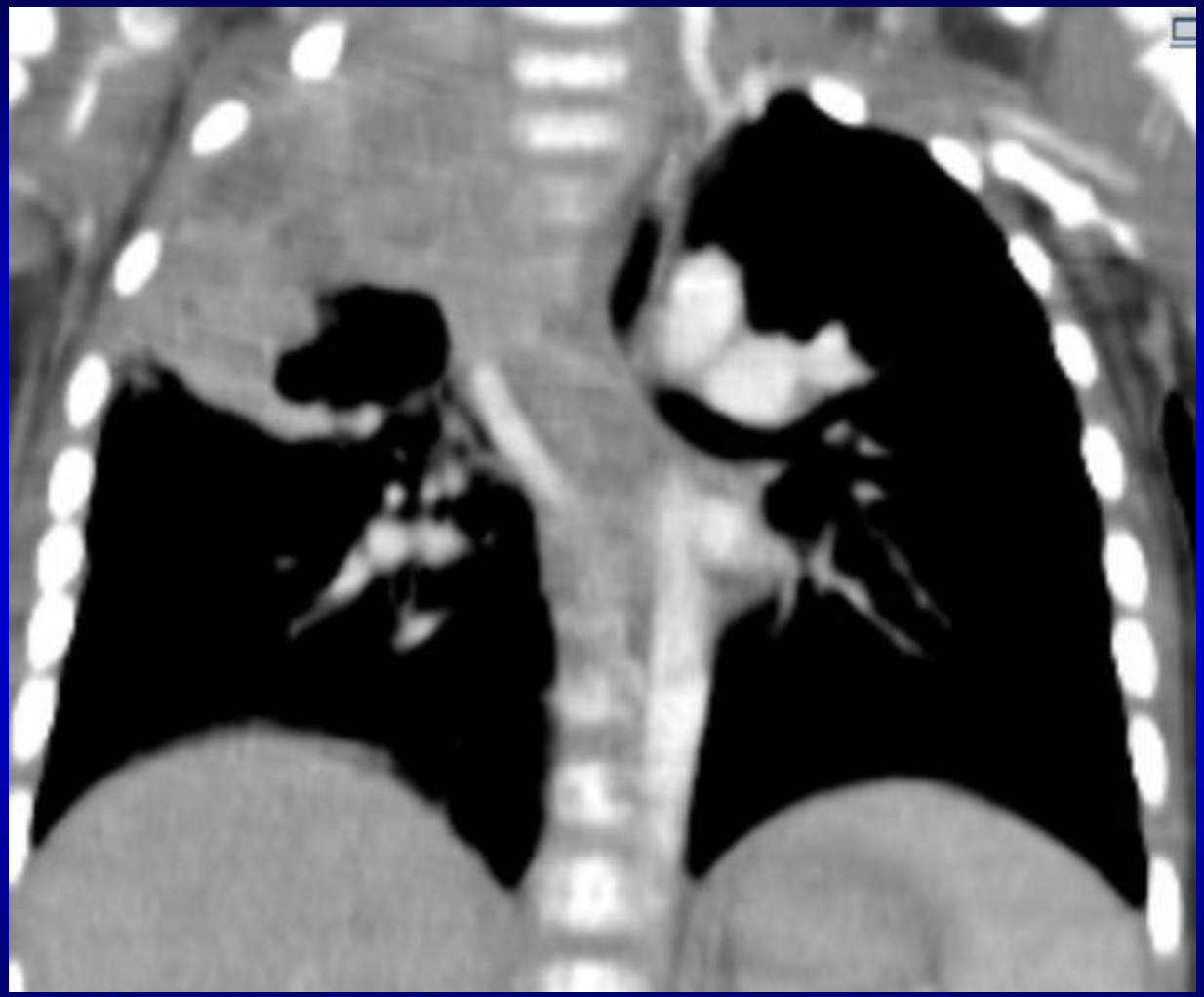


Axial CT image

- Right sided mass
- Notice how it is pushing the trachea to the left
  - just like we saw on the CXR!

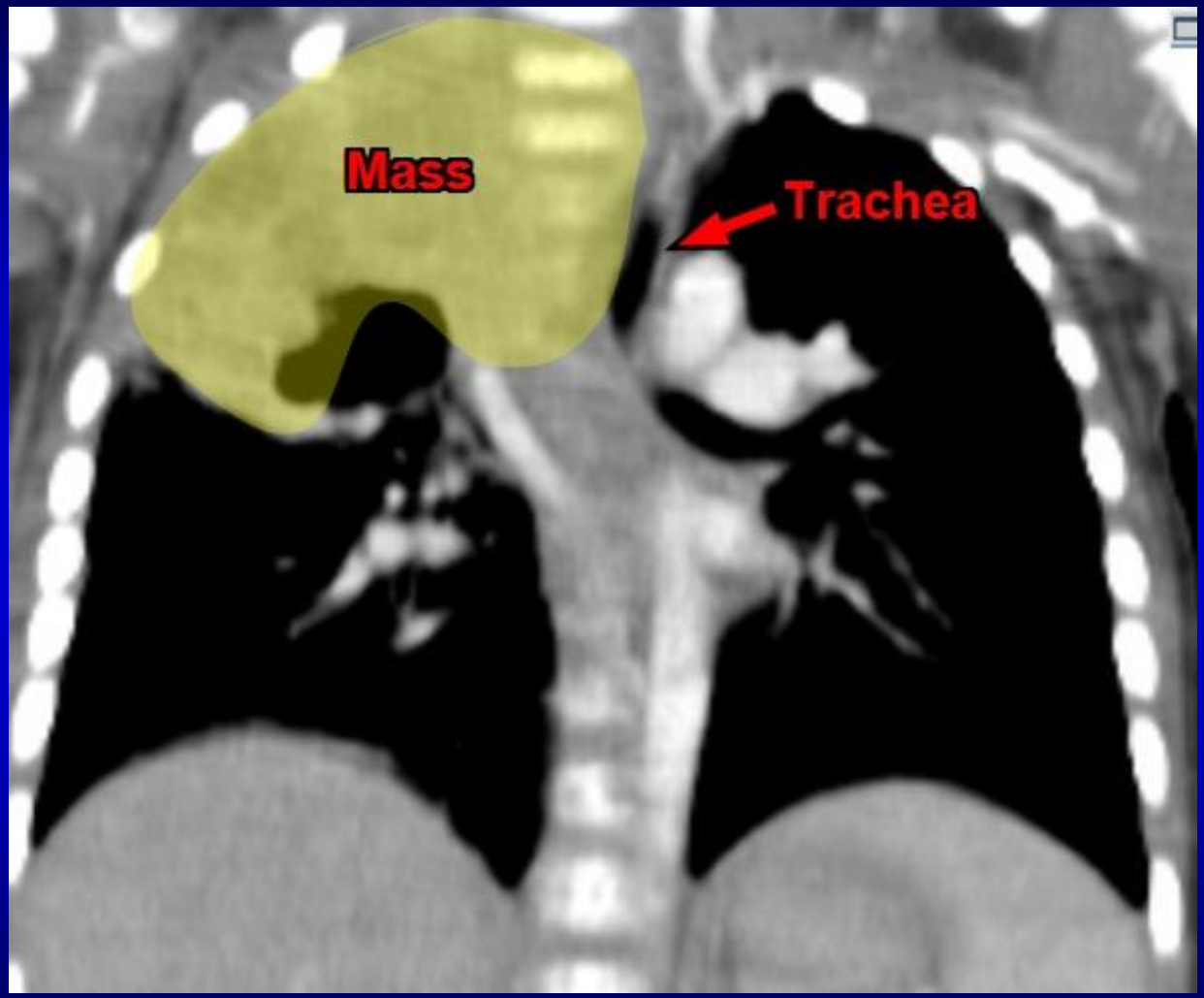


Coronal CT image



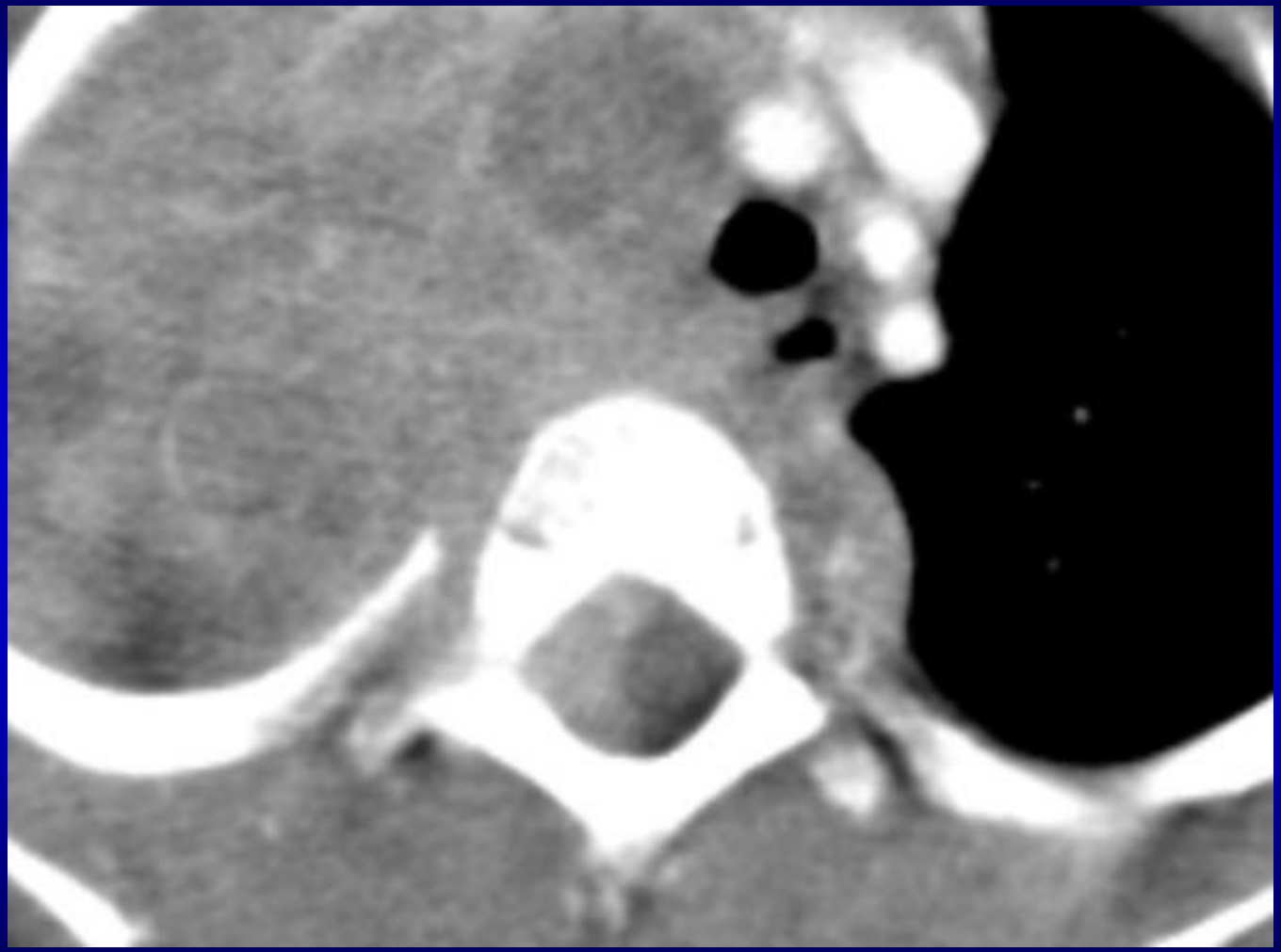
This image is similar orientation to the CXR image

Coronal CT image



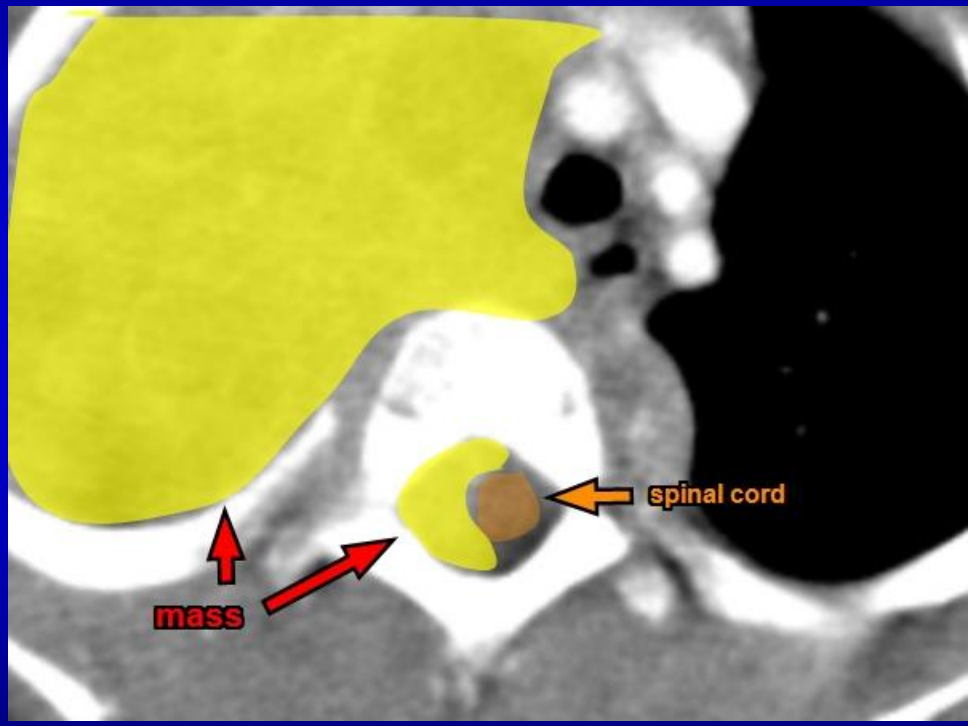
This image is similar orientation to the CXR image

Close up axial image



Close up axial image

- It looks like there is extra soft tissue going into the spinal canal - it even pushes the spinal cord to the left!
- This tells you that this has to be a posterior mediastinal mass, and in a 2 year old there is only 1 thing this is likely to be.....



Findings

- Chest radiograph:
  - opacity in the right upper lobe
  - widening of the space between the right posterior ribs
- Chest CT:
  - large heterogenously enhancing mass centered in the posterior mediastinum
  - mass effect on the middle mediastinum (trachea, vessels)
  - enhancing tissue is seen in the spinal canal, causing mass effect on the spinal cord

A Question

- Grandma noticed that the patient's right eyelid was "droopy" - Why did that happen? What is that called?

Diagnosis

Neuroblastoma

Differential Diagnosis

- Peds posterior mediastinal mass:
  - Neuroblastoma (malignant neurogenic tumor)
  - Ganglioneuroblastoma (a less malignant neurogenic tumor)
  - Ganglioneuroma (benign neurogenic tumor)
  - Sarcoma (from bone or soft tissues) growing into posterior mediastinum
  - Others (infection, loculated pleural effusion)

Differential Diagnosis

- Adult posterior mediastinal mass:
  - Neurogenic tumor (ganglioneuroma, schwannoma, etc...) - neuroblastoma doesn't occur in adults!
  - Extramedullary hematopoesis
  - Others (infection, pleural fluid, etc...)

Discussion

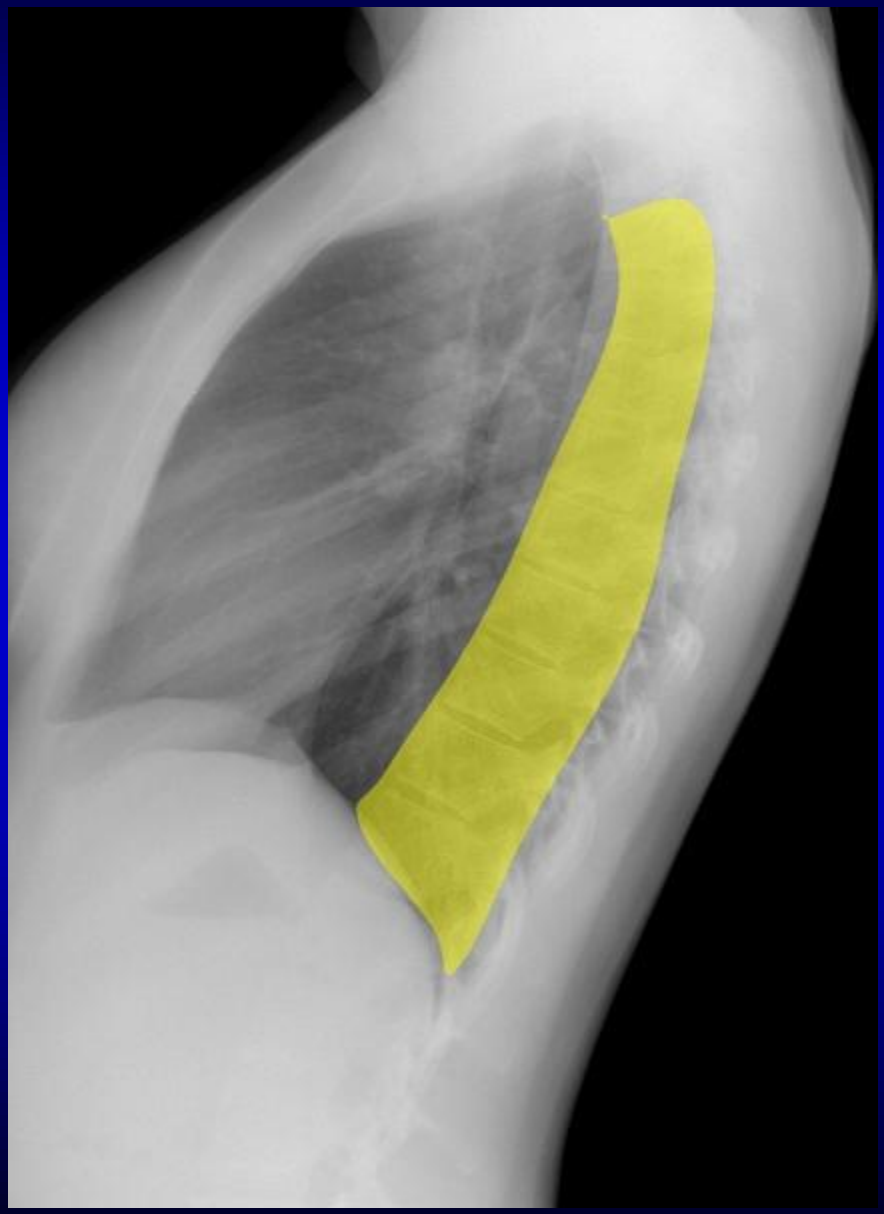
- The posterior mediastinum is located posterior to the middle mediastinum.
- Imagine you are looking at a lateral chest x-ray
  - Draw an imaginary line down the anterior portion of the vertebral bodies
  - Everything behind that line (but still inside the mediastinum) is in the posterior mediastinum.
  - Go back to the figures for an example.

Discussion

- The posterior mediastinum mainly contains neurovascular structures.
- As such, most tumors that arise in the posterior mediastinum come from one of these two things
  - (most commonly nerves)
- The types of masses that arise in the posterior mediastinum depend on the age of the patient.

Posterior mediastinum

- Normal lateral chest x-ray in a different patient. The shading indicates the posterior mediastinum.



Discussion

- In young children (i.e., <5 years), the most common posterior mediastinal mass is a malignant tumor of immature sympathetic nervous tissue (neuroblastoma).
- This is what our patient had.

Discussion

- As you move into later childhood and young adulthood, masses in the posterior mediastinum tend to be more benign, but are still commonly from neurogenic origin.
  - These include ganglioneuroblastoma (intermediate malignancy), ganglioneuroma (benign), schwannoma (benign) and neurofibroma (especially in patients with Neurofibromatosis Type 1).

Discussion

- In older patients, the posterior mediastinum can be invaded by tumors originating outside this space (e.g., lung cancer, esophageal cancer).

- In patients with abnormal bone marrow, the paraspinal spaces can fill with masses of extramedullary hematopoetic tissue
  - This is called: Extramedullary hematopoiesis

Discussion

- Do you know why our patient had a drooping eyelid?

- The mass was so large that it was causing mass effect on his sympathetic nervous system and causing what is called "Horner's syndrome". This is recognized by the following triad:
  - 1. Ptosis - drooping eyelid
  - 2. Miosis - constricted pupil
  - 3. Anhidrosis - lack of sweating