CIRA Case of the Week
March 2016

UNIVERSITÉ
LAVAL

Case Courtesy of Drs. Rémi Poirier and Guillaume Garneau

Laval University

Clinical History

- 63 year old woman
- Epidermoid carcinoma of the nasal septum with left inferior cervical lymphadenopathy

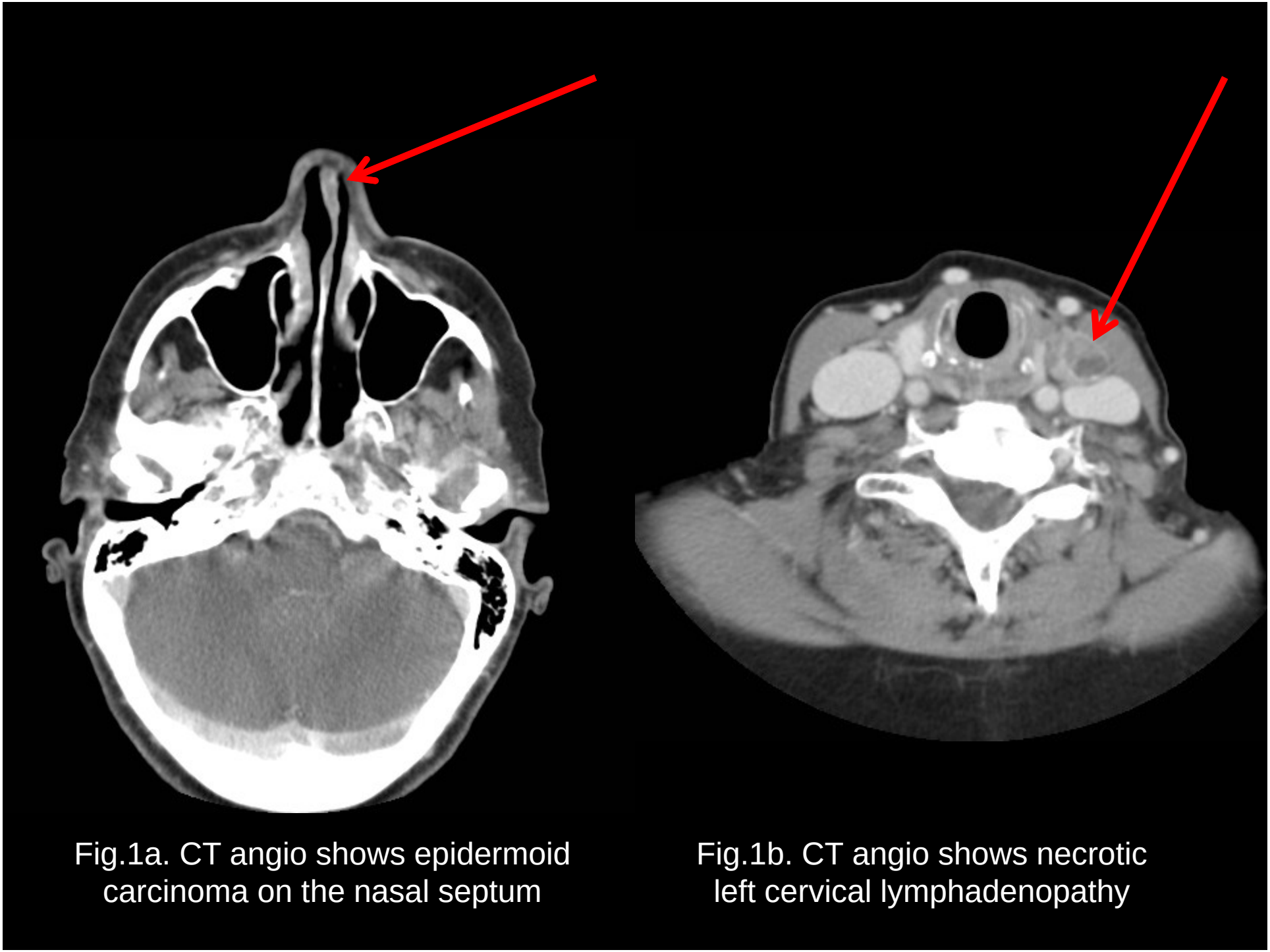


Fig.1a. CT angio shows epidermoid carcinoma on the nasal septum

Fig.1b. CT angio shows necrotic left cervical lymphadenopathy

Clinical History

- Nasal surgery with left cervical lymphadenectomy
- Chylous leaking ++++ by the left cervical wound
- Fail to plug the leak in a second attempt in OR

H&N Team asked: : Can you do something about it?

Imaging

- Try to opacify the chylous leak via left axillary lymphography
- US-guided puncture of a dominant left axillary node and injection of lipiodol

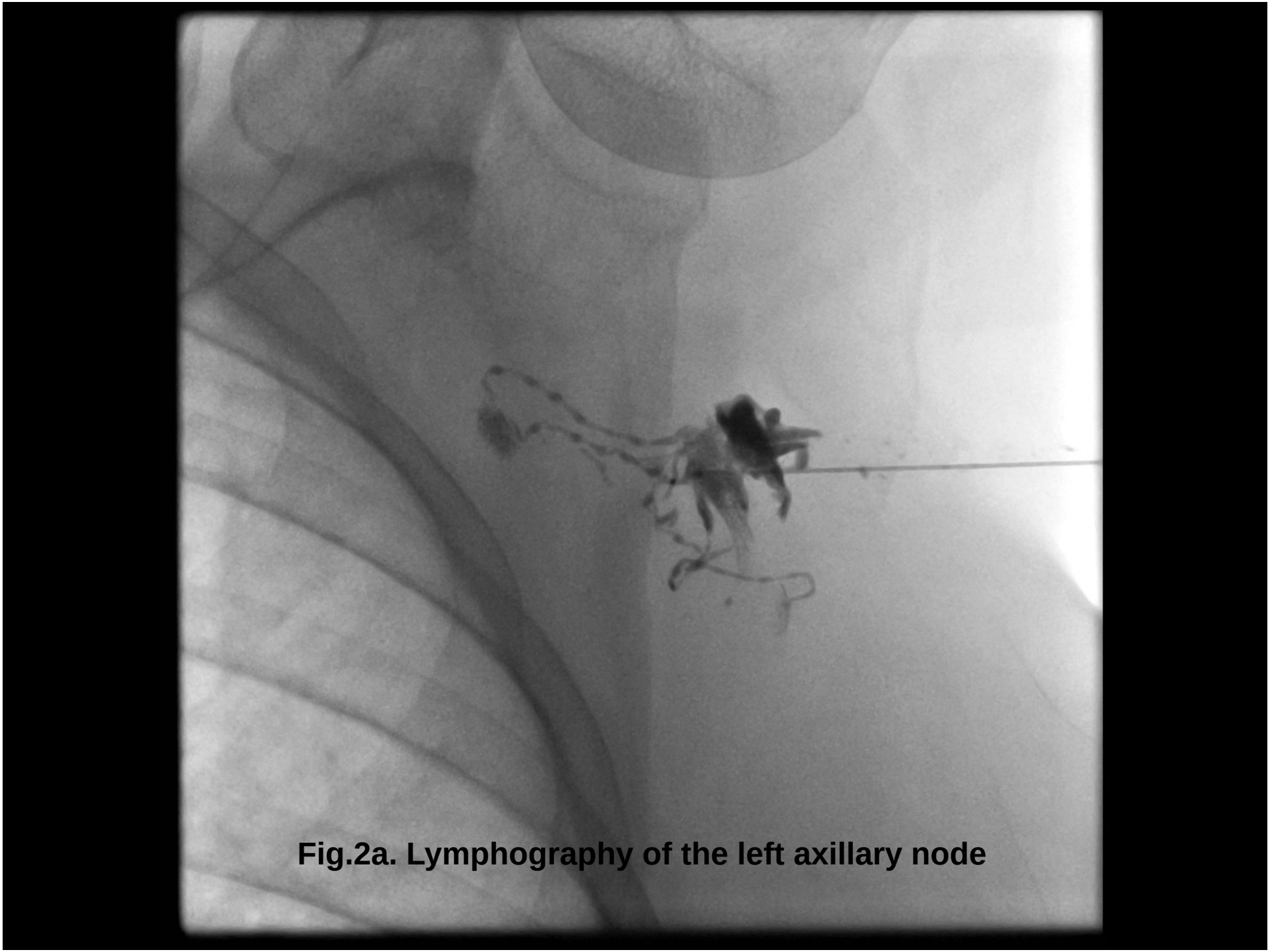


Fig.2a. Lymphography of the left axillary node

Fig.2b. Lymphography of the left axillary node and opacification of the lymphatics

Imaging

- Left Axillary Lymphography: FAIL

- No opacification of the cervical lymphatics
- The lipiodol is draining in the left subclavian vein
- Bilateral inguinal lymphography has been tried

Inguinal lymphography

- Replace the standard pedal lymphography
- Much easier to perform
- Allows opacification of ilio-lumbar lymphatics, cisterna chyli and thoracic duct

Procedural details

- US-guided puncture of the inguinal nodes with 25G spinal needles
- Injection of lipiodol with pumps
  - 10-15 cc each side at a rate of approximately 10 cc/hour
- XR each 15 minutes to keep an eye on the contrast progression

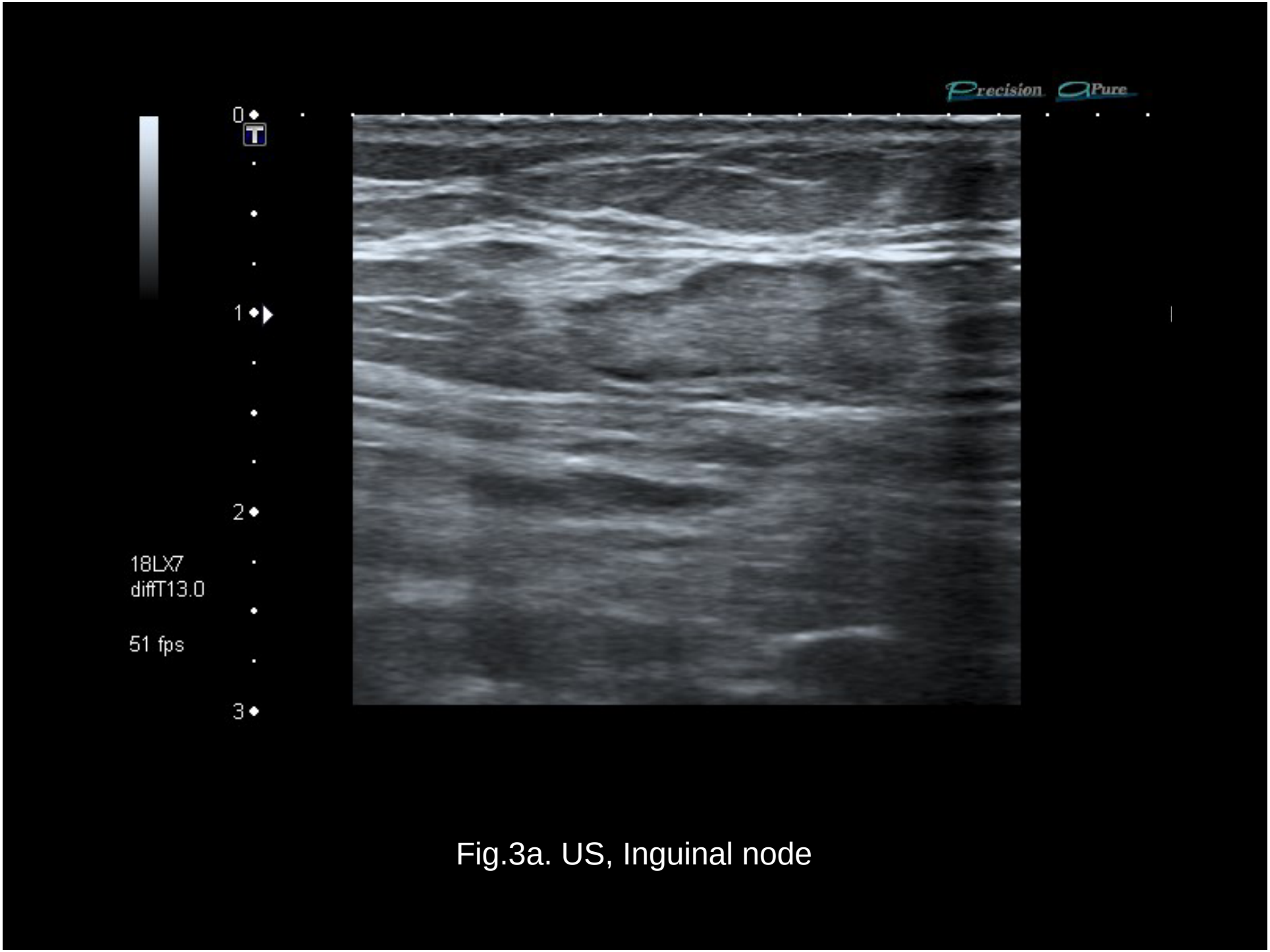


Fig.3a. US, Inguinal node

Fig.3b. Mapping of the inguinal nodes

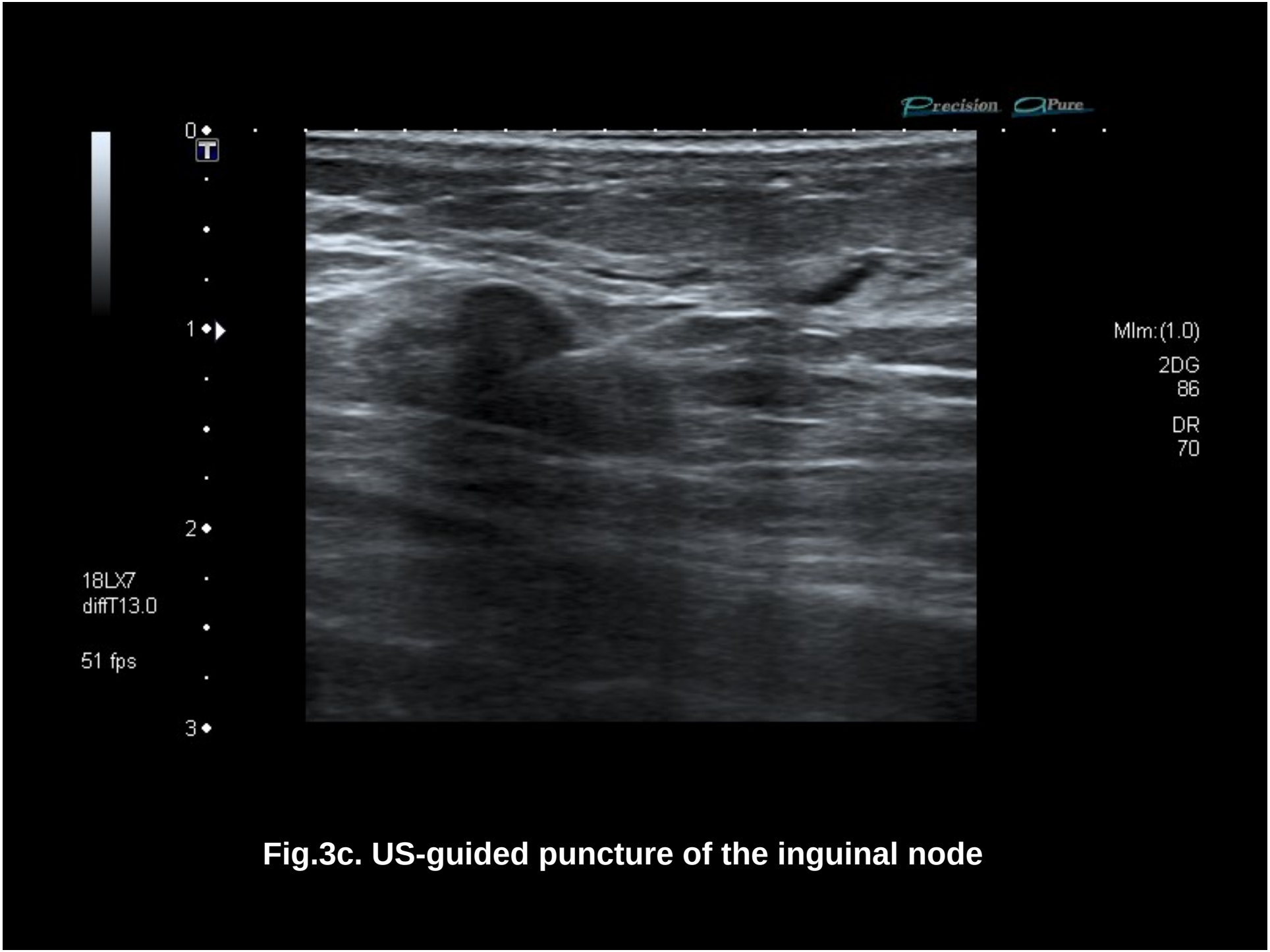


Fig.3c. US-guided puncture of the inguinal node

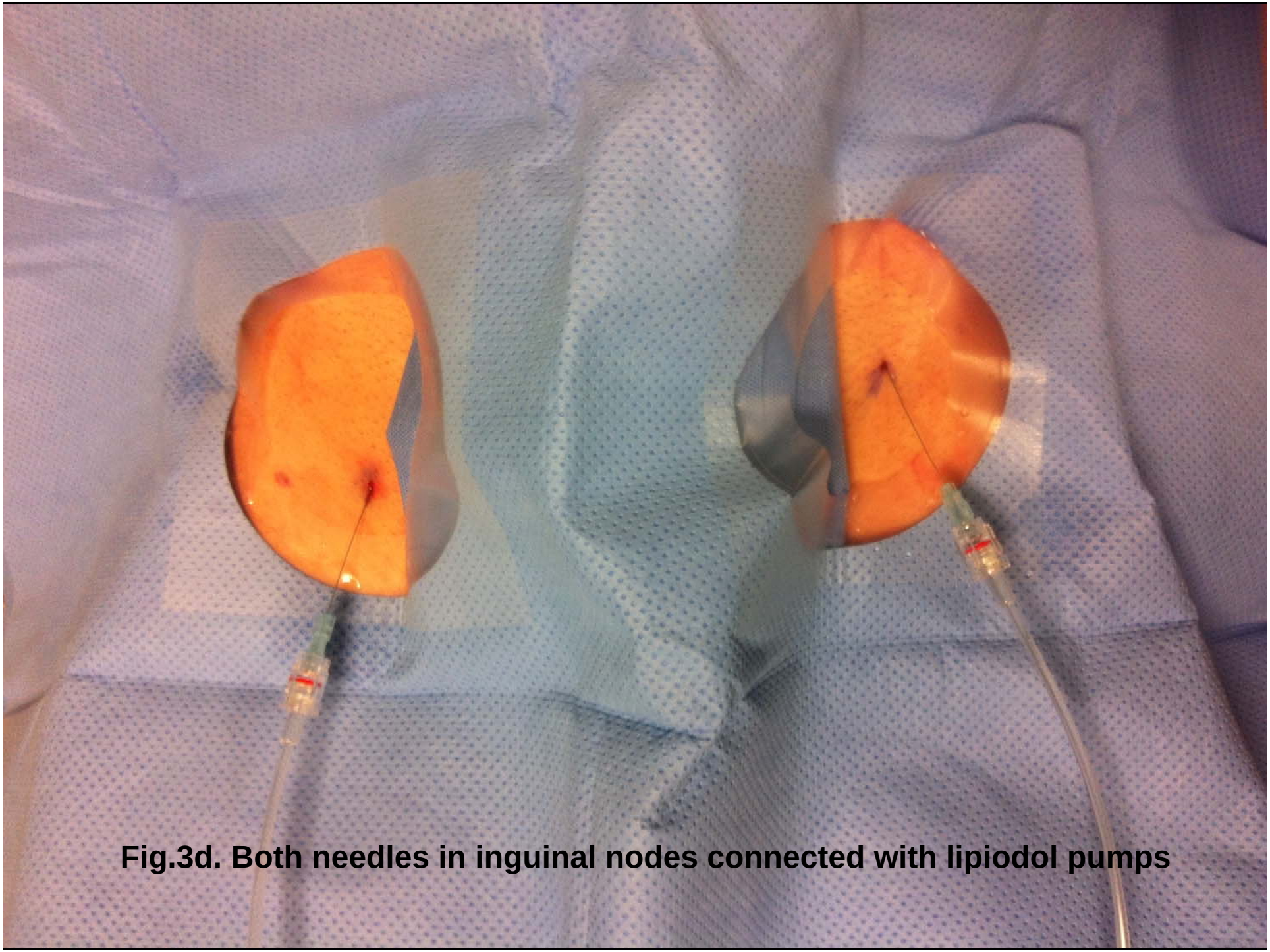


Fig.3d. Both needles in inguinal nodes connected with lipiodol pumps

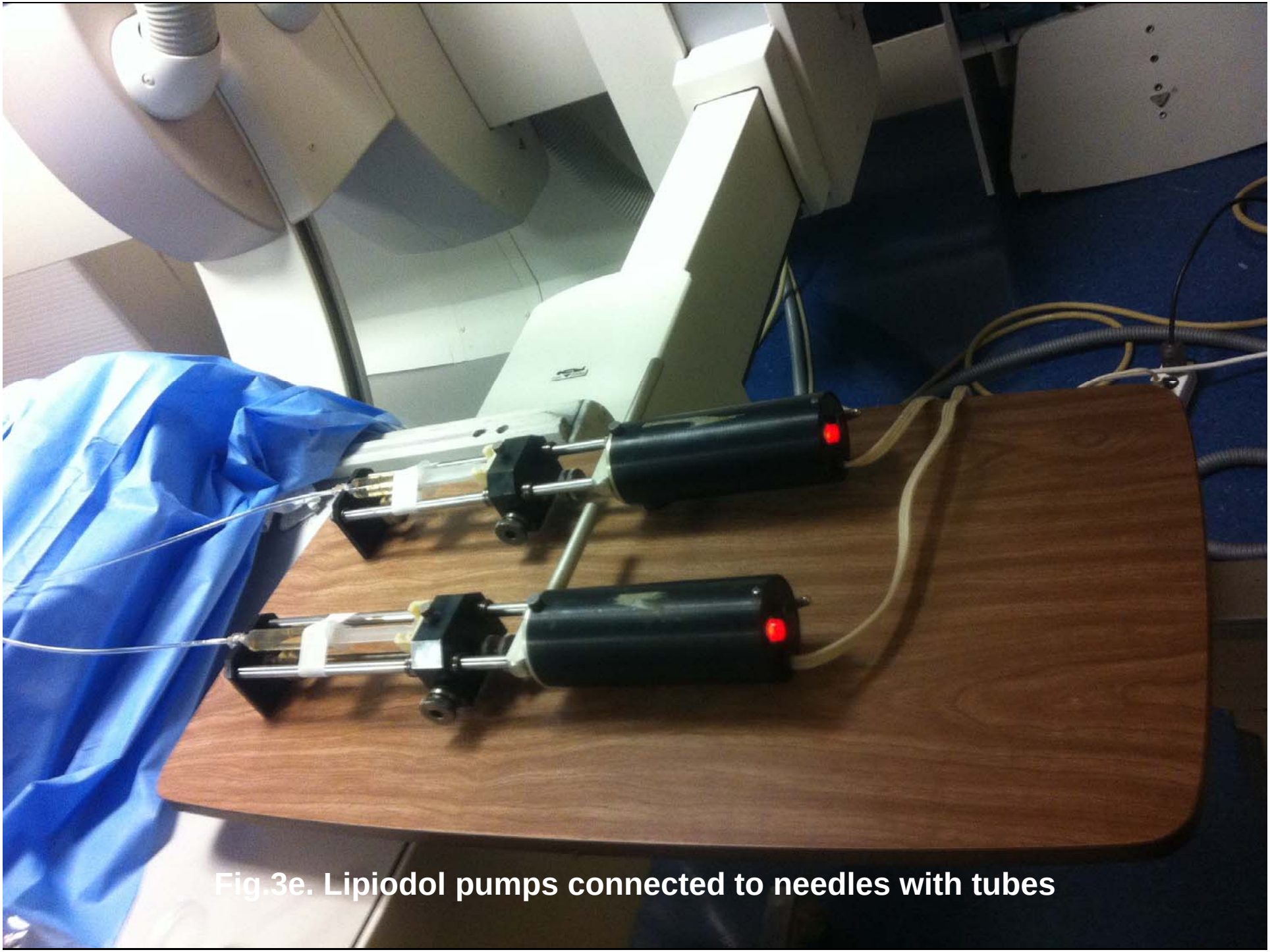


Fig.3e. Lipiodol pumps connected to needles with tubes

Fig.3f. Opacification of bilateral inguinal lymphatics

Fig.3g. Opacification of the ilio-lumbar lymphatics

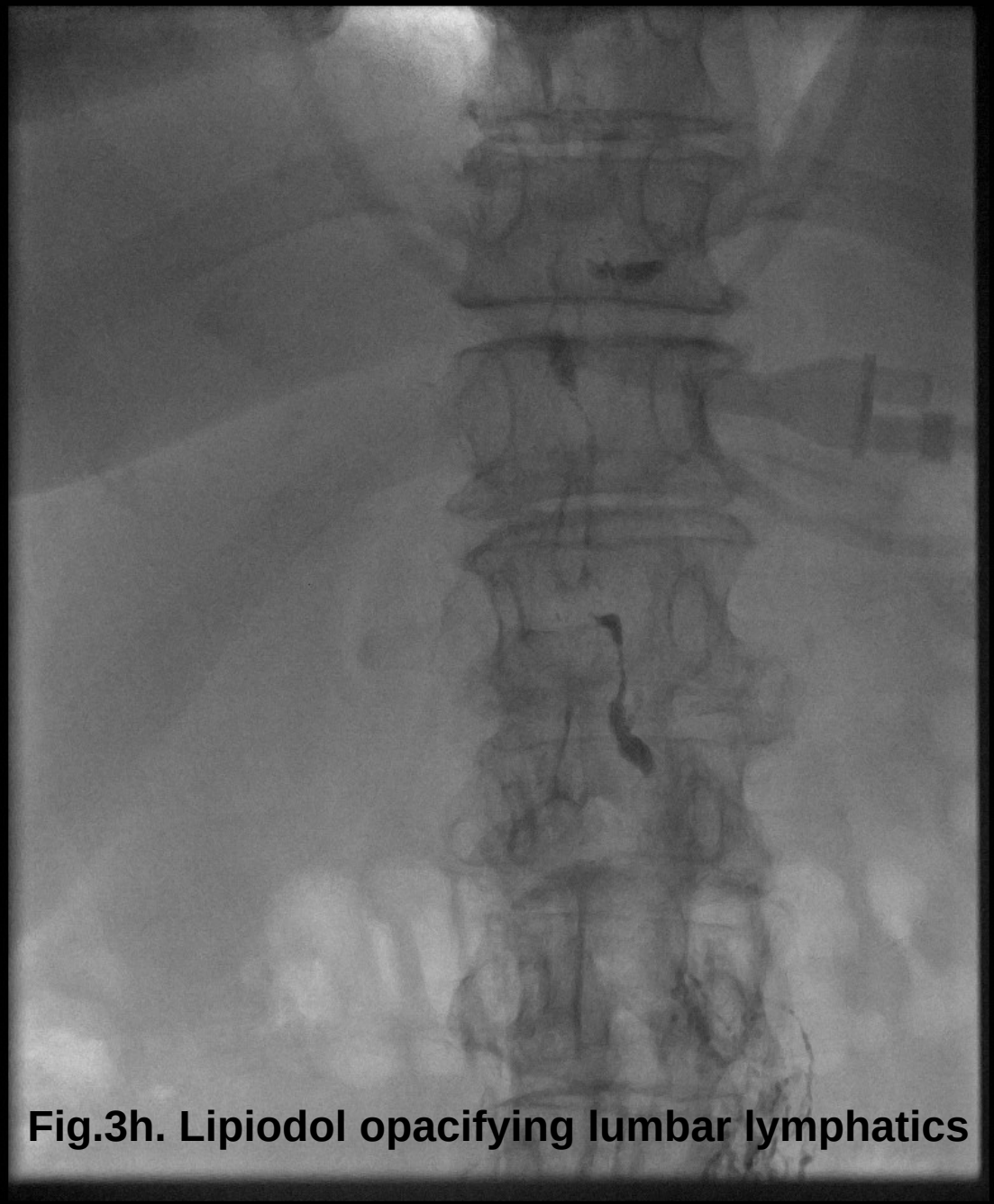


Fig.3h. Lipiodol opacifying lumbar lymphatics

Fig.3i. Opacification of the cisterna chyli and inferior part of the thoracic duct

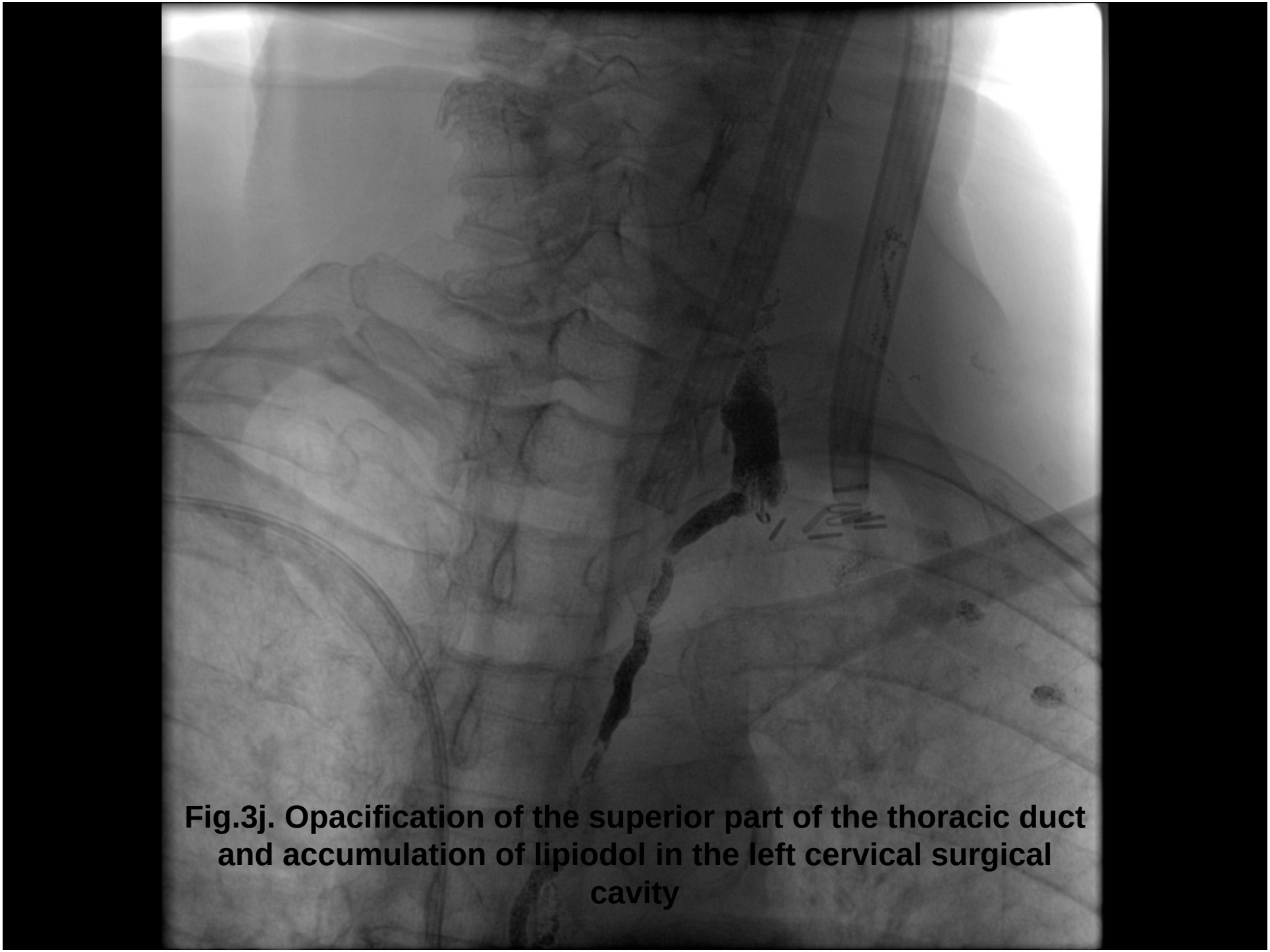


Fig.3j. Opacification of the superior part of the thoracic duct and accumulation of lipiodol in the left cervical surgical cavity

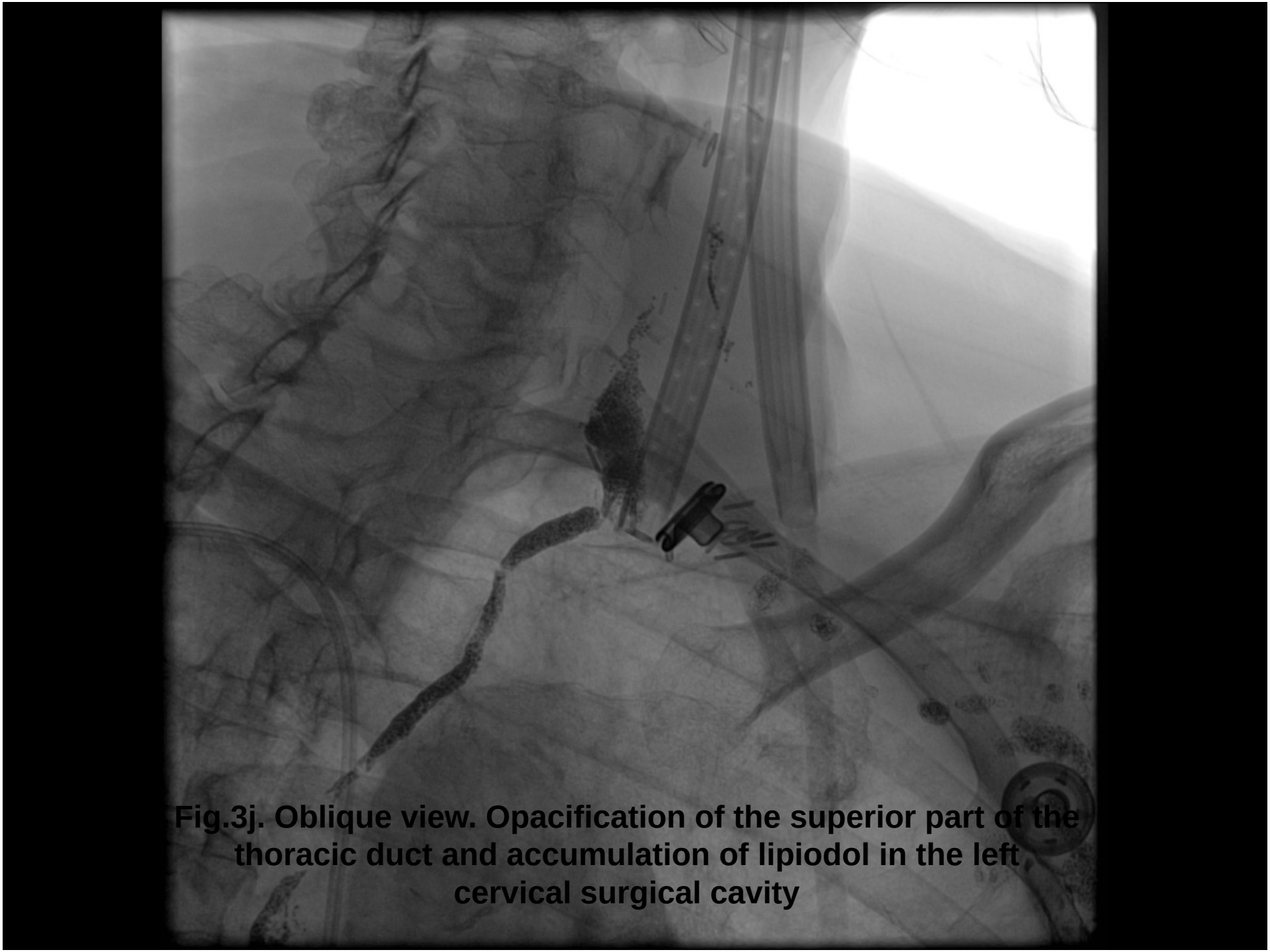


Fig.3j. Oblique view. Opacification of the superior part of the thoracic duct and accumulation of lipiodol in the left cervical surgical cavity

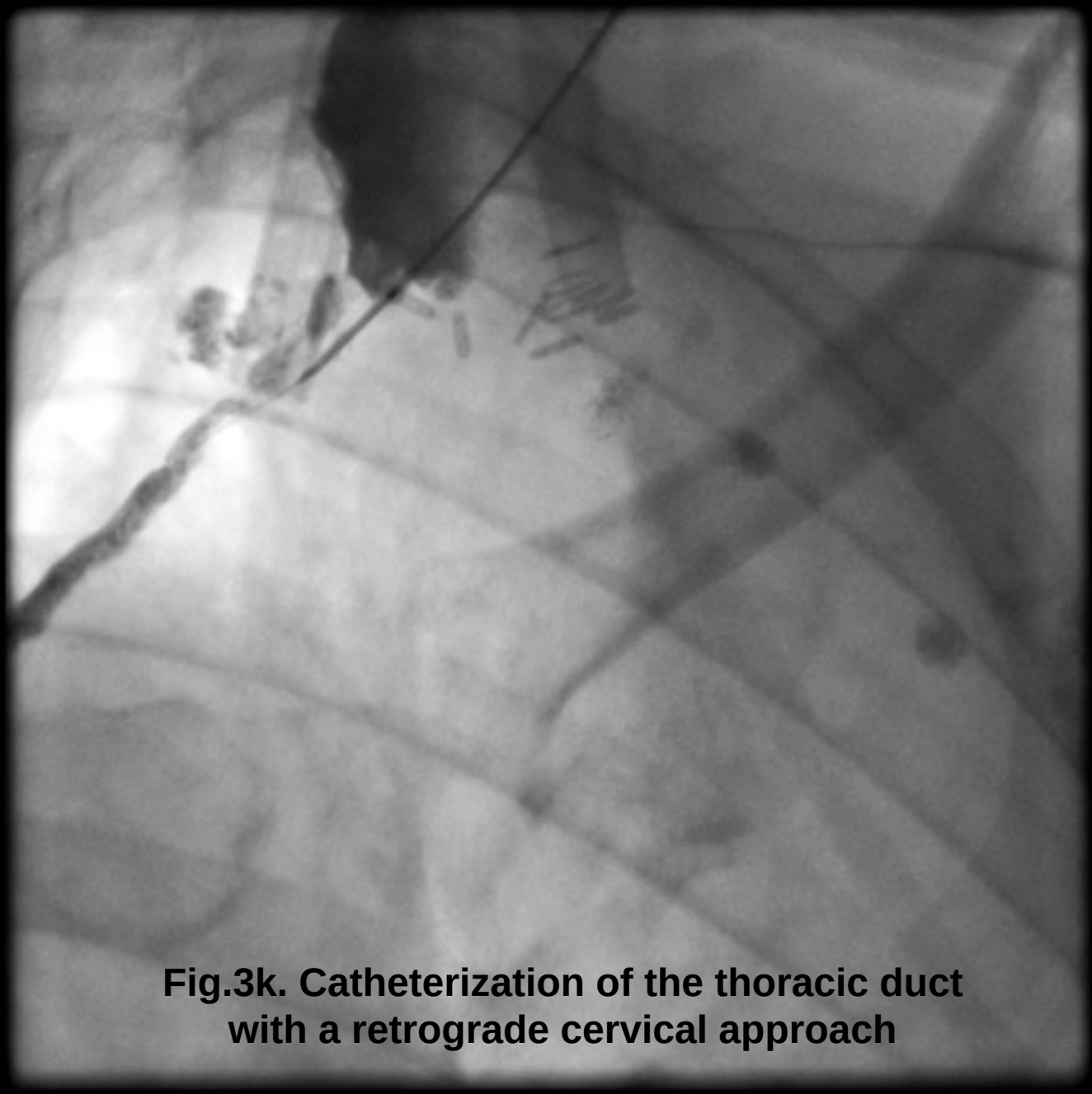


Fig.3k. Catheterization of the thoracic duct with a retrograde cervical approach

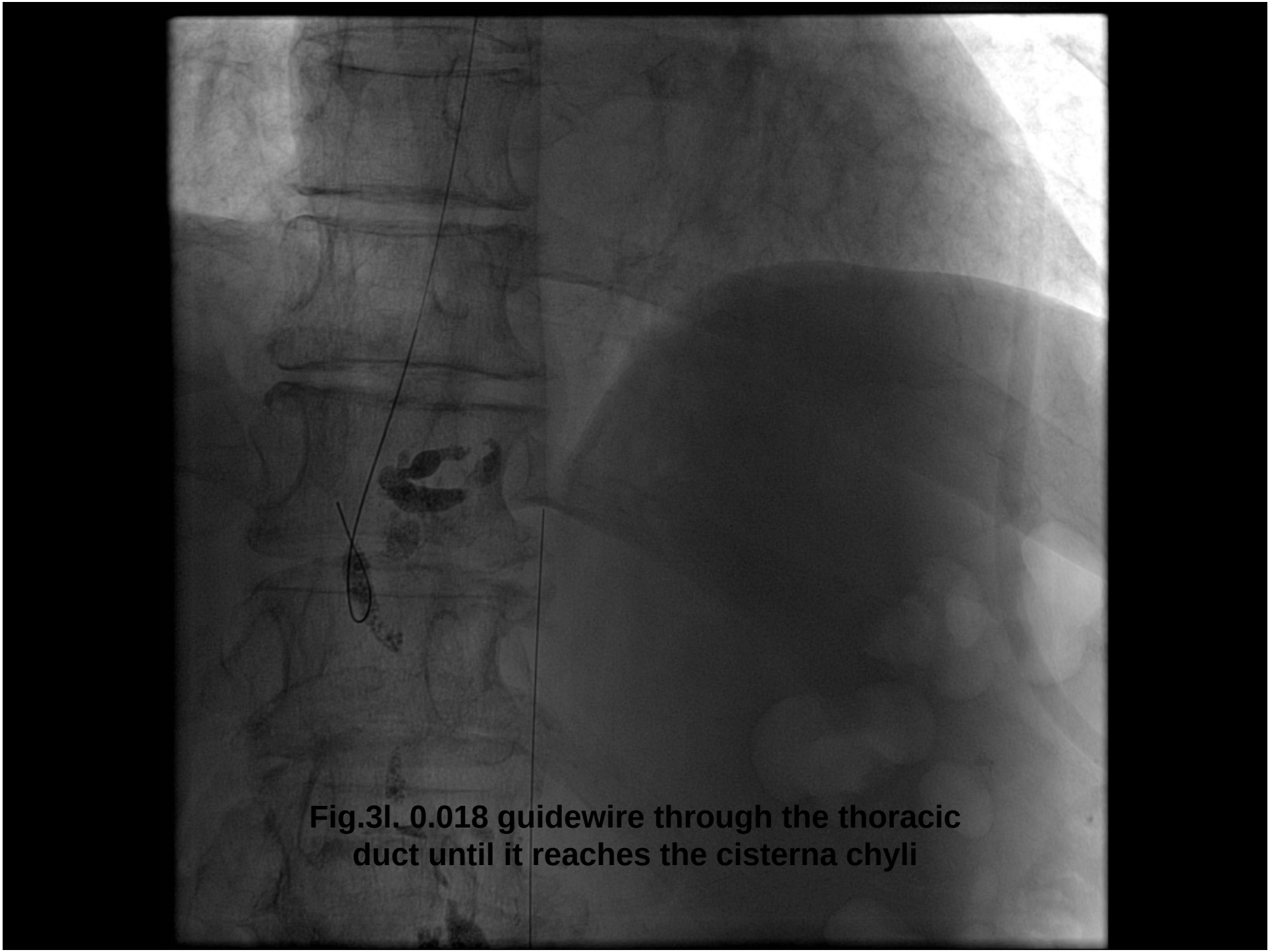


Fig.3l. 0.018 guidewire through the thoracic duct until it reaches the cisterna chyli

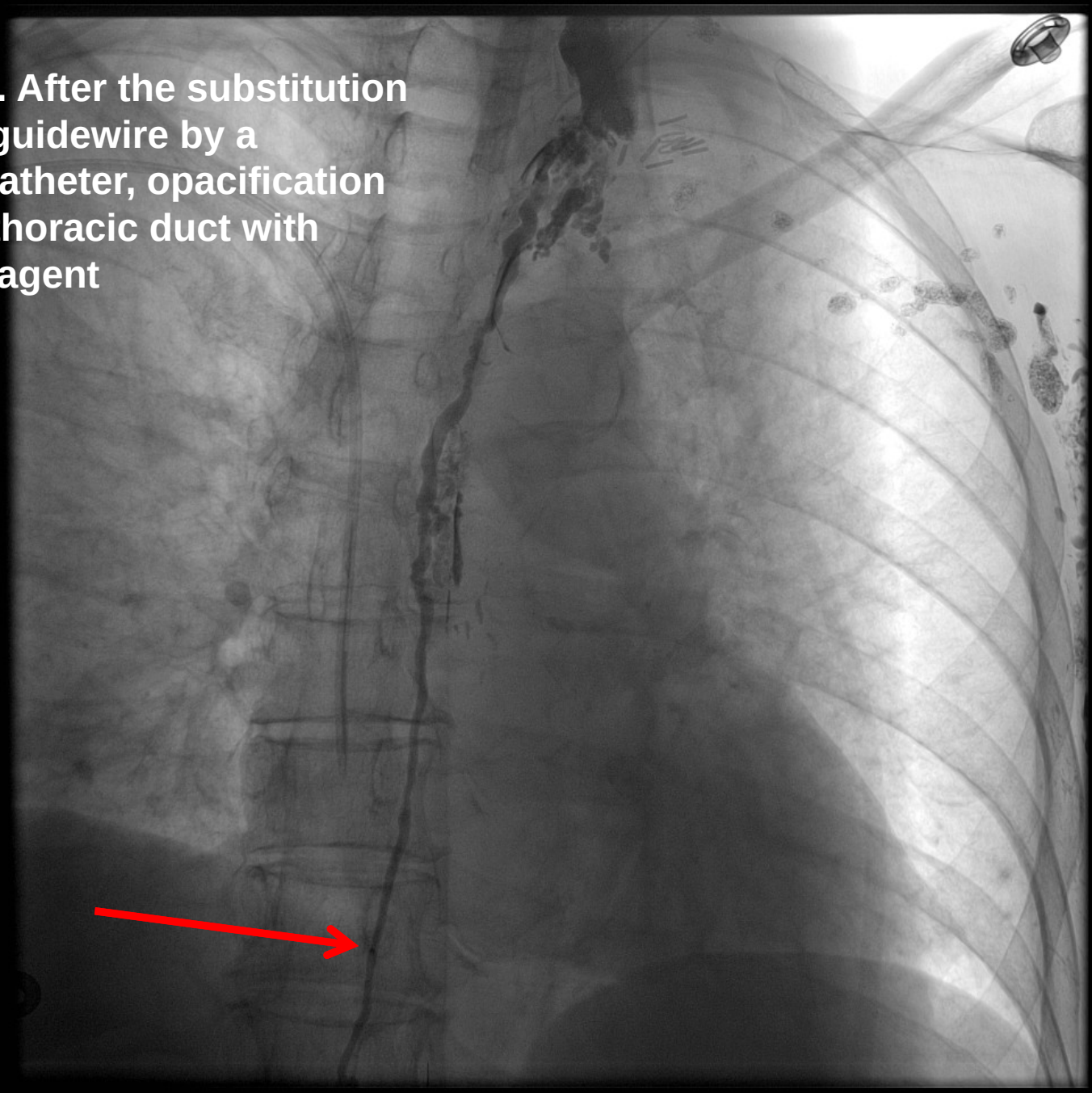


Fig.3m. After the substitution of the guidewire by a microcatheter, opacification of the thoracic duct with iodine agent

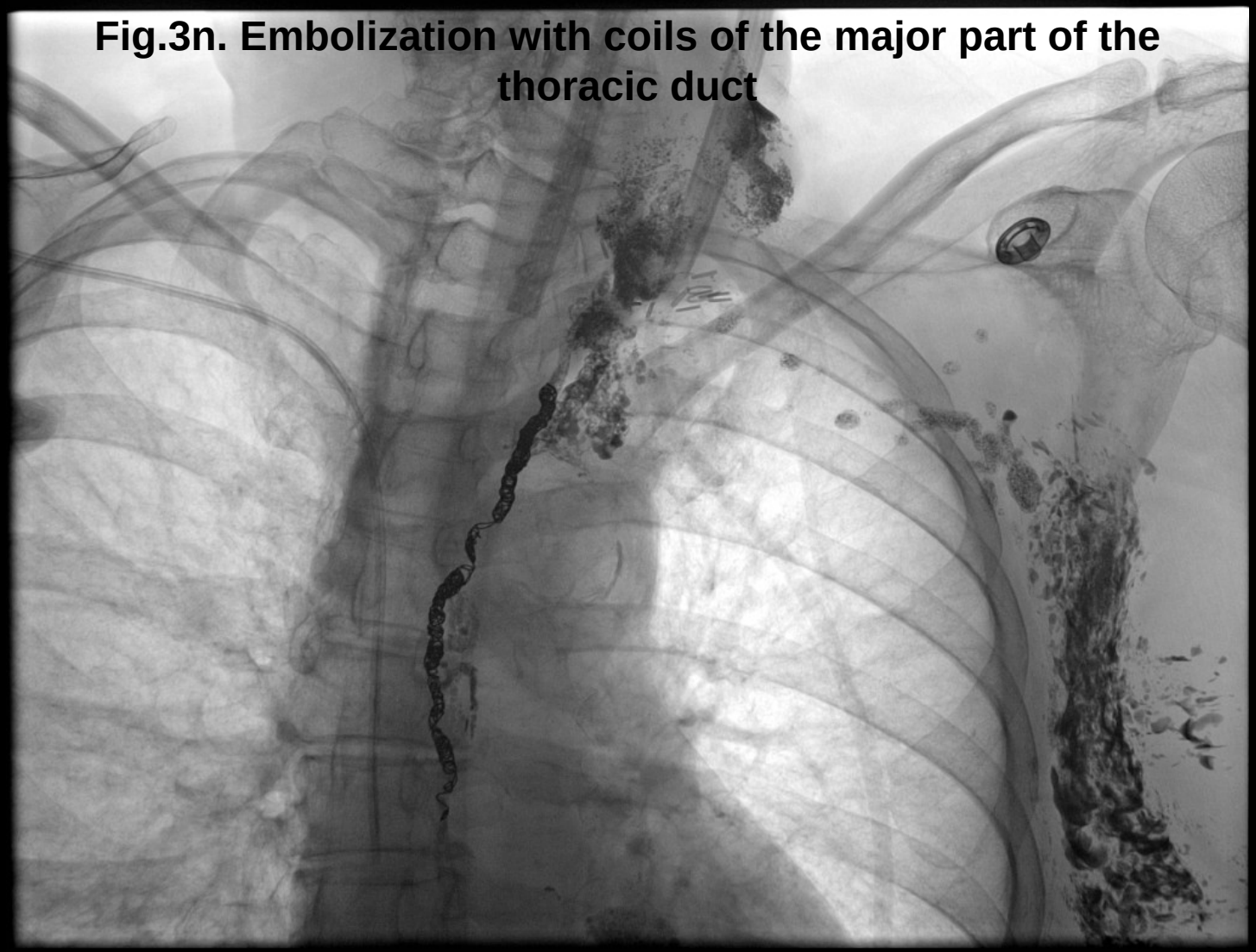


Fig.3n. Embolization with coils of the major part of the thoracic duct

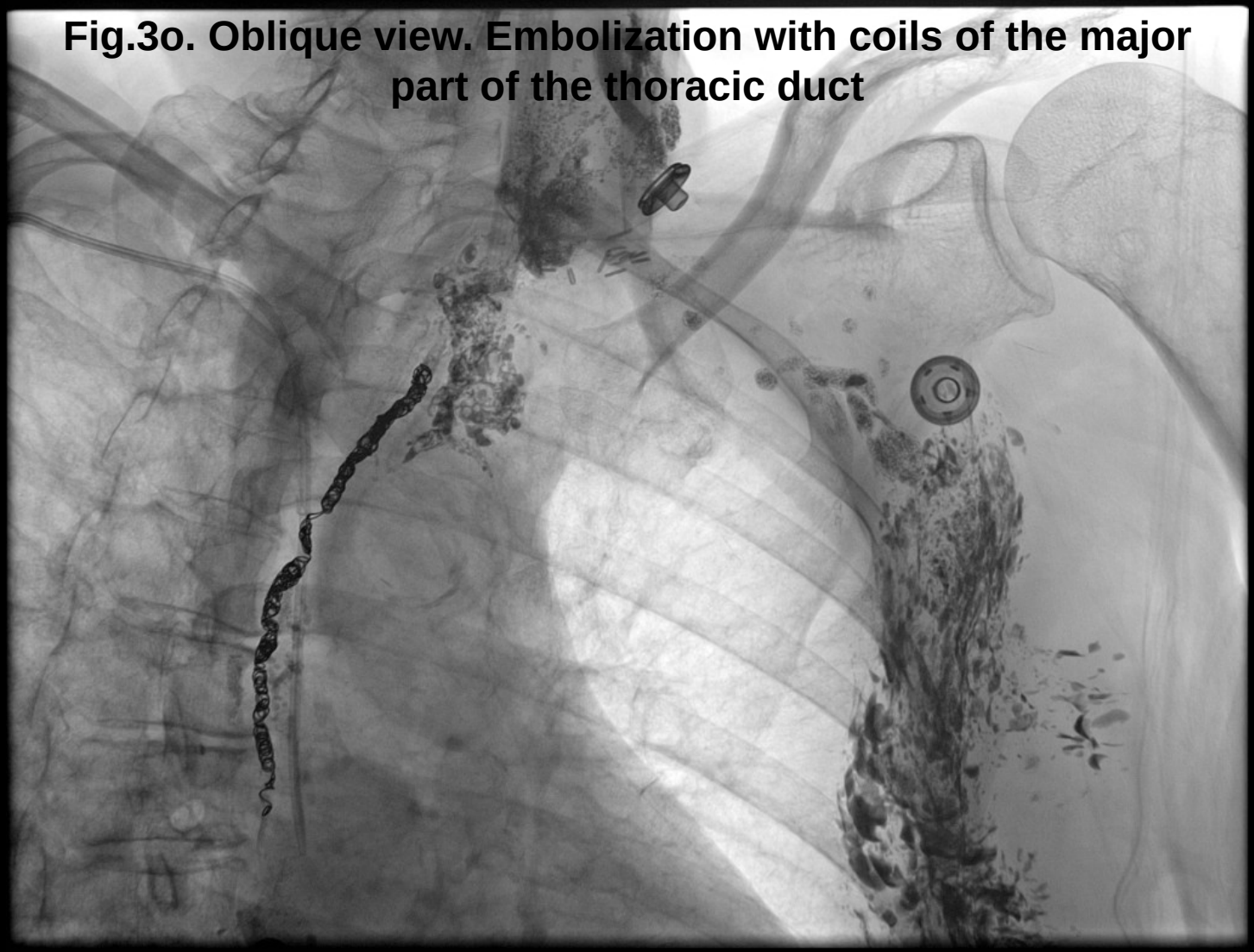


Fig.3o. Oblique view. Embolization with coils of the major part of the thoracic duct

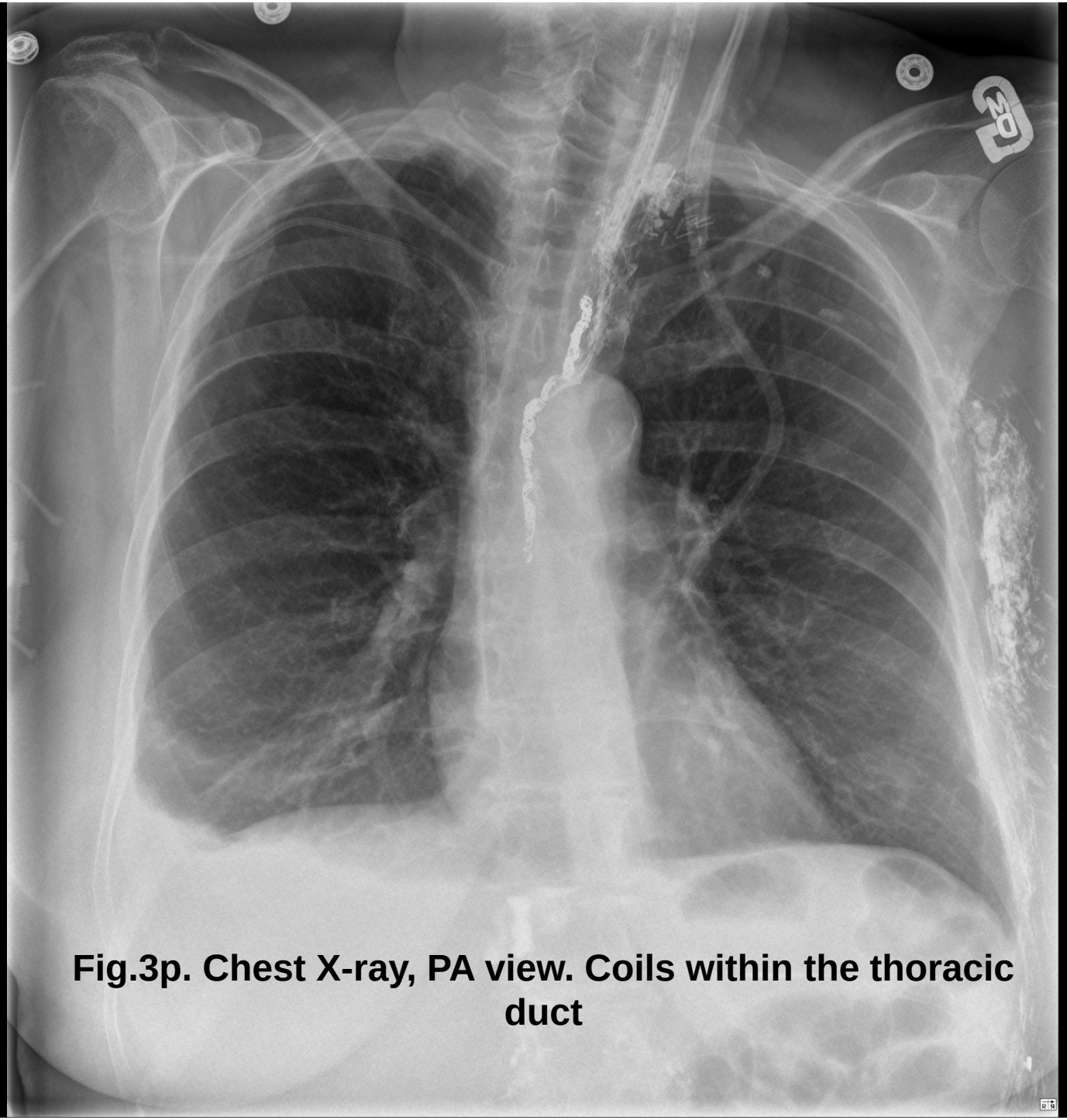


Fig.3p. Chest X-ray, PA view. Coils within the thoracic duct

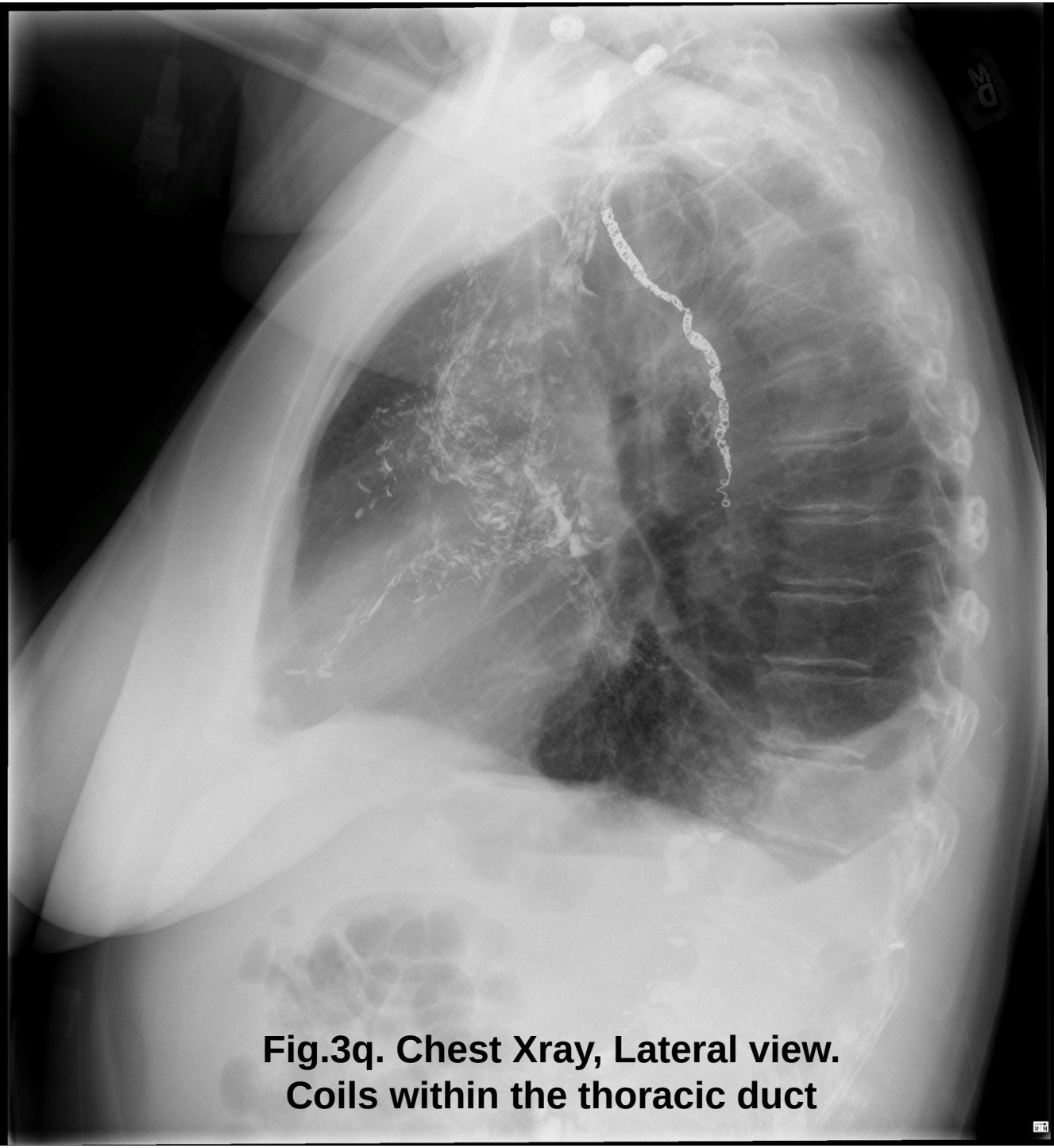
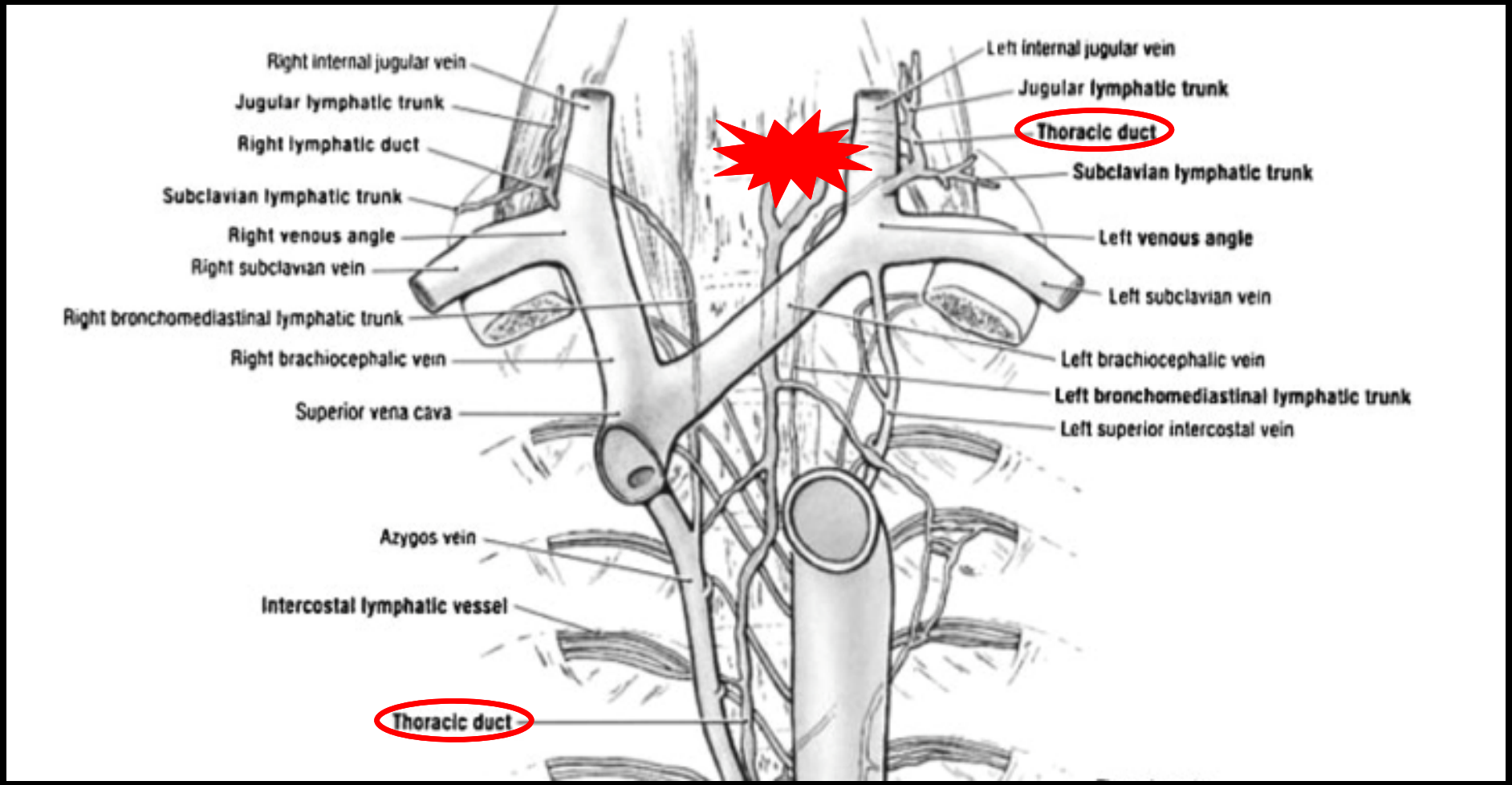


Fig.3q. Chest Xray, Lateral view.
Coils within the thoracic duct



Diagnosis:

- **Chylous leakage due to thoracic duct transsection**

Technique

Catheterization of the thoracic duct with a retrograde cervical approach

- Alternative to the trans-abdominal approach
- Easier

Indications

- Chylous leakage/ Chylous effusion
  - Iatrogenic / traumatic
    - Oesophagectomy
    - Pneumonectomy/lobectomy
    - Aortic surgery
    - CABG
    - H&N
  - Idiopathic, congenital, malignancy

Considerations

Potential complications associated with important chylous leakage

- 50% mortality
- Severe malnutrition
  - Proteins
  - Lipids
  - Dehydratation
- Immunodeficiency and less immunity to infections due to B-lymphocyte depletion

Treatment

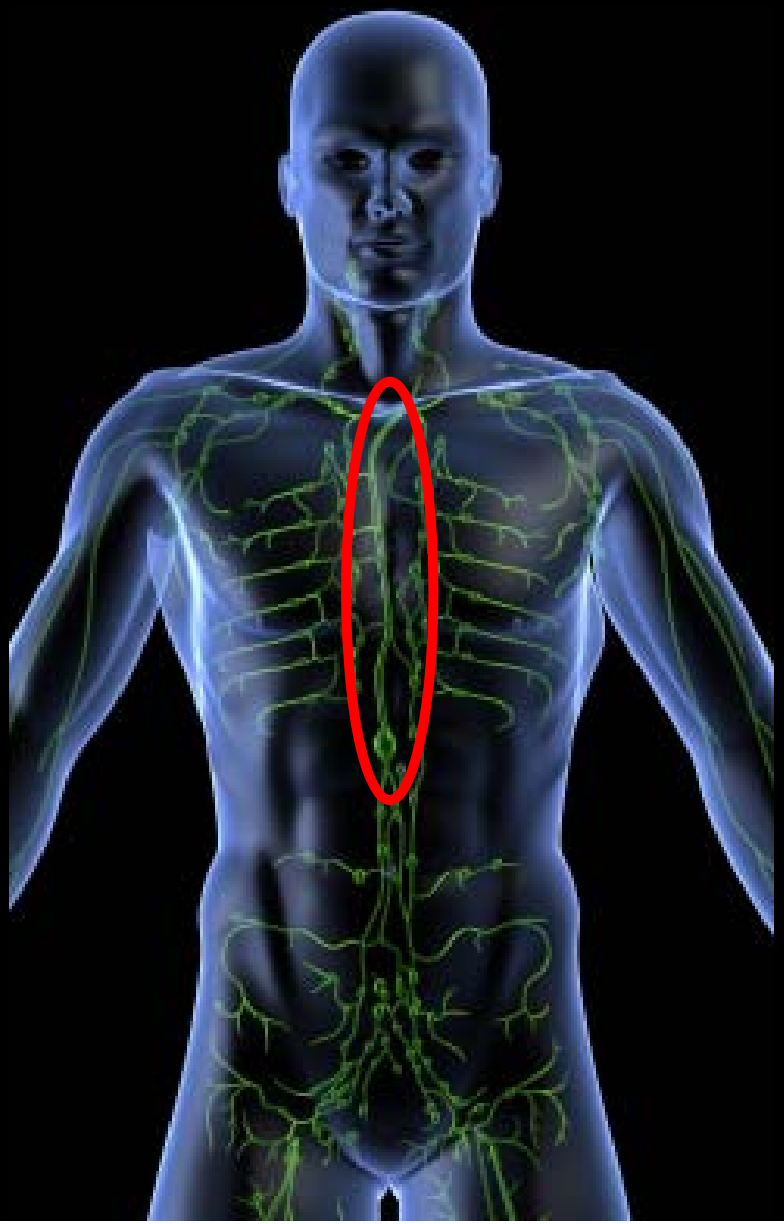
Treatment of chylous effusion / chylous leakage

- Conservative management if low flow (< 500 ml/day)
  - Chest tube
  - Low fat diet
- Blockage of the thoracic duct if high flow
  - Surgical ligature typically between T8 and T12
    - 12 to 25% mortality ; 39% morbidity
  - **Percutaneous embolization or needle disruption**

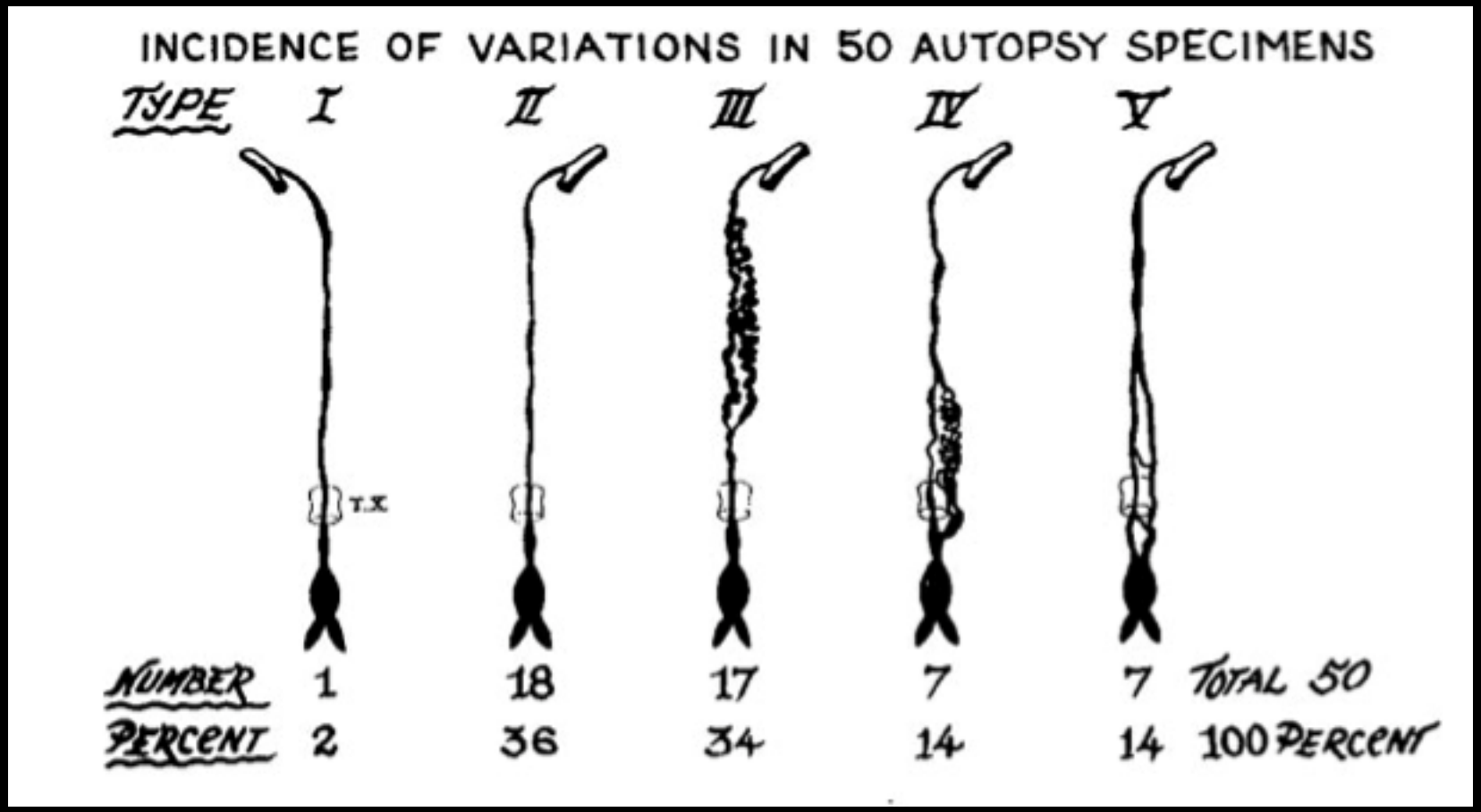
Anatomy

Thoracic duct

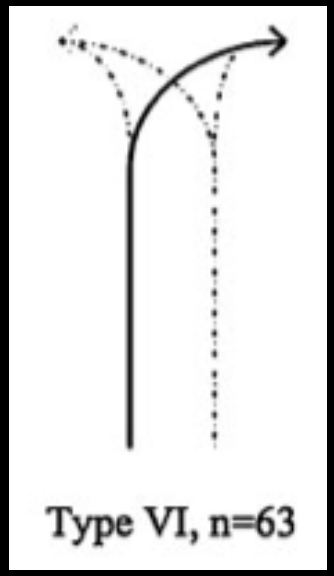
- Start from T10 to L3
- Path
  - Pass between aorta and azygos vein
  - Drain at the confluence of left internal jugular and left subscalvian veins
- Diameter 2 to 6 mm ;45 cm long; Flow 1.5 to 2.5 L/day
- Drains all body parts except right upper limb and the right part of the head/neck/thorax
- Anatomic variations



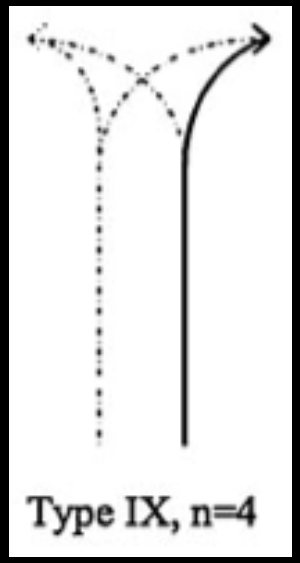
Classifications



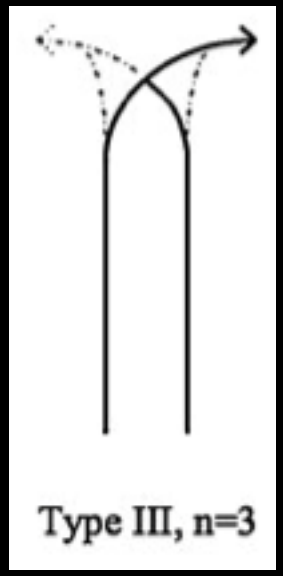
Classifications



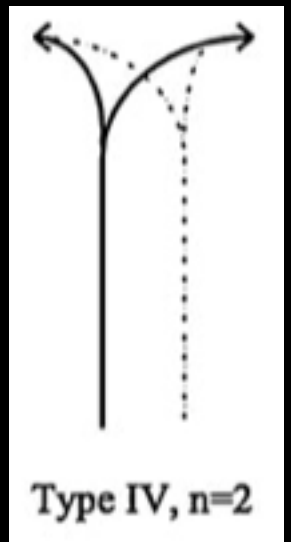
Type VI, n=63



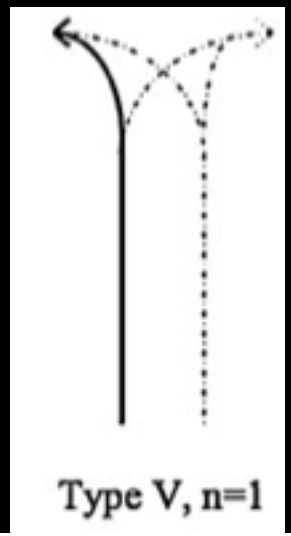
Type IX, n=4



Type III, n=3



Type IV, n=2

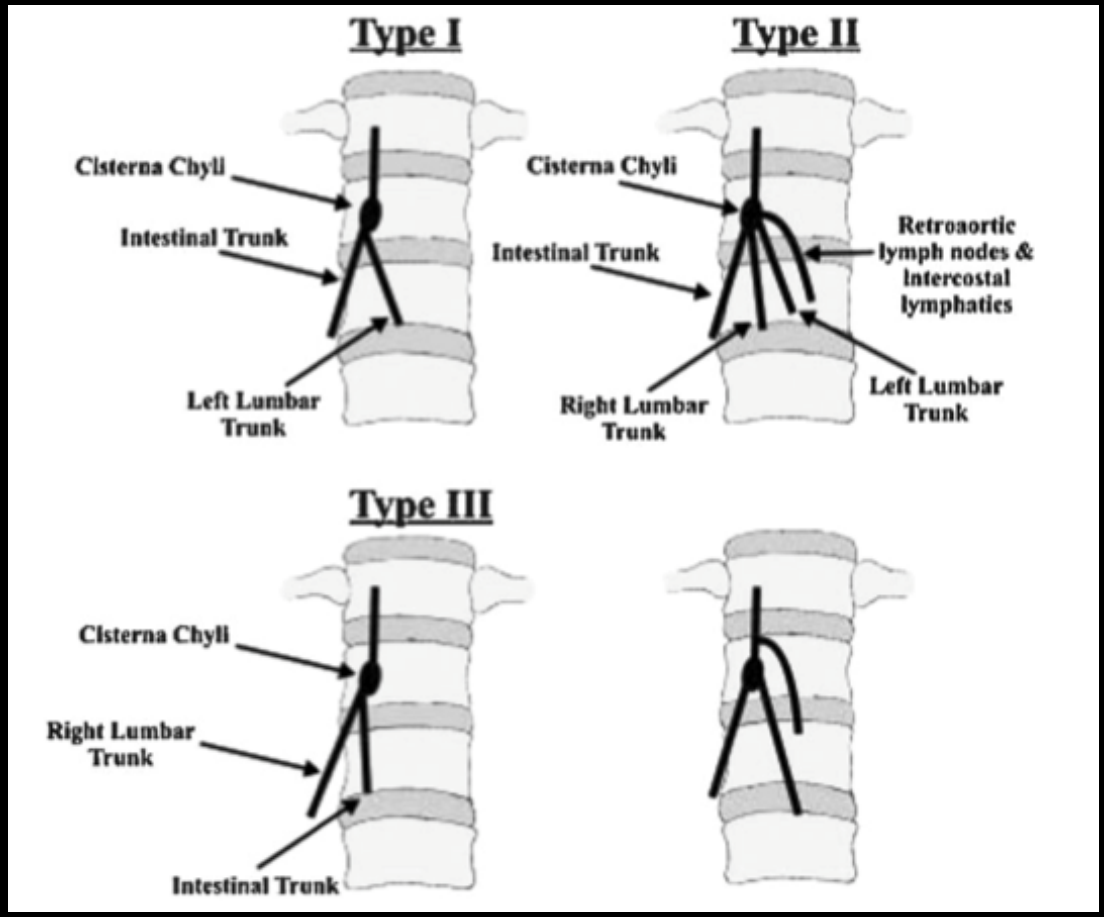


Type V, n=1

Transabdominal Thoracic Duct Embolization

- Direct puncture under fluoroscopic guidance
  - **Cisterna chyli** (visible on 30 to 53% of lymphography)
    - Multiple lymphatics confluence (variable)
      - Lumbar R/L, intestinal, hepatic
    - At the L1-L2 level, right of aorta
    - 2 cm x 1 cm (CC x TR)
  - **Lumbar lymphatic trunks**
    - Under the cisterna chyli

Variations


Type I
Cisterna Chyli
Intestinal Trunk
Left Lumbar Trunk
Type II
Cisterna Chyli
Intestinal Trunk
Retroaortic lymph nodes & intercostal lymphatics
Right Lumbar Trunk
Left Lumbar Trunk
Type III
Cisterna Chyli
Right Lumbar Trunk
Intestinal Trunk

Transabdominal Thoracic Duct Embolization

Procedure details:

- Prophylactic antibiotics (Ancef 1 g IV)
- Chiba needle 21g or 22g (15 -20 cm) and 0.018 guidewire
- Microcatheter inserted in the thoracic duct
  - Opacify the thoracic duct and localise the rupture site
- Thoracic duct embolization
  - Coils (3-6 mm)
  - Histoacryl/lipiodol (1:1)

Companion case 1

- 78 year old woman
- Oesophagectomy with gastric pull-up
- Persistent right pleural effusion
- After chest tube placement: chylous effusion with high flow leakage

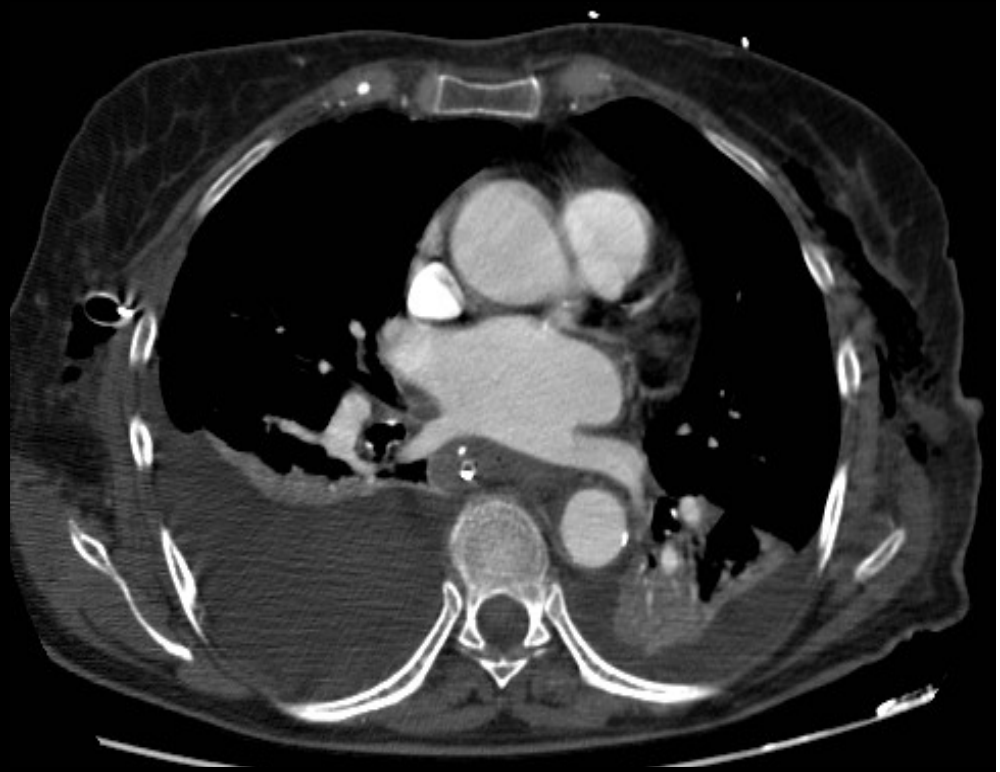


Fig. 4a. Pleural effusion R>>>L

Companion Case 1

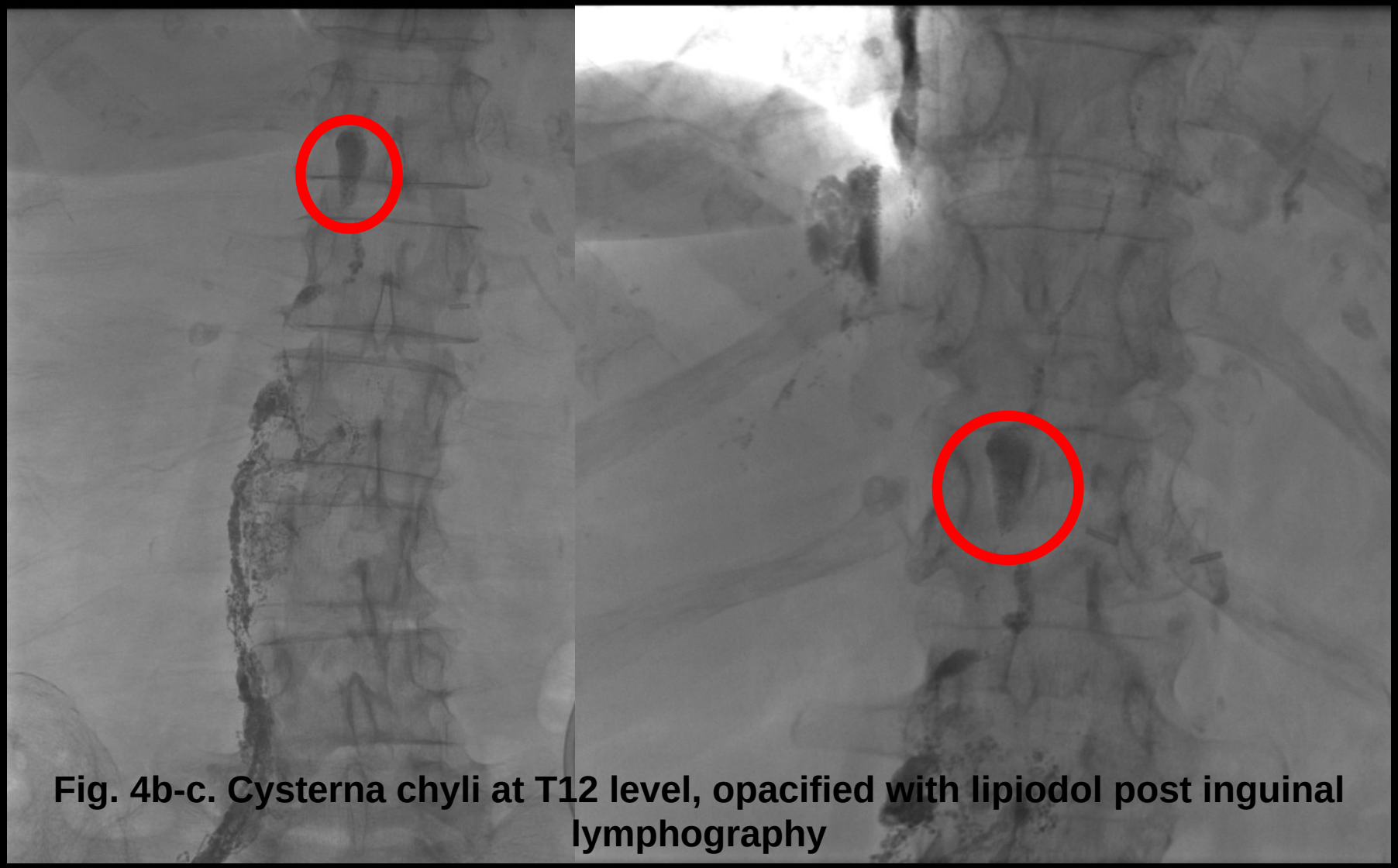


Fig. 4b-c. Cysterna chyli at T12 level, opacified with lipiodol post inguinal lymphography

Companion Case 1

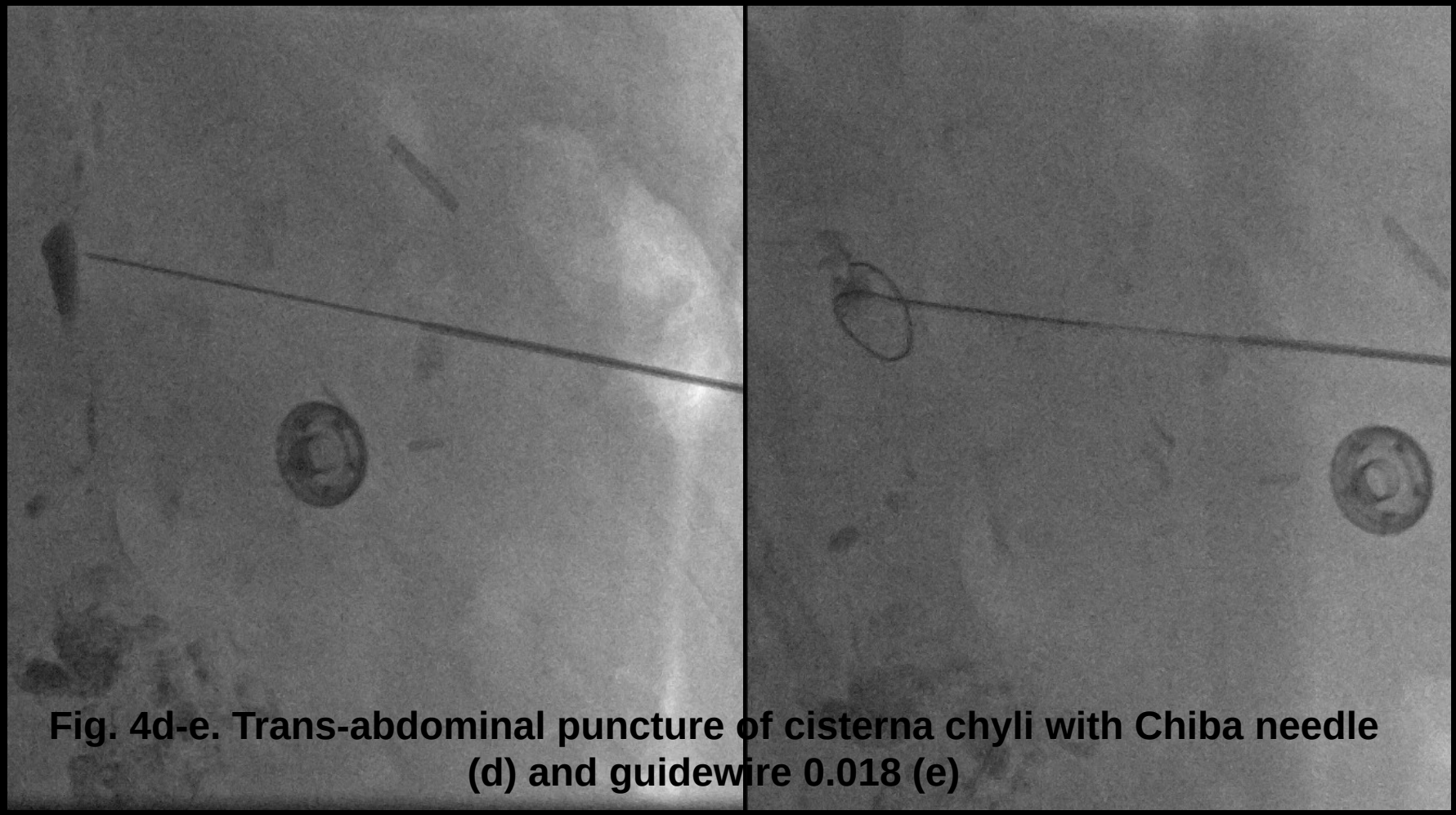


Fig. 4d-e. Trans-abdominal puncture of cisterna chyli with Chiba needle (d) and guidewire 0.018 (e)

Companion Case 1

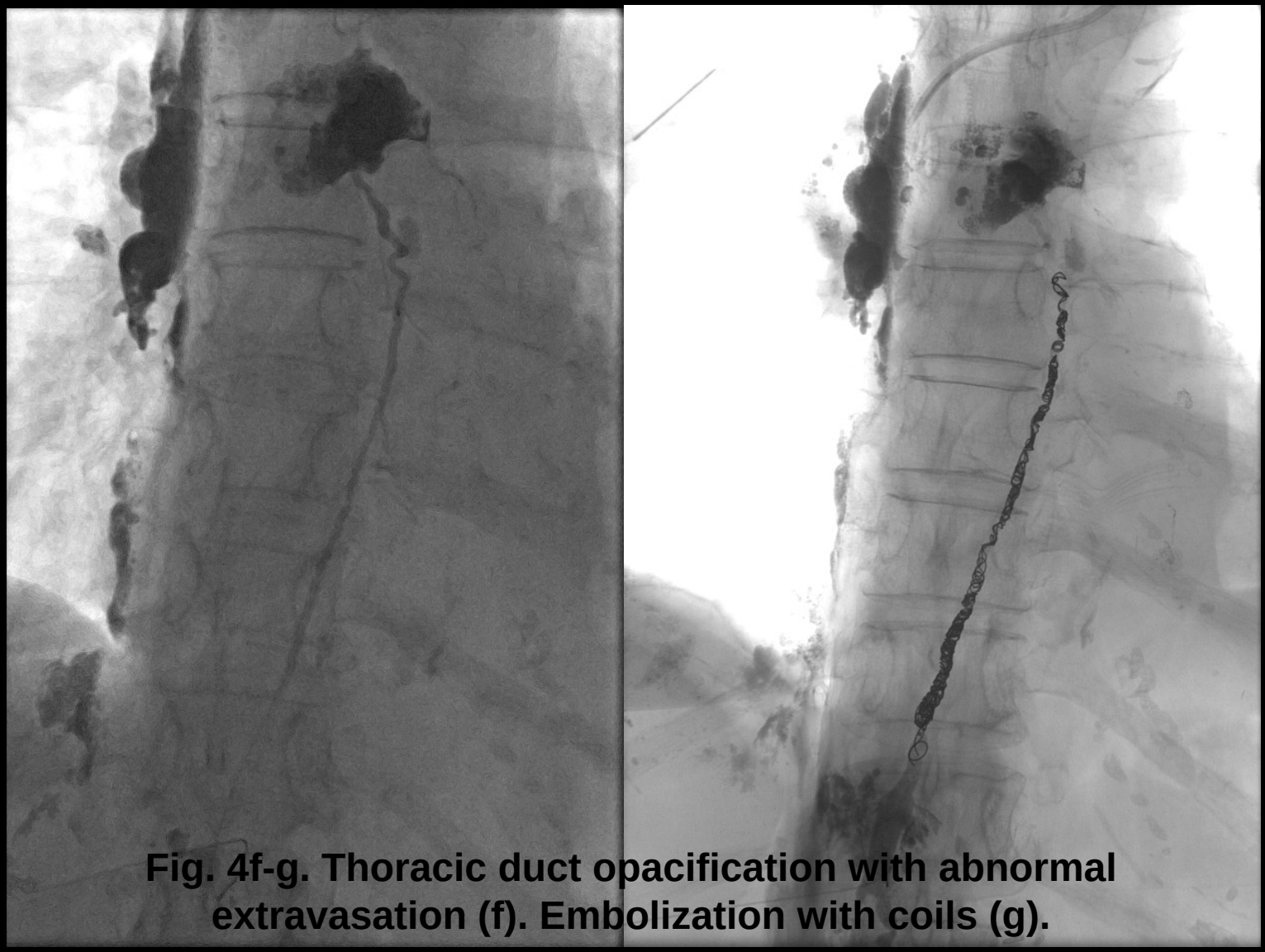


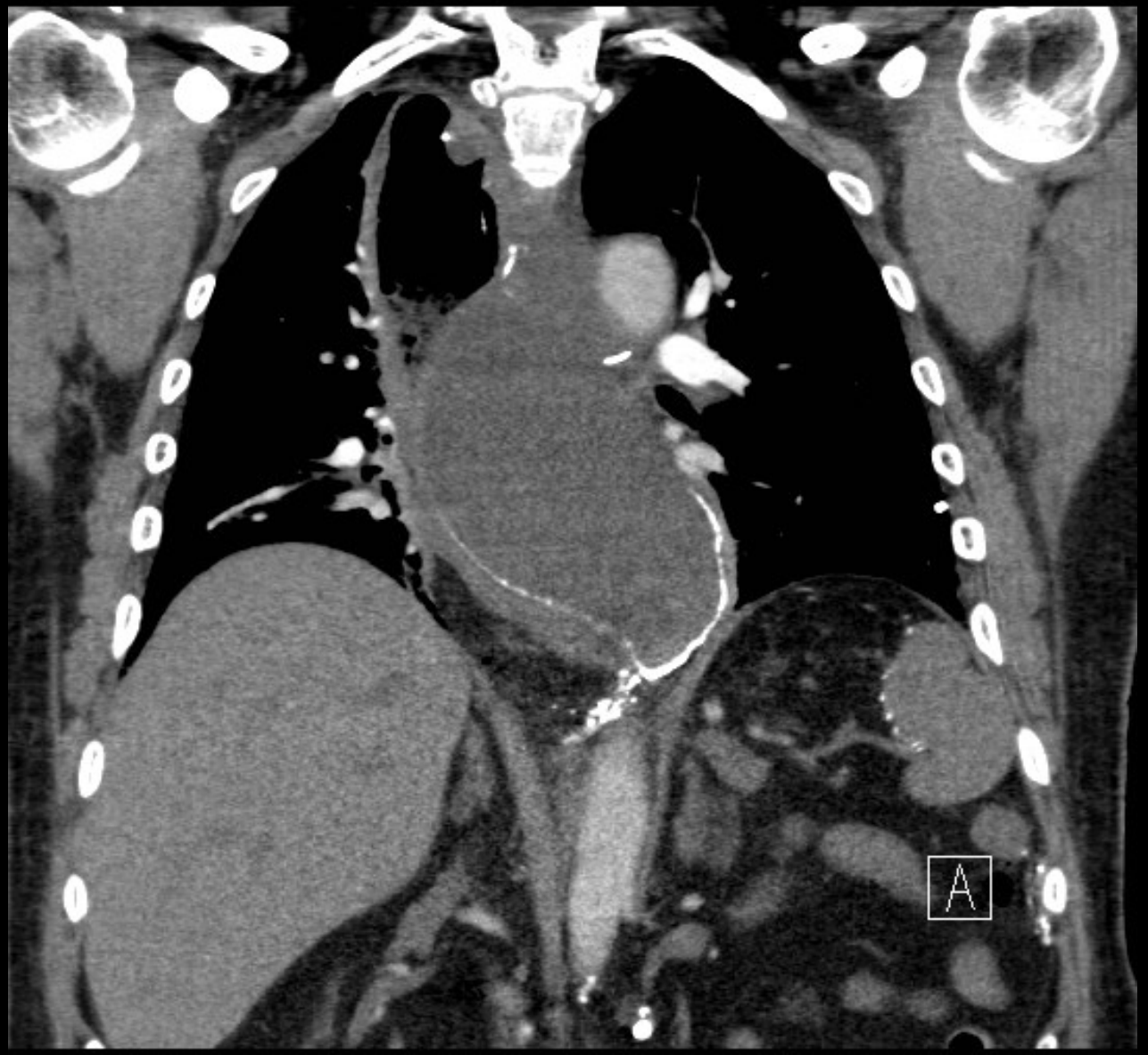
Fig. 4f-g. Thoracic duct opacification with abnormal extravasation (f). Embolization with coils (g).

Transabdominal Thoracic Duct Embolization

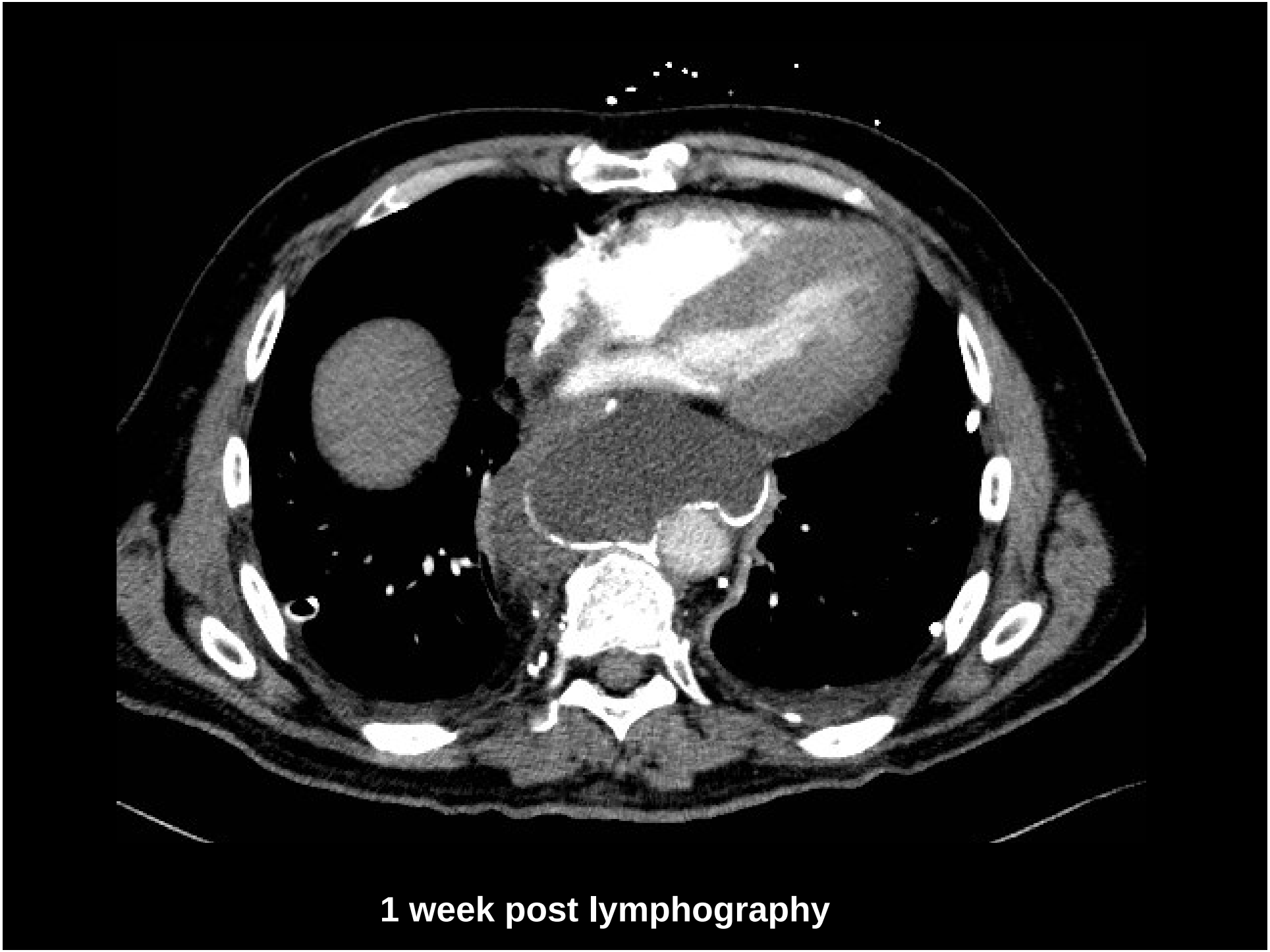
- 70%-80% technical success
  - 30% of patient have lymphatics that aren't accessible
- Alternatives
  - Needle disruption
    - Mutiple punctures of the cistern/lumbar lymphatics result in lots of microleaks with discontinuation of the principal leakage
  - The stickiness of lipiodol can contribute to dry up some leaks (next case)

Companion Case 2

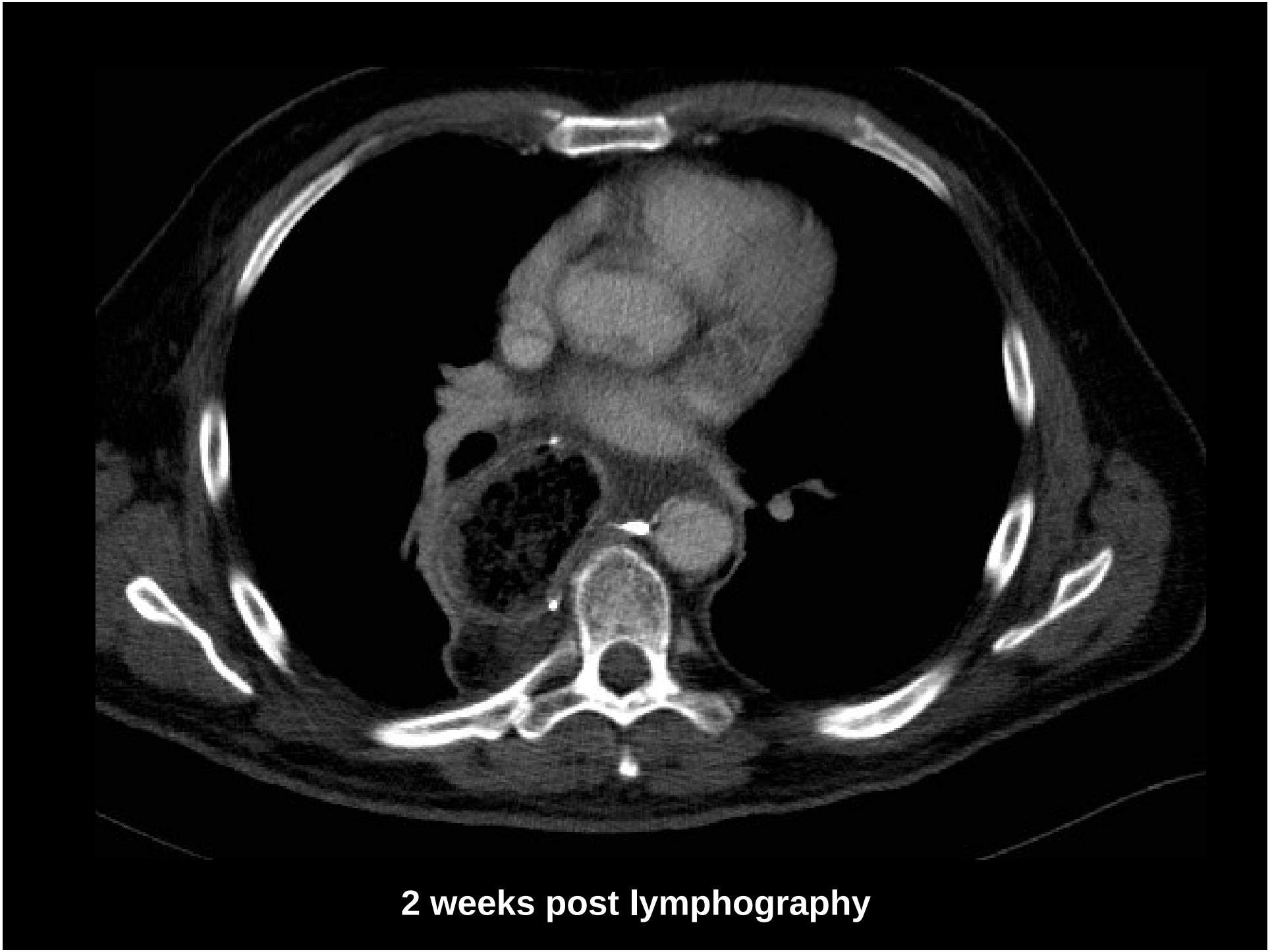
- 60 year old man
- 10 days post oesophagectomy with gastric pull-up
- Posterior chylous mediastinal collection with chylous effusion even though he had surgical thoracic duct ligation during the surgery



1 week post lymphography


1 week post lymphography

2 weeks post lymphography


2 weeks post lymphography

Take-Home Message

- 50% mortality associated with important chylous leakage
- Catheterization of the thoracic duct with a retrograde cervical approach is an alternative that can be easier than trans-abdominal approach
- Both are an alternative to surgical ligature
  - 0% mortality (IR) versus 11.8% mortality (surgical)