Transabdominal chest drainage: A non-vascular approach for a potentially high-risk vascular complication

Camilo Barragan Leal
Vascular and Interventional Radiology Fellow
University of Toronto
Toronto General Hospital UHN/MSH

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University of Toronto
Sinai Health System
University Health Network
Women's College Hospital

Clinical History

- 39-y.o. male with a history of ischemic cardiomyopathy with a heart attack in 2018
  - Recent post-cardiac transplant surgery
- Post-transplant complications
  - ECMO postoperatively due to graft dysfunction

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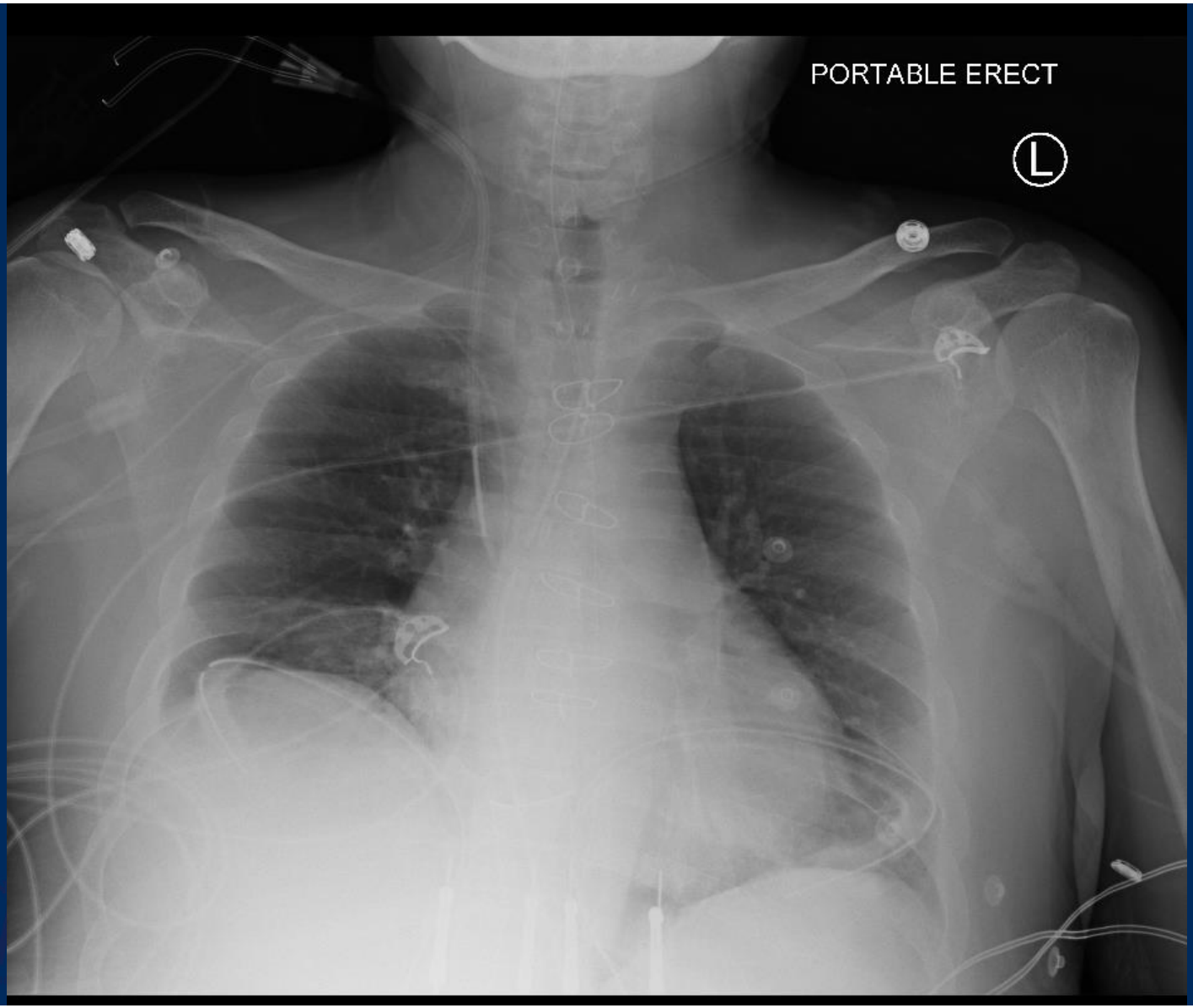
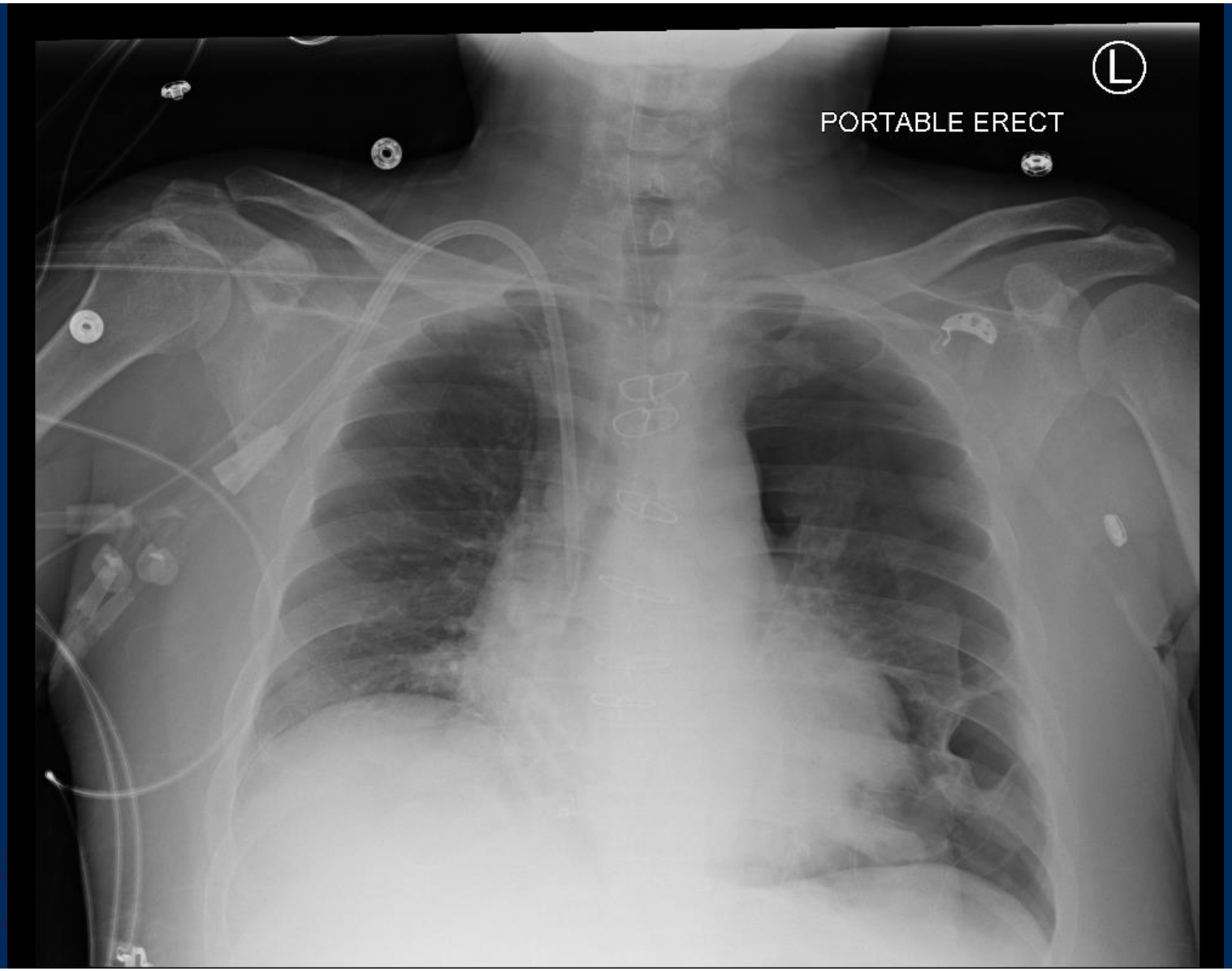
Pre chest tube removal



Post chest tube removal



Clinical History

- Chest surgery team re-inserted chest tubes

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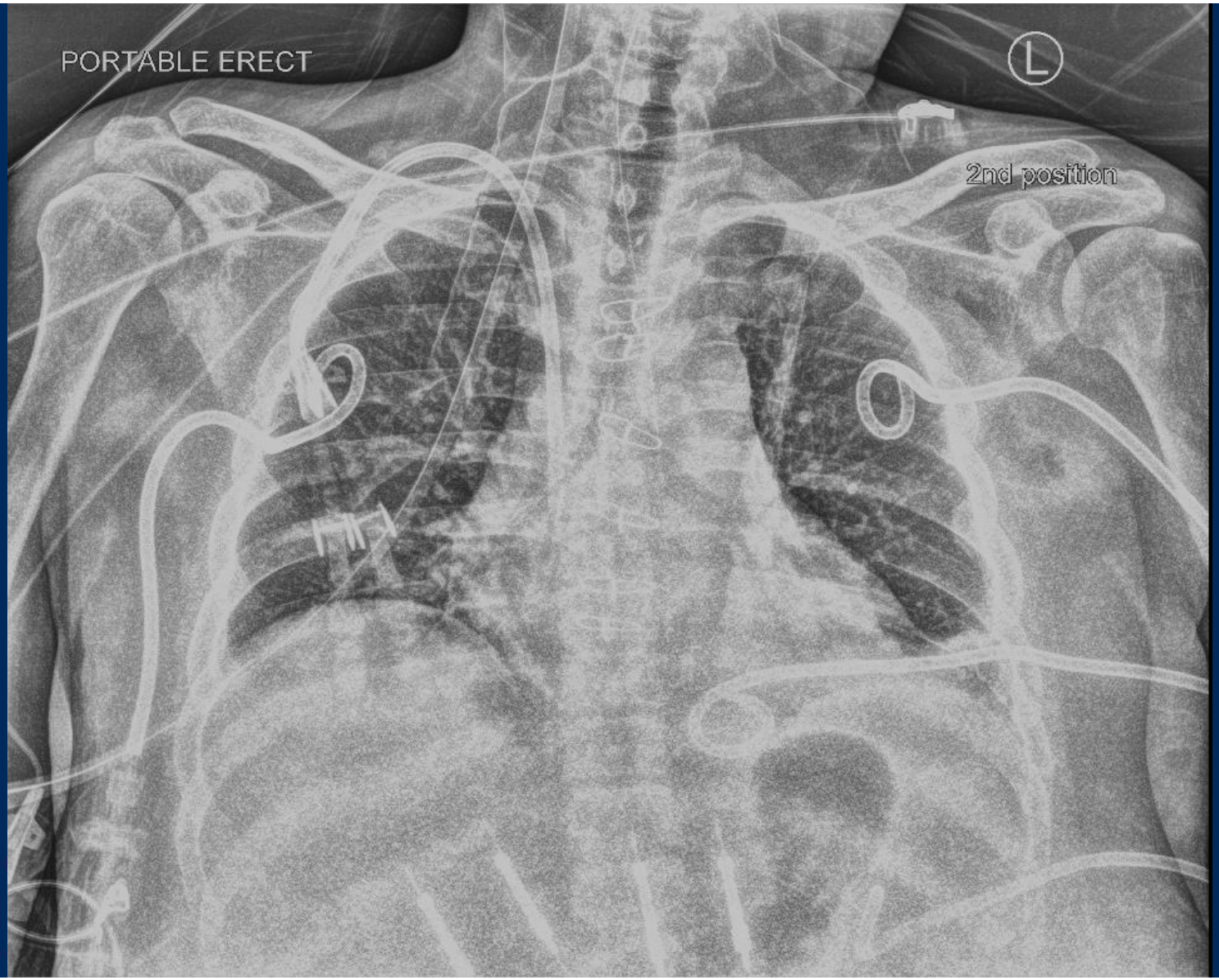
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2nd position

Clinical History

- After reviewing those x-ray, a CT scan was performed to check final position of the lower left chest tube

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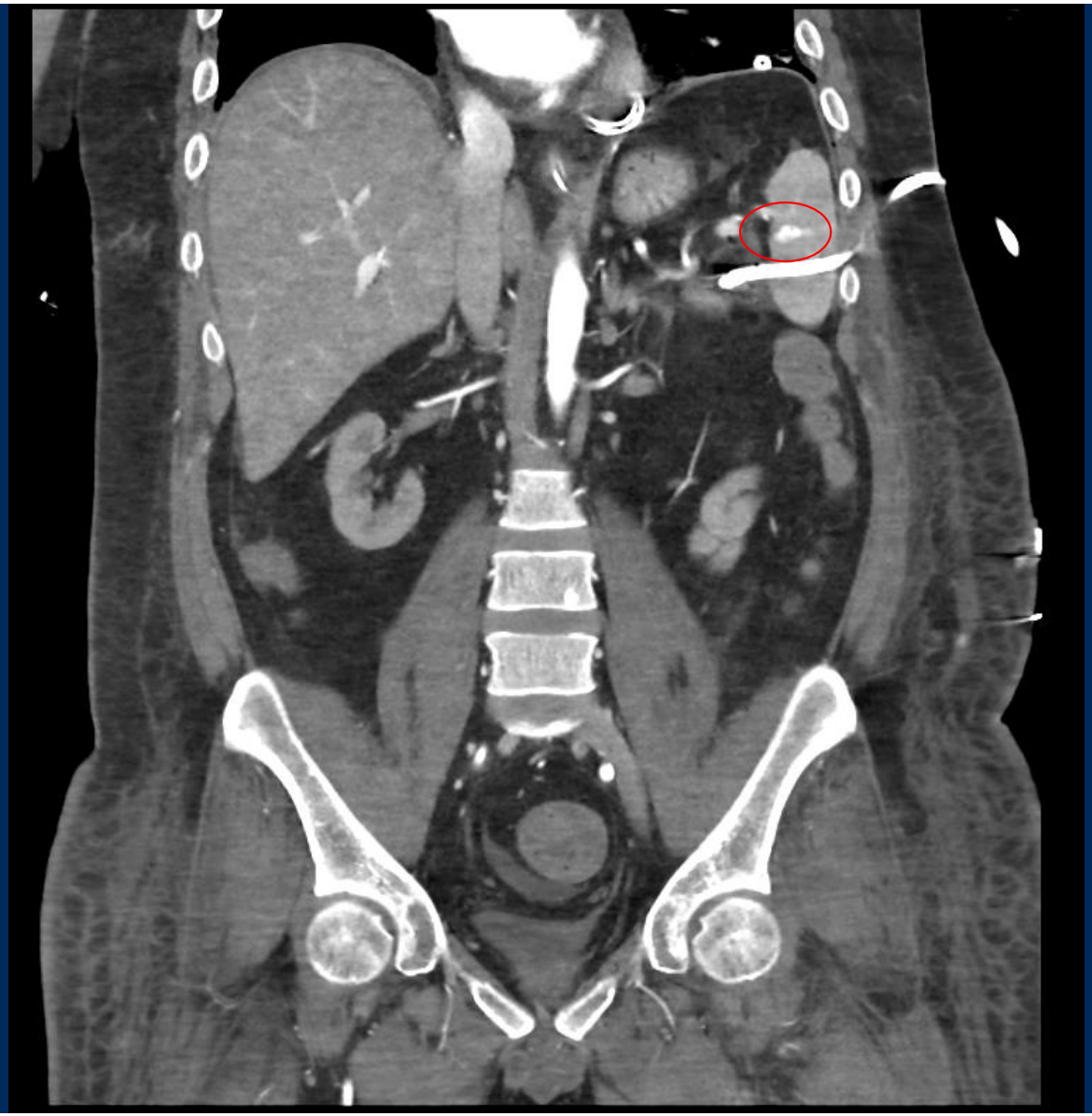

Procedure

- Surgery team requested splenic artery pseudoaneurysm embolization
  - Surgery team asked to leave the catheter in place for at least 2 more weeks (maturate the tract?)
  - Right groin access (left groin hematoma)

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Follow-up…

- Patient remained stable, with mild pain and discomfort in LUQ
- The decision to remove the tube was taken (General Surgery, Transplant Team, Vascular Surgery, and Interventional Radiology)

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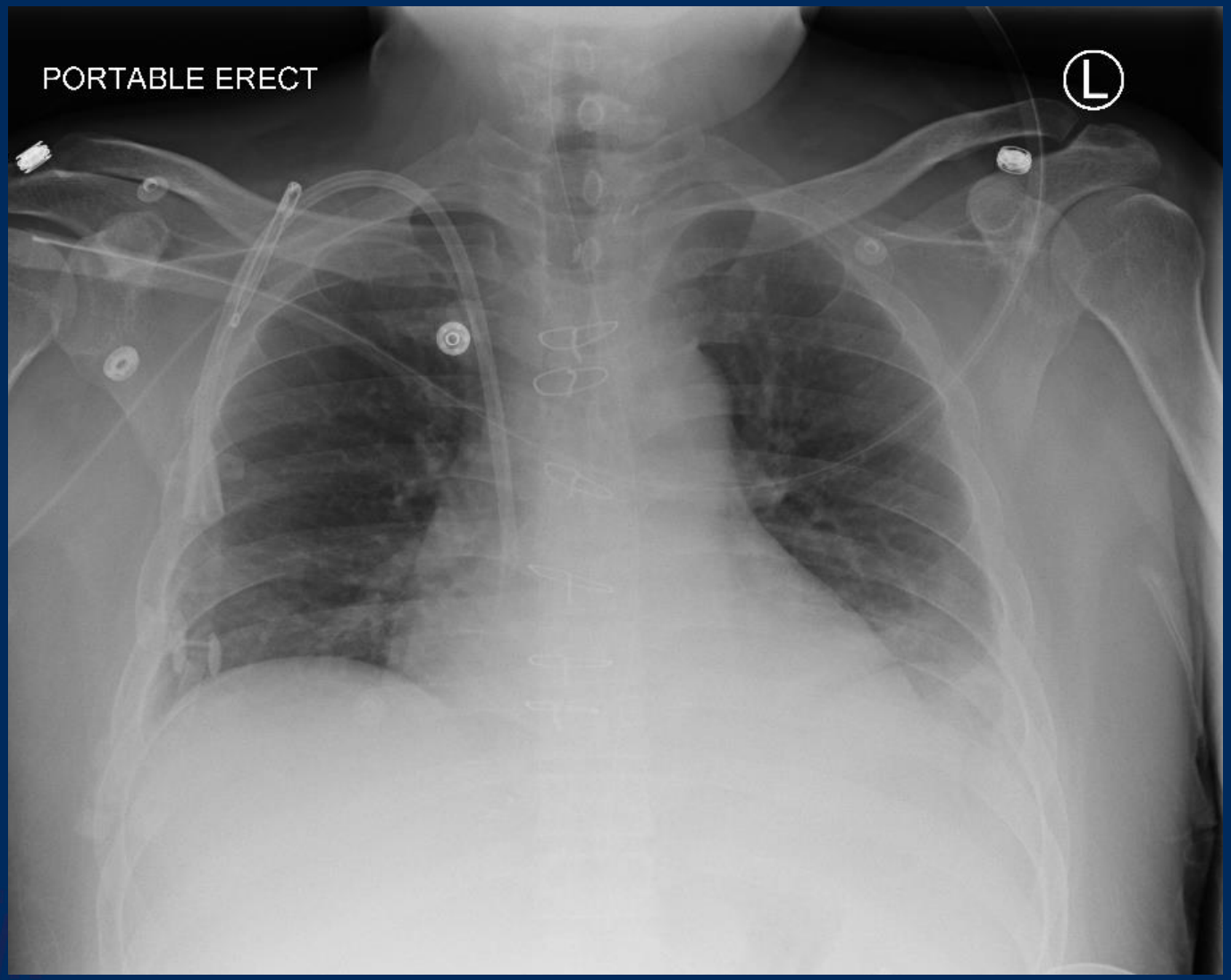
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Procedural approach

- Before the procedure, technical features and possible complications were explained to the patient and his mother
  - Both agreed to continue with the procedure

- Patient was positioned supine in Fluoro table, left arm (due to bilateral groin ulcers) and abdominal LUQ (catheter insertion site) were prepped in a sterile fashion

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Procedure

- Left brachial artery accessed with micropuncture set
- 5 Fr sheath
- 5 Fr x 100 cm Bern tip catheter advanced reaching splenic artery at the hilum
- Angiogram performed without evidence of active extravasation
- The whole system was exchanged over an Amplatz wire for a long 6 Fr sheath
- A second Amplatz wire advanced through prior LUQ tube

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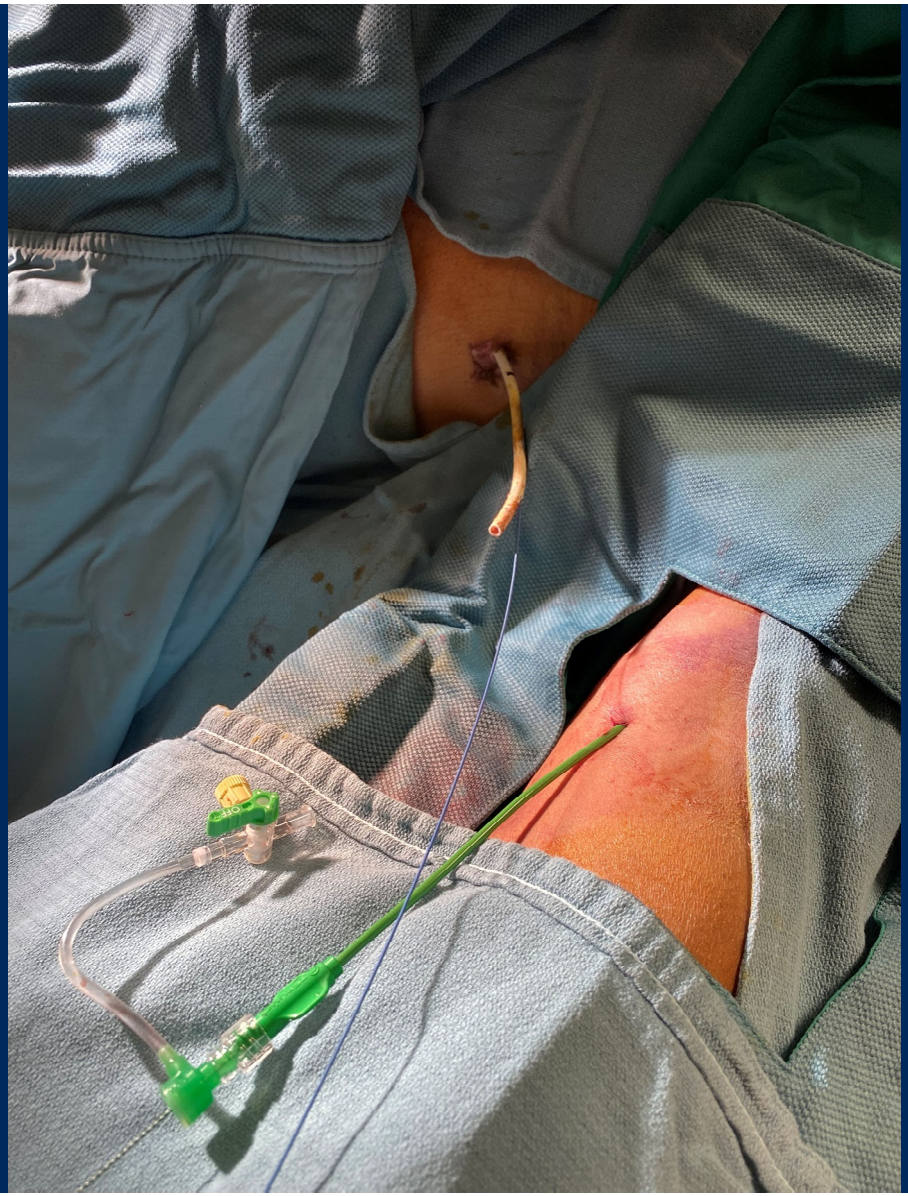

Procedure

- The tube was cut and removed over a short Amplatz wire
- Immediately, a 12 Fr sheath was placed over the wire
- Mixture of hemostatic agent and contrast media was injected while removing the sheath

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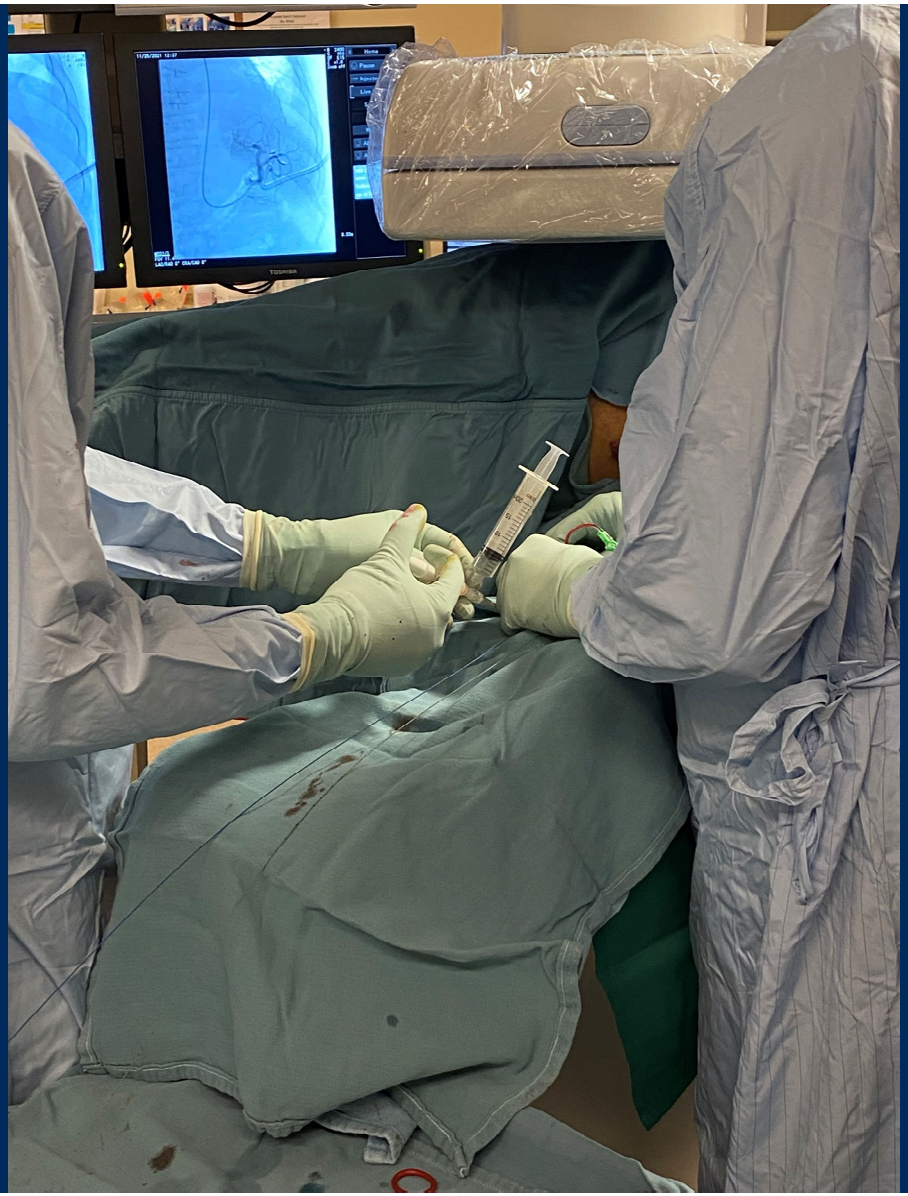


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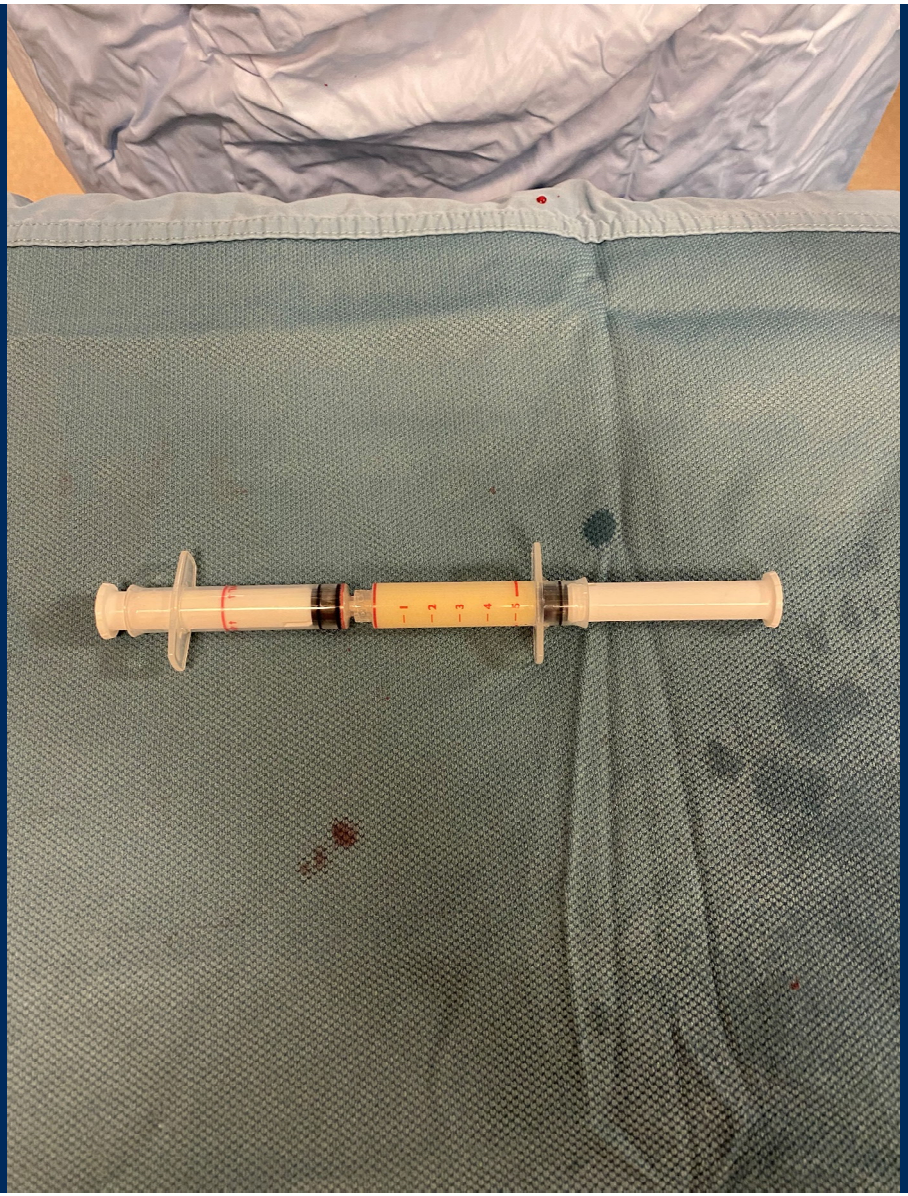

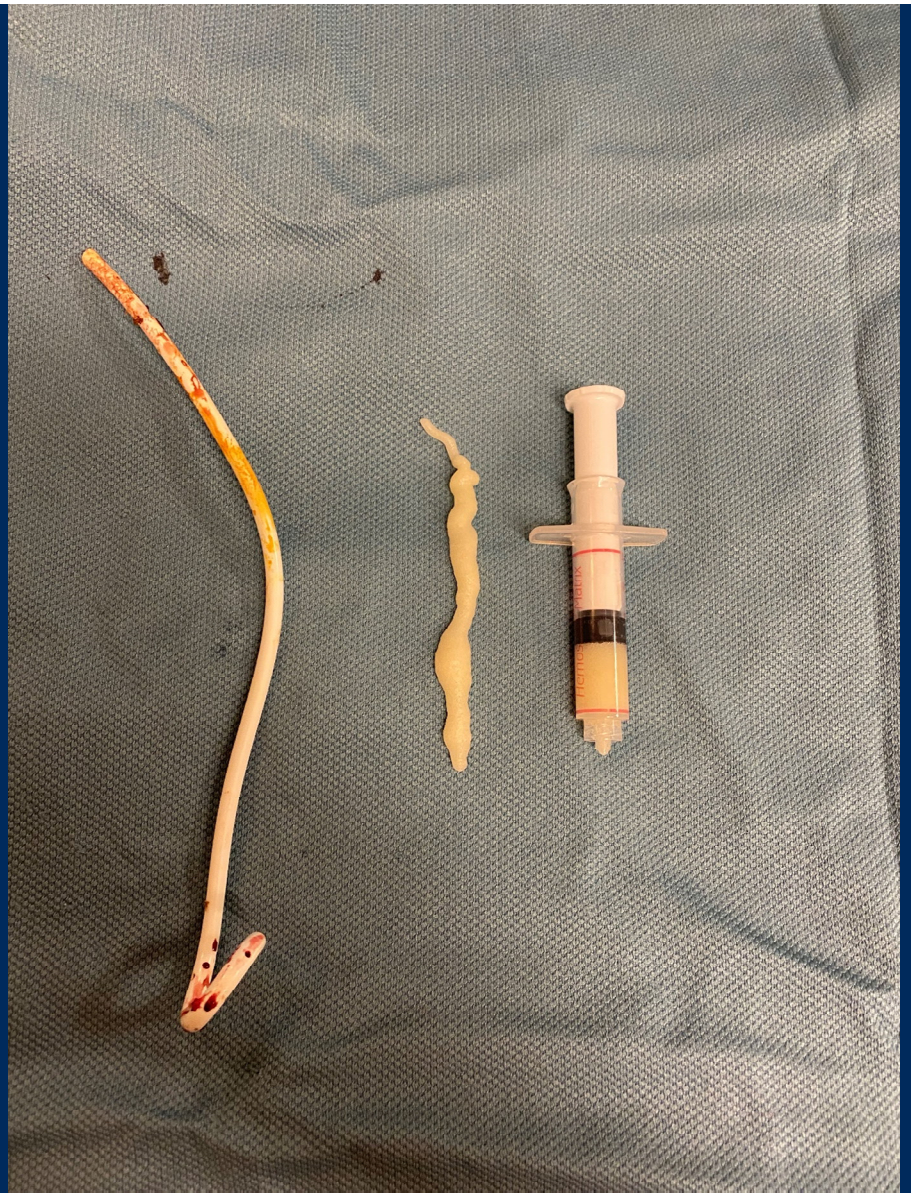

Procedure

- Final angiography run through catheter didn’t demonstrate any bleeding after tube removal
- No immediate complications
- Hemostasis achieved with hand compression on puncture site in the left arm

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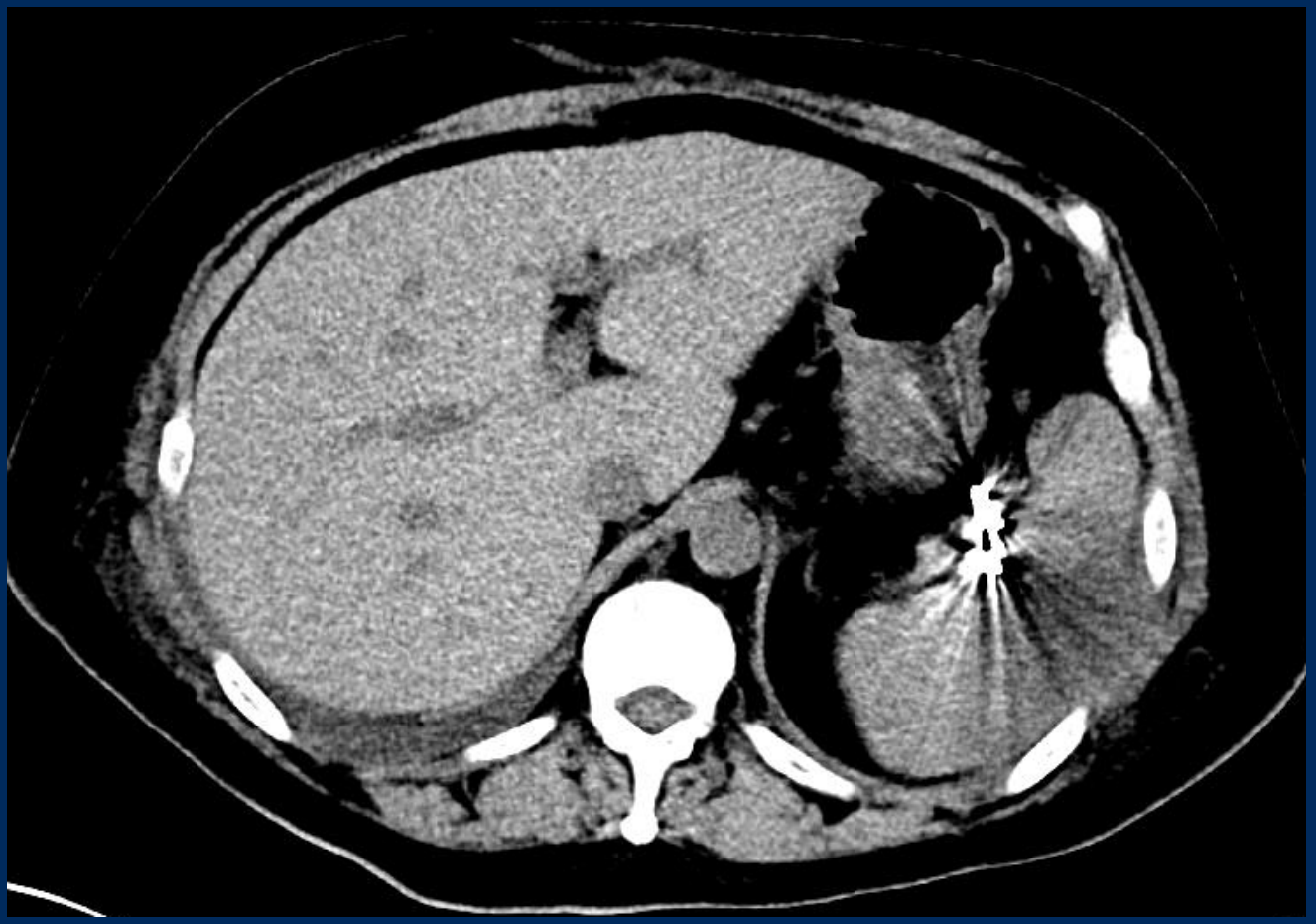
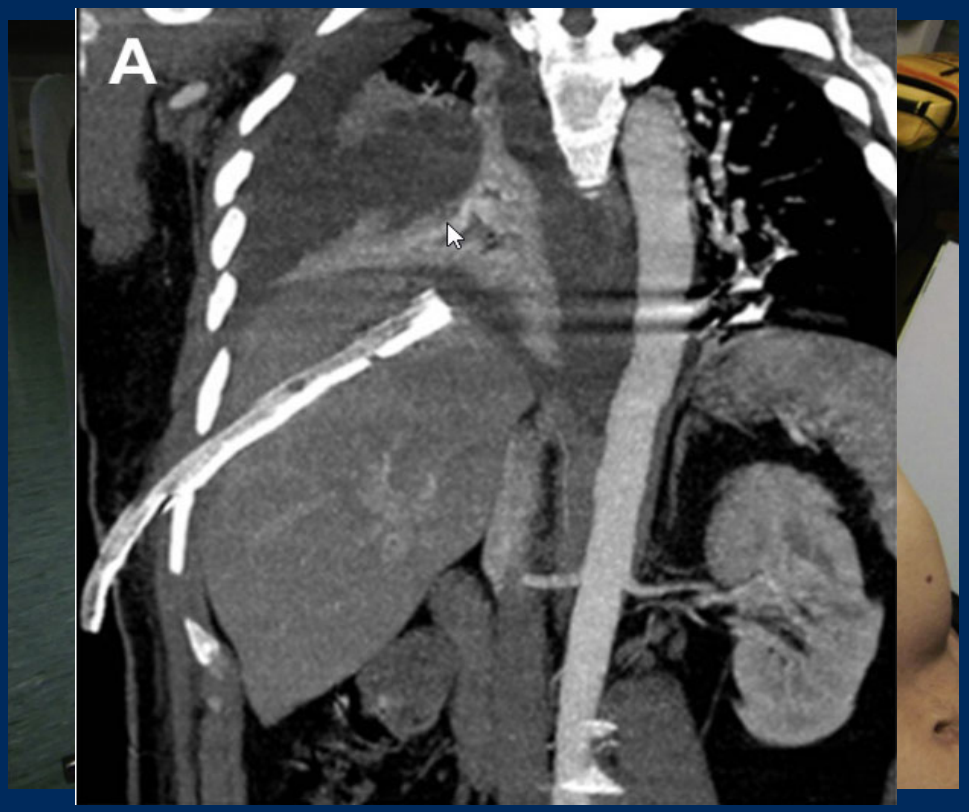


Plain CT scan 1 week later (to R/O abscess) demonstrated no complications

Chest Tube Insertion Complications

- Safety triangle (anterior edge of latissimus dorsi, lateral edge of major pectoris, and a transverse line crossing the nipple)
- Be aware of chest habitus (scoliosis) and prior surgeries (diaphragm can be raised)
- Blunt vs trochar technique
  - Prefer blunt technique – Less risk of tissue and lung injury



Pier et al. Thorac Surg Clin 27 (2017) 57–67

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Chest Tube Insertion Complications

- Average 5-10%
- Categories
  - Acute (<48 h), chronic (>48 h), procedural, and non-procedural

- Most common: Tube malposition or technical complications (1%)
  - (Intrafissural, intraparenchymal, extrathoracic, or obstructed)

- Damage to intrathoracic or extrathoracic organs
  - Spleen (rare)
    - Bleeding through the tube is the immediate consequence

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Caleb et al. Jour of Surg Research. July 2019 (239) 98-102

Key points

- Chest tube insertion complications 5 – 10%, this is one of the most common procedures performed in ED

- Evaluate the anatomy before the procedure (malformation, prior surgeries, characteristics of the pleural space – air, empyema)
  - Access site and correct size of the drainage tube

- Confirm the correct position of the chest drainage
  - If not sure, perform another x-ray or CT
  - Ask for a helping hand

TORONTO JDMI

camilo.barraganleal@uhn.ca
caanbale61@hotmail.com
@camilo_barragan

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