Dayton Children's Medical Center

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Trauma Medical Director

History

- 11 month old male involved in MVC
- Transported to Dayton Children's by Dayton Paramedics with a transport time of < 11 minutes.
  - Restrained back seat forward facing passenger
  - Vehicle "T-boned" by another vehicle, resulting in the car being split in half
  - The patient was found in the car seat which had been ejected and landed in the back yard of a house at that intersection
  - Responsive at scene, but GCS decreased from 9 to 4

History cont.

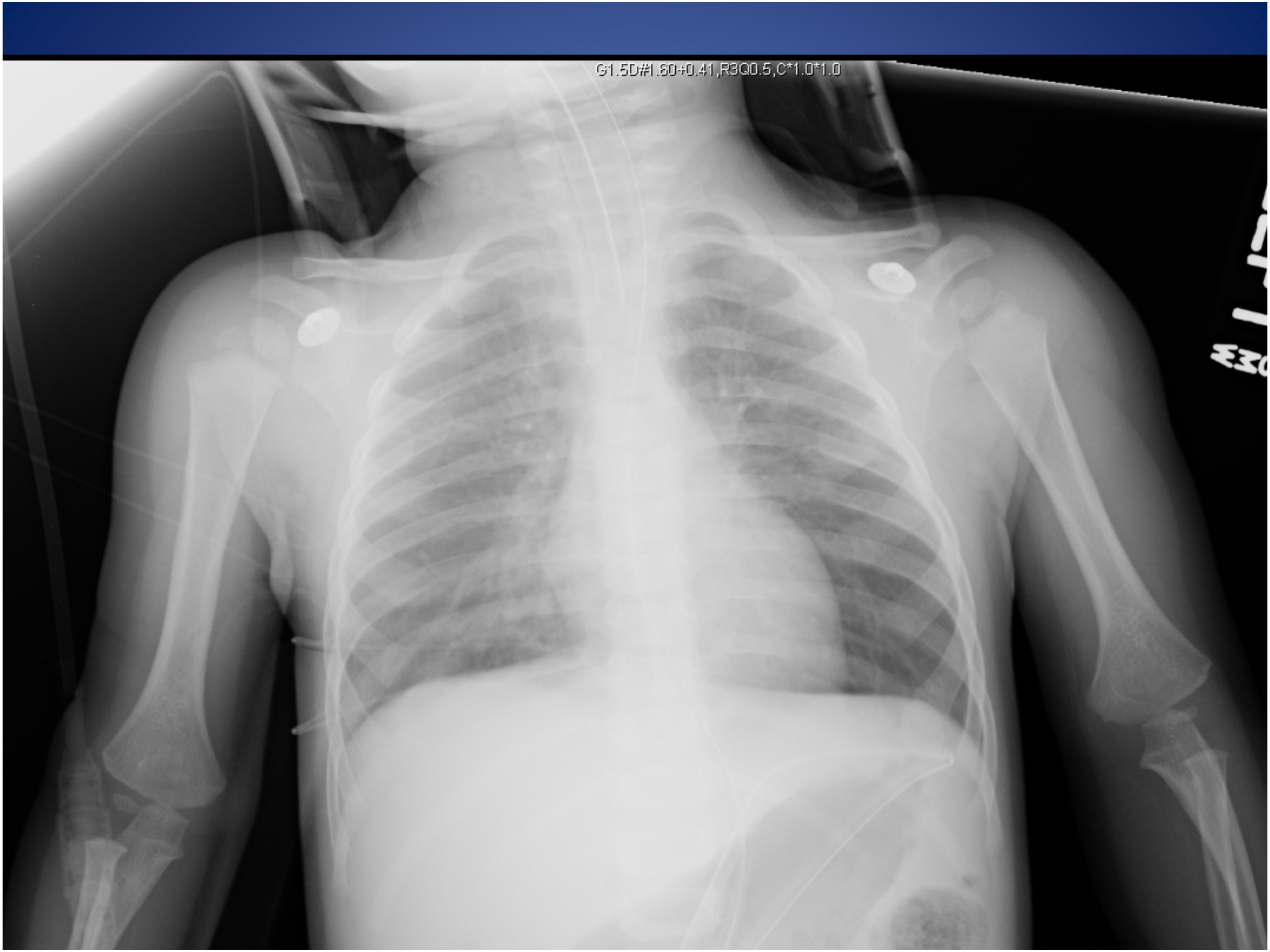
- Presented to CMC as an Alpha trauma alert
  - Initial injuries:
    - Forehead abrasion
    - Initial GCS of 9, decreased responsiveness
      - Intubated in trauma bay
    - Abrasion to left lower extremity

Labs:

- H/H: 11.2/34.8
- AST: 633
- ALT: 250
- Lipase: 55
- Amylase: 184

Imaging:

- CT head:
  - Cerebral edema, extra-axial fluid on the right
- Chest X-ray
- LLE plain films
  - Small buckle fracture of left tibia
- CT abdomen deferred secondary to benign abdominal exam

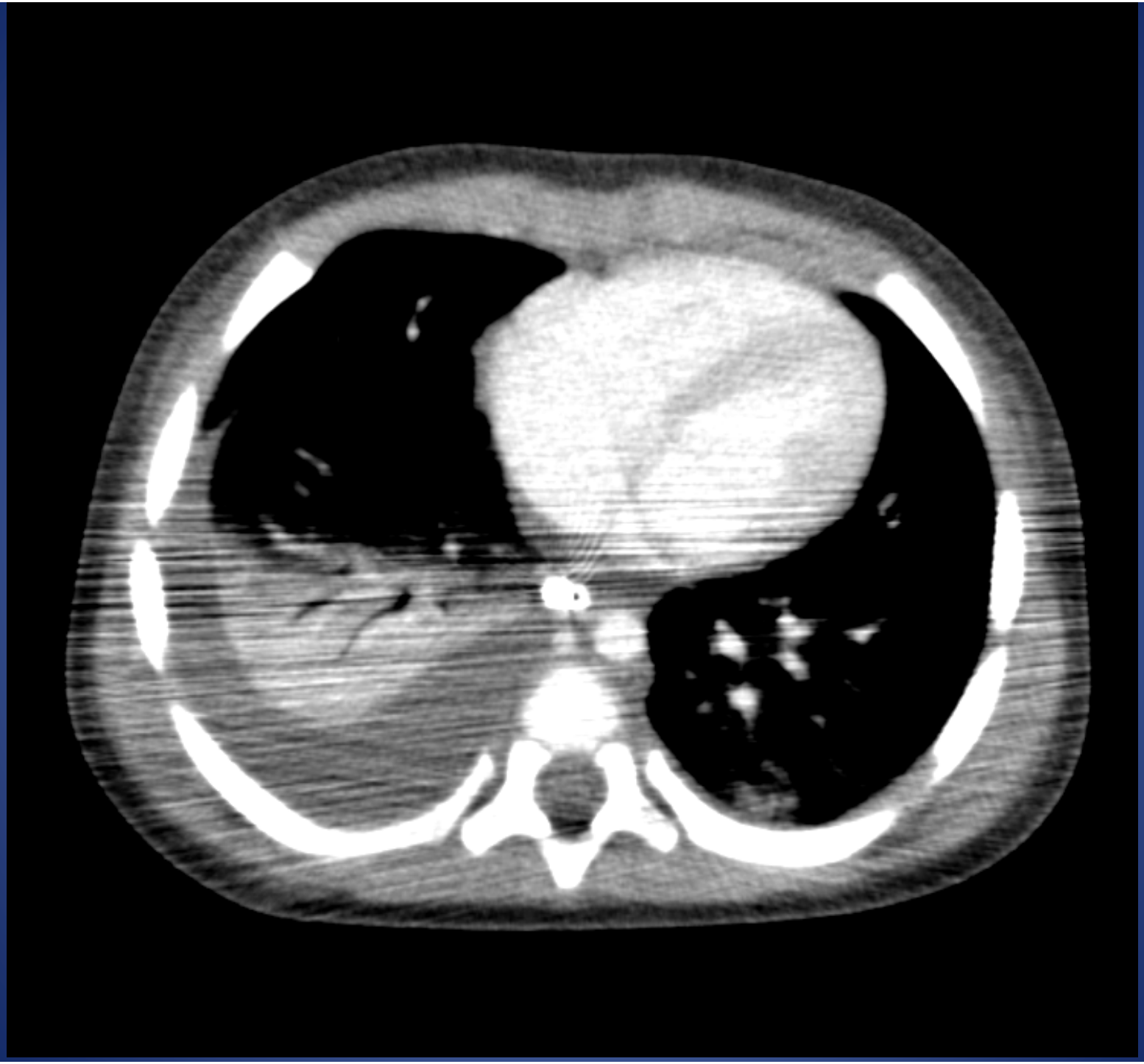

G1.5D#1.60+0.41,R3Q0.5,C*1.0*1.0

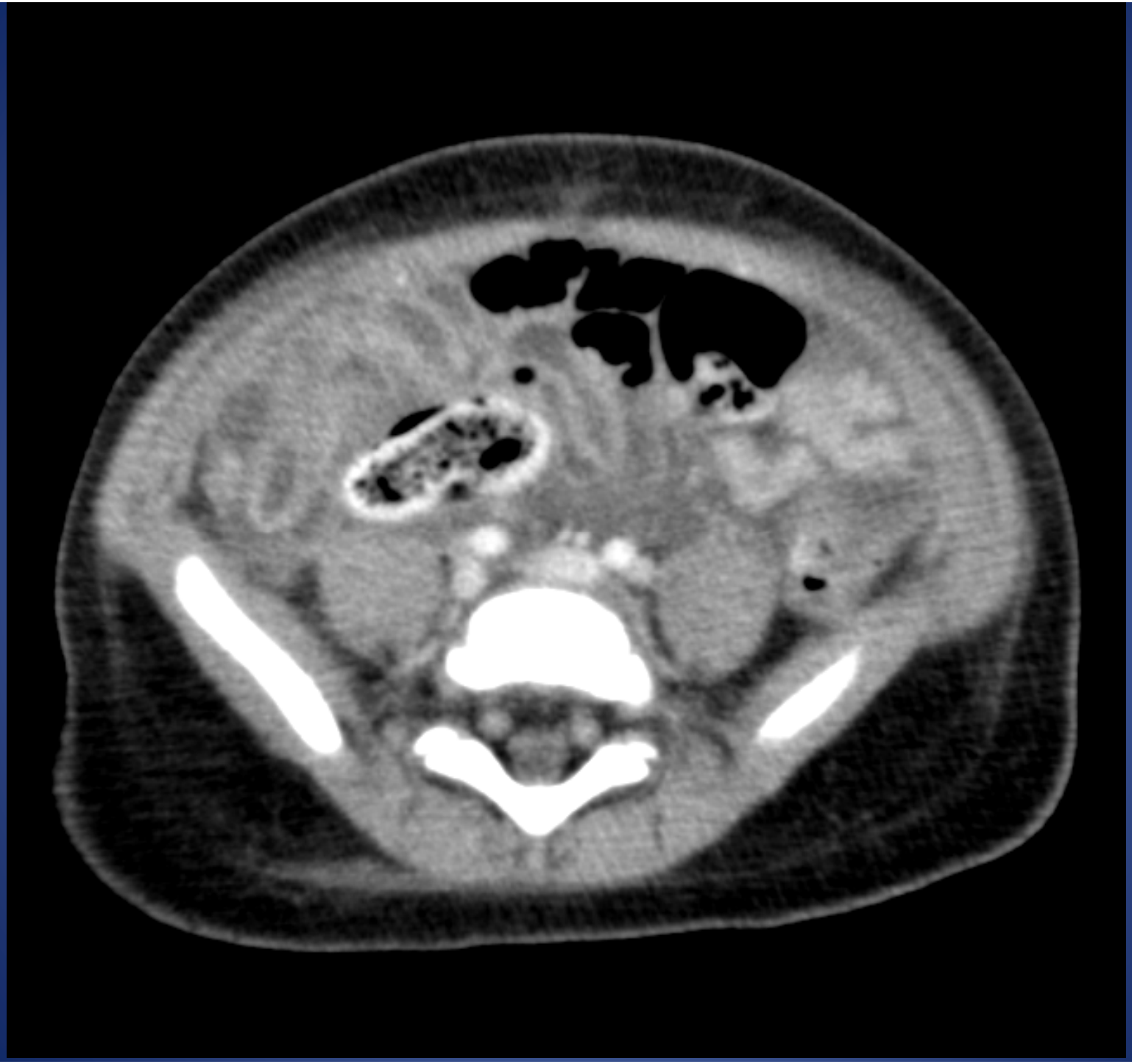
Course

- Admitted to PICU
- Neurosurgery consulted
  - Bolt placed
  - Opening pressure recorded as 23
  - Overnight ICP's peaked to 30-40

Course Cont.

- PTD 2
  - Hgb drop to 7.8
  - Concern for missed abdominal injury
  - CT abd/pelvis performed





CT abd/pelv

- Right pleural effusion
- Atelectasis
- No solid organ injury
- Large amount of intraabdominal fluid

Course cont.

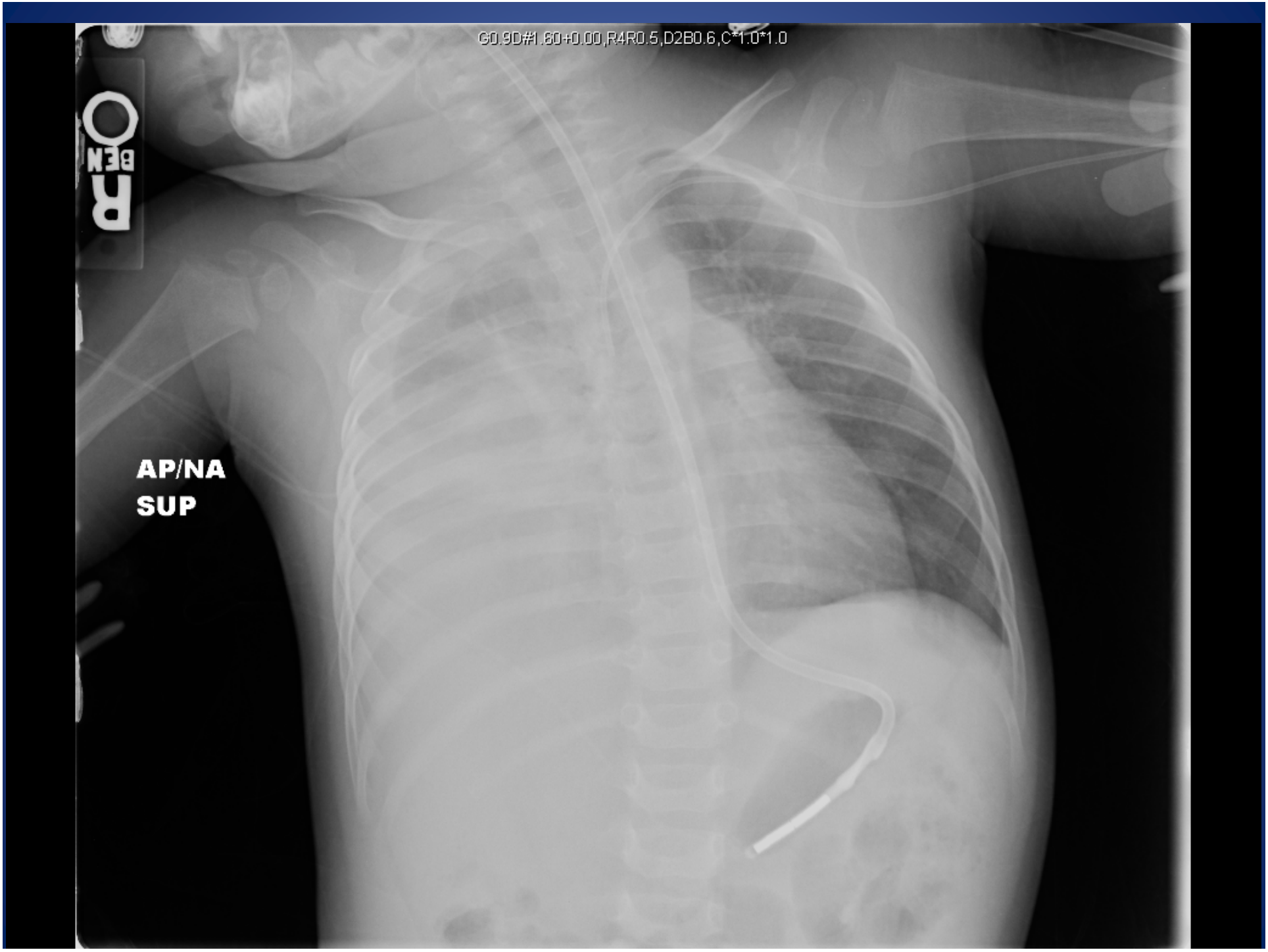
- IR performed paracentesis
- Blood in fluid
  - >35,000 RBC/hpf
- Patient to OR for ex lap
  - Small contusion to paracolic mesentery
    - No other injury noted

Course cont.

- Thoracentesis postoperatively
  - Bloody pleural fluid drained by IR
- Pt kept in ICU until PTD 14
  - Extubated, ICP monitor removed
  - Slow recovery of neurologic function
- Swallowing difficulty
  - NG feeds during therapy
  - Consideration of definitive feeding access

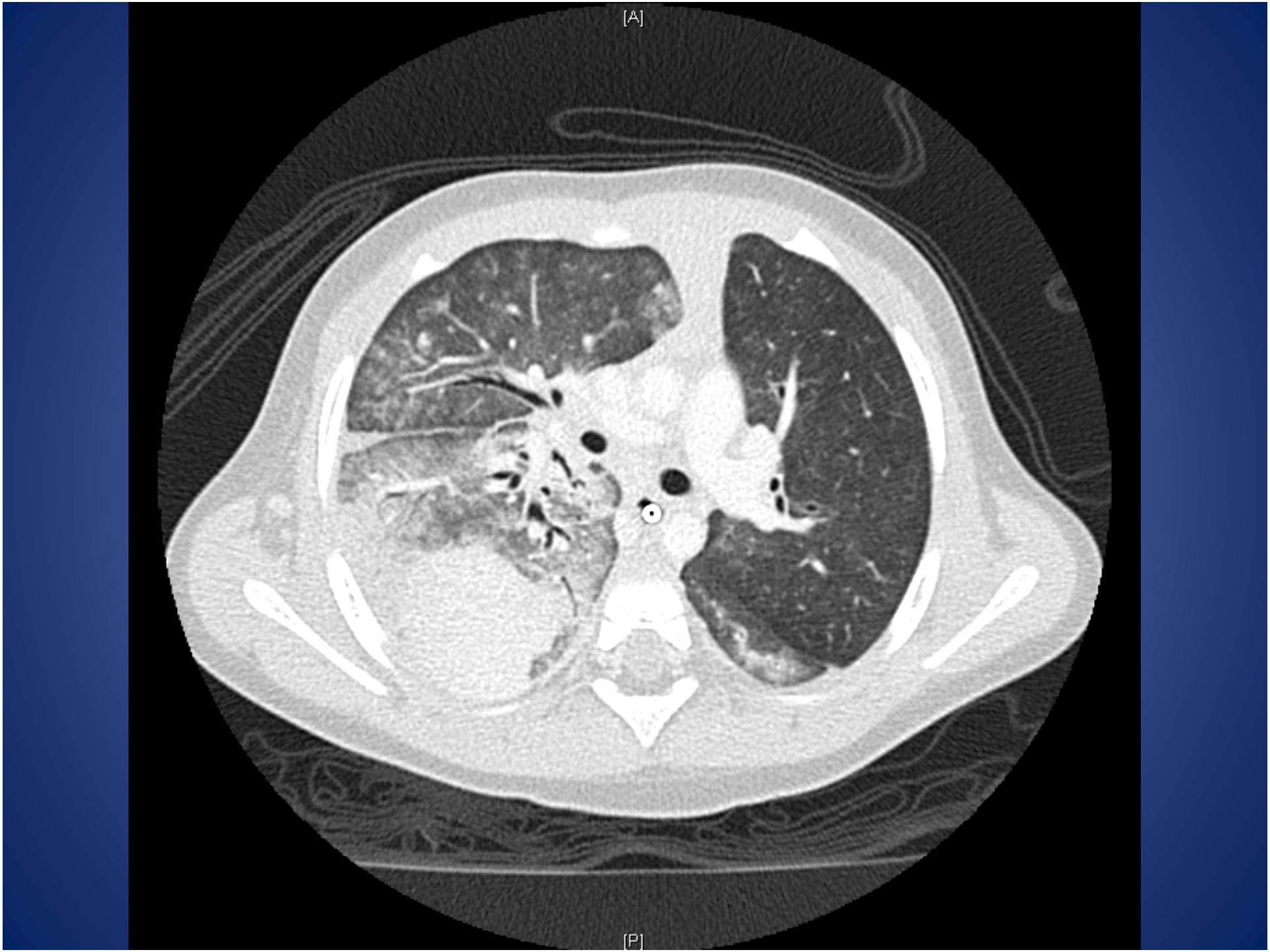
Course Cont.

- PTD 32
  - During speech therapy session, patient thought to have aspiration event
  - Some SOB that night with mild increase in O2 requirement
  - CXR obtained


G0.9D#1.80+0.00,R4R0.5,D2B0.6,C*1.0*1.0
R
BEN
AP/NA
SUP

Course Cont.

- Abx therapy begun for aspiration pneumonia
- PTD 33-43
  - Intermittent improvement in pulmonary status
  - Apparent consolidation in right lung without improvement
  - CT Chest performed to characterize nature of problem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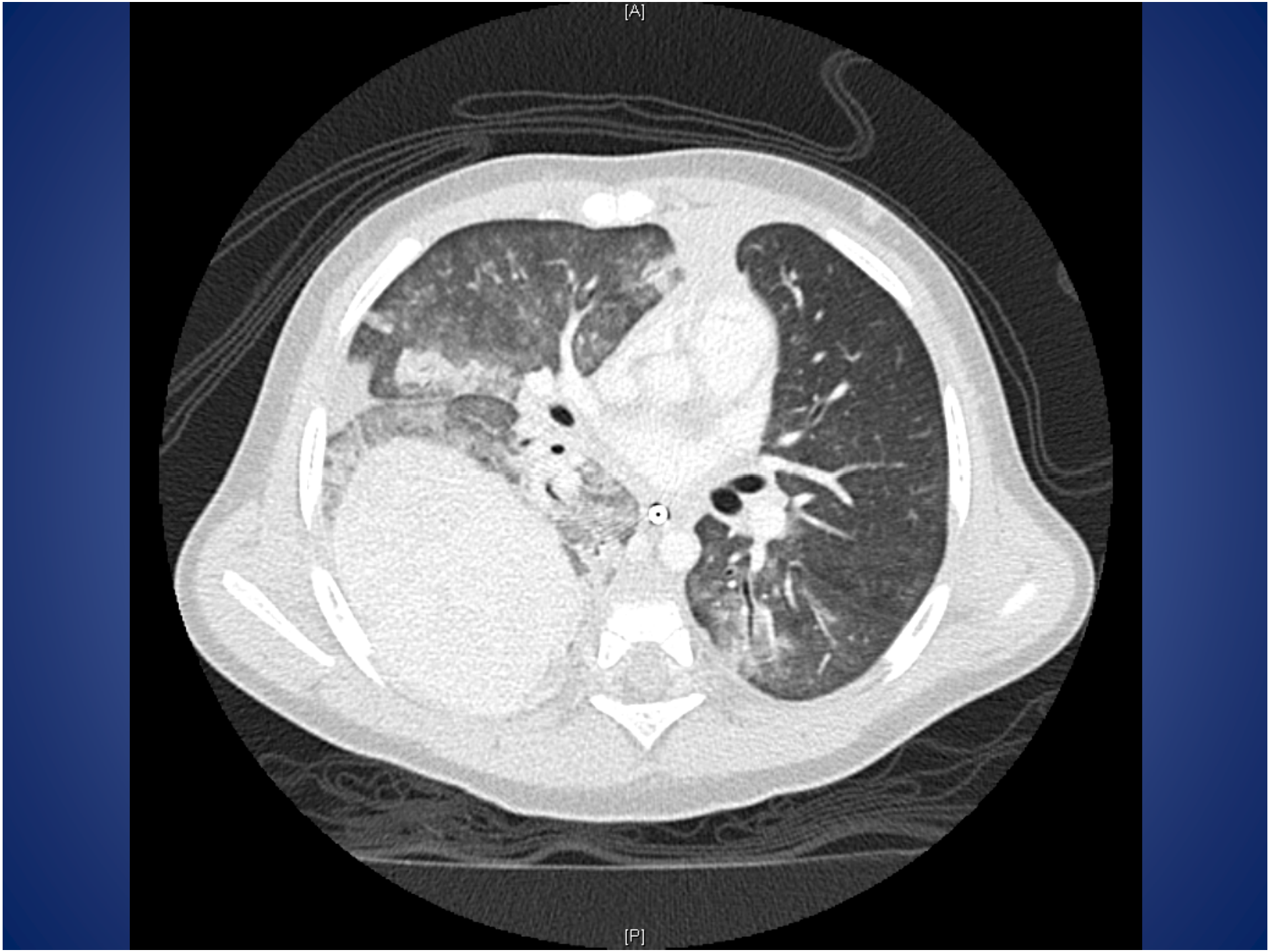
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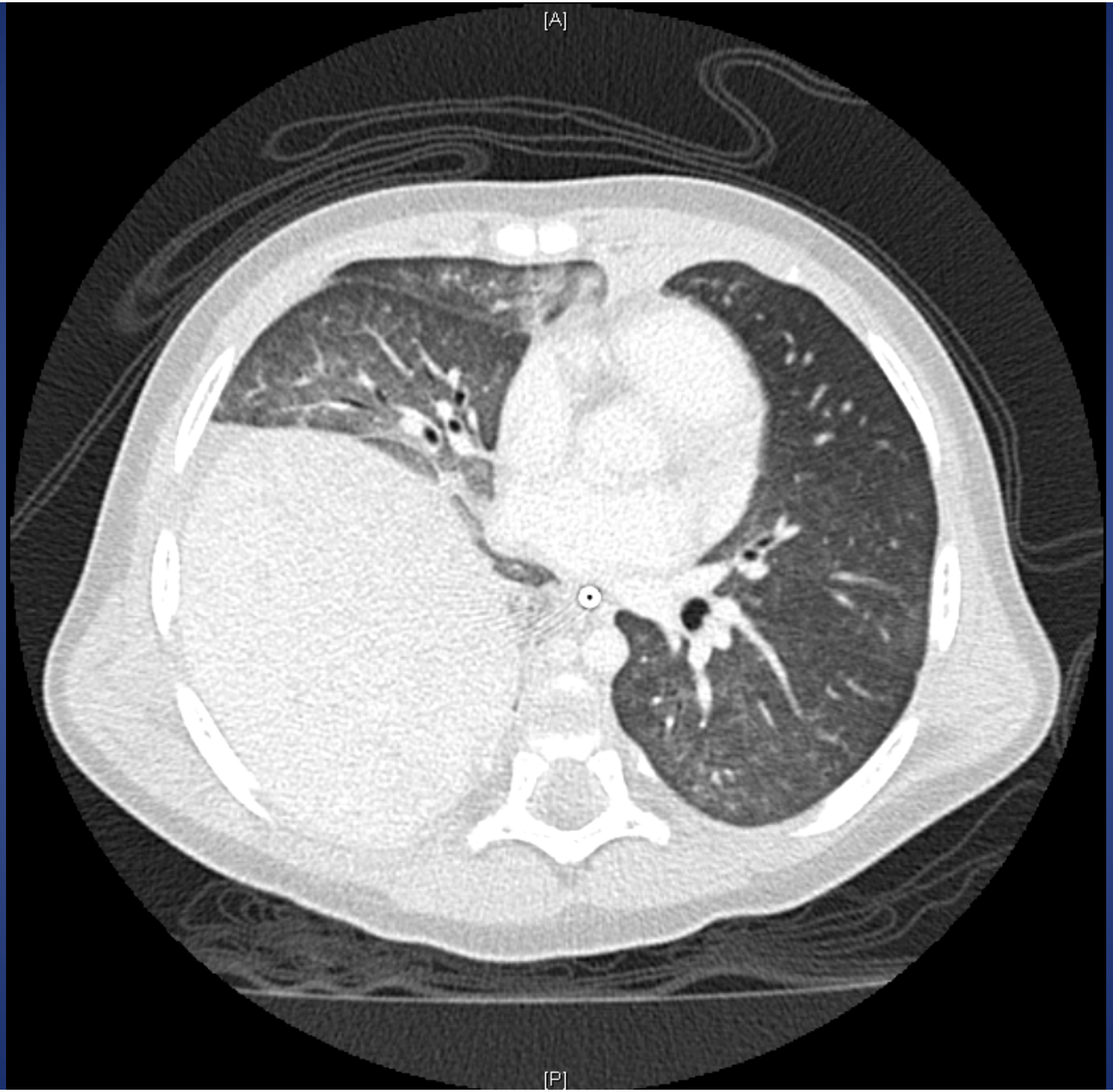
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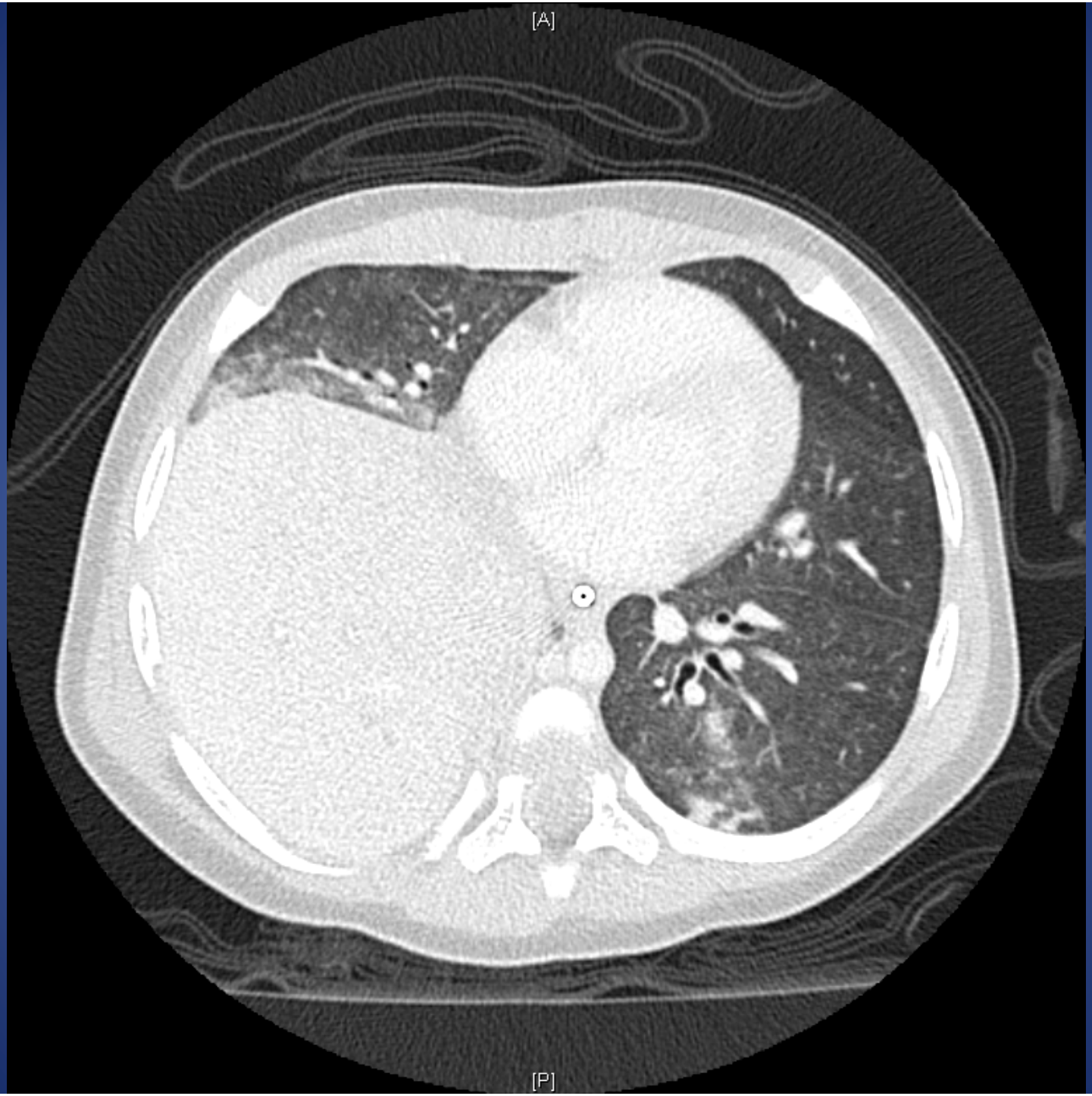
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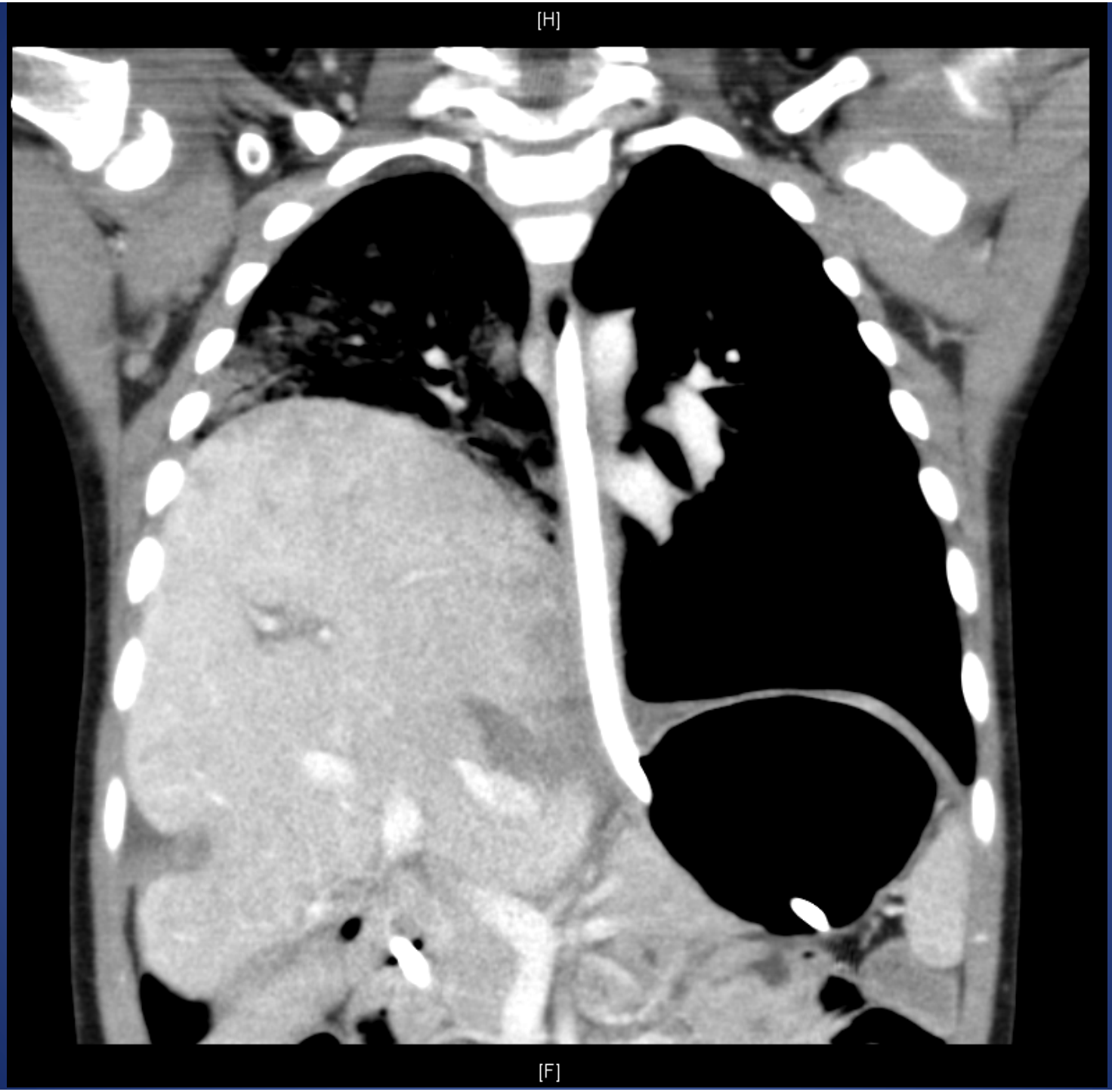
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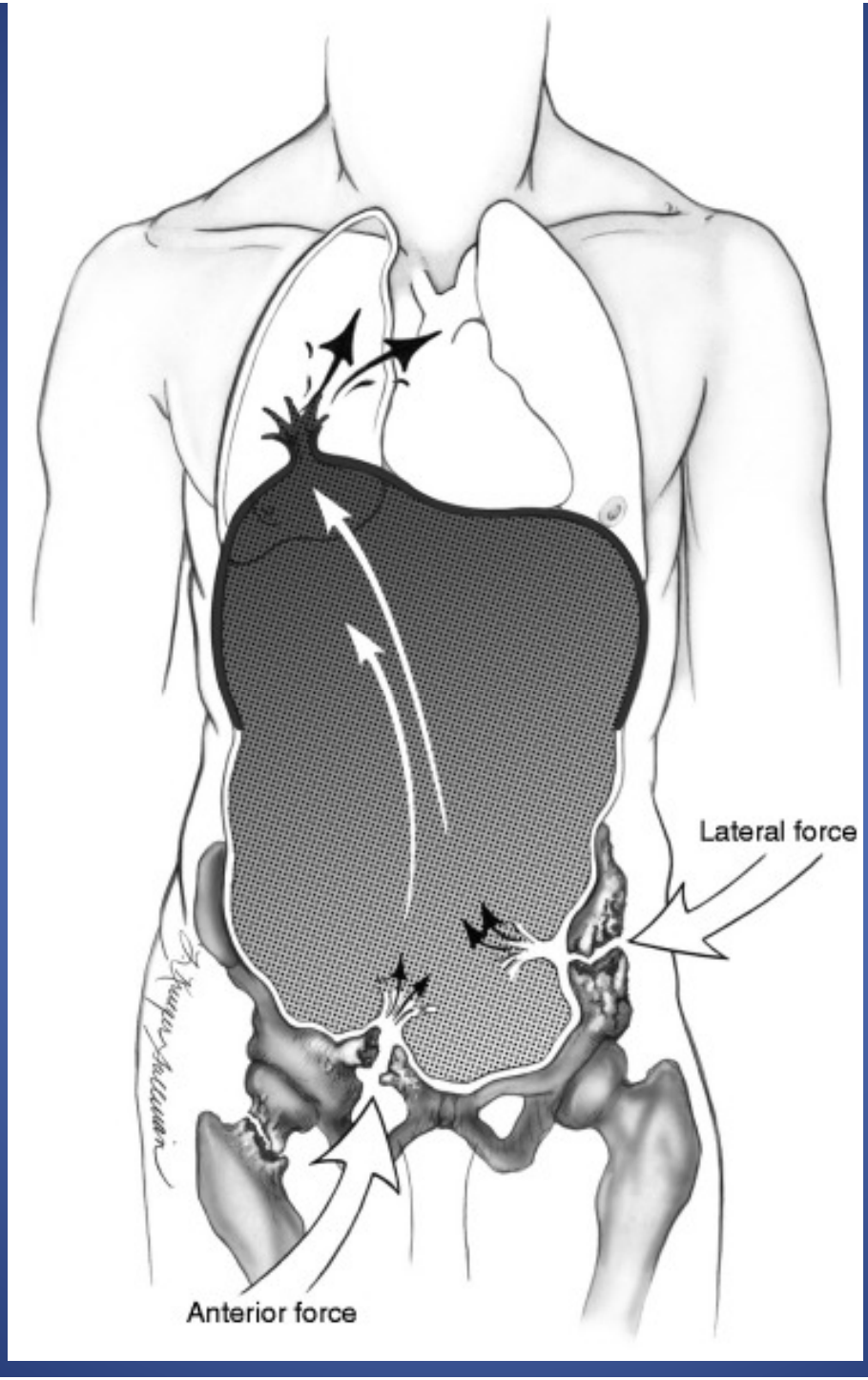
Course Cont.

- PTD 44
  - Diaphragmatic hernia repair performed through right thoracotomy
    - Liver and gallbladder incarcerated in thoracic cavity.
    - 6cm defect opened an additional 3 cm for reduction
    - Repaired with single layer, interrupted, non-absorbable suture
- Uneventful recovery
  - Discharged to rehab on PTD 53

Discussion

- Incidence of diaphragmatic hernia secondary to blunt trauma
  - 0.8-5%
  - 90% occur in young men secondary to MVC
  - Right sided rupture rare
    - 5-20% of all diaphragmatic disruptions
- In children
  - Uncommon, and associated with severe trauma
  - Incidence of associated injuries is 75-90%


Lateral force
Anterior force

Discussion

- At time of injury (rupture)
  - Physical exam – non-specific
  - Plain films reported sensitivity as low as 17%
  - 30-40% of initial CXRs normal
  - CT – sensitivity between 14% and 61% and specificity between 76% and 99%
- Exploration?
  - 31% of patients with diaphragmatic rupture have no abdominal symptoms

Discussion

- Diagnosing right sided rupture in the acute setting
  - Boulanger BR, 1993 University of Maryland
    - Series of 80 blunt traumatic diaphragmatic ruptures diagnosed acutely
    - 59 left (79%), 16 right (20%), 5 bilateral (6%0
    - 27 left sided ruptures diagnosed preoperatively
      - CXR
    - 0 right sided ruptures diagnosed preoperatively
      - 11/11 DPLs performed on group were positive (>100K RBC)

Boulanger BR, Milzman DP, Rosati C, Rodriguez A. A comparison of right and left blunt traumatic diaphragmatic rupture. J Trauma 1993;35:255–60.

Discussion cont.

- Often delayed unless high index of suspicion

Table 1 Details of the patients admitted with TDI

No.	Gender	Age (years)	Time elapsed before admission	Type of trauma	Affected side	Type of herniation	Associated injuries	Surgery
1	Male	2	6 months	RTA	Left posterolateral	Stomach, colon, spleen, small bowel	Minor abrasional injuries	Laparotomy
2	Male	10	2 years	Not known	Left posterolateral	Stomach, small bowel and transverse colon	None	Thoracotomy
3	Male	7	3 years	Fall	Left posterolateral	Stomach, spleen, colon, small bowel	None	Laparotomy
4	Male	4	4 months	Fall of heavy trolley over abdomen	Left posterolateral	Stomach, spleen, small bowel	None	Laparotomy
5	Female	6	3 months	RTA	Left posterolateral	Stomach, spleen, small bowel, and colon	None	Laparotomy
6	Male	6	6 h	RTA	Central tear in left crus near hiatus	Stomach, small bowel and spleen	Fracture Humerus and multiple rib fractures abdominal bruise	Laparotomy
7	Male	8	1 month	Fall	Left posterolateral	Stomach, spleen, small bowel and transverse colon	Scalp laceration with underlying undisplaced fracture	Laparotomy
8	Male	12	1 year	RTA	Left para-central	Stomach, spleen small bowel and colon	Abrasional injuries	Laparotomy

Khan TR, et al. Traumatic diaphragmatic injuries in children: do they really mark the severity of injury? Our experience. Pediatr Surg Int (2009) 25:595–599