Case of the Day
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Case presentation

- Clinical history: 77 years old female with invasive neoplasm of the oesophagus
- No metastasis
- Transhiatal oesophagectomy with cervical oesophago-gastric anastomosis on April 21st 2009
- Rapid progression of a right pleural effusion
- Pleural drain installed PO#9

Case presentation

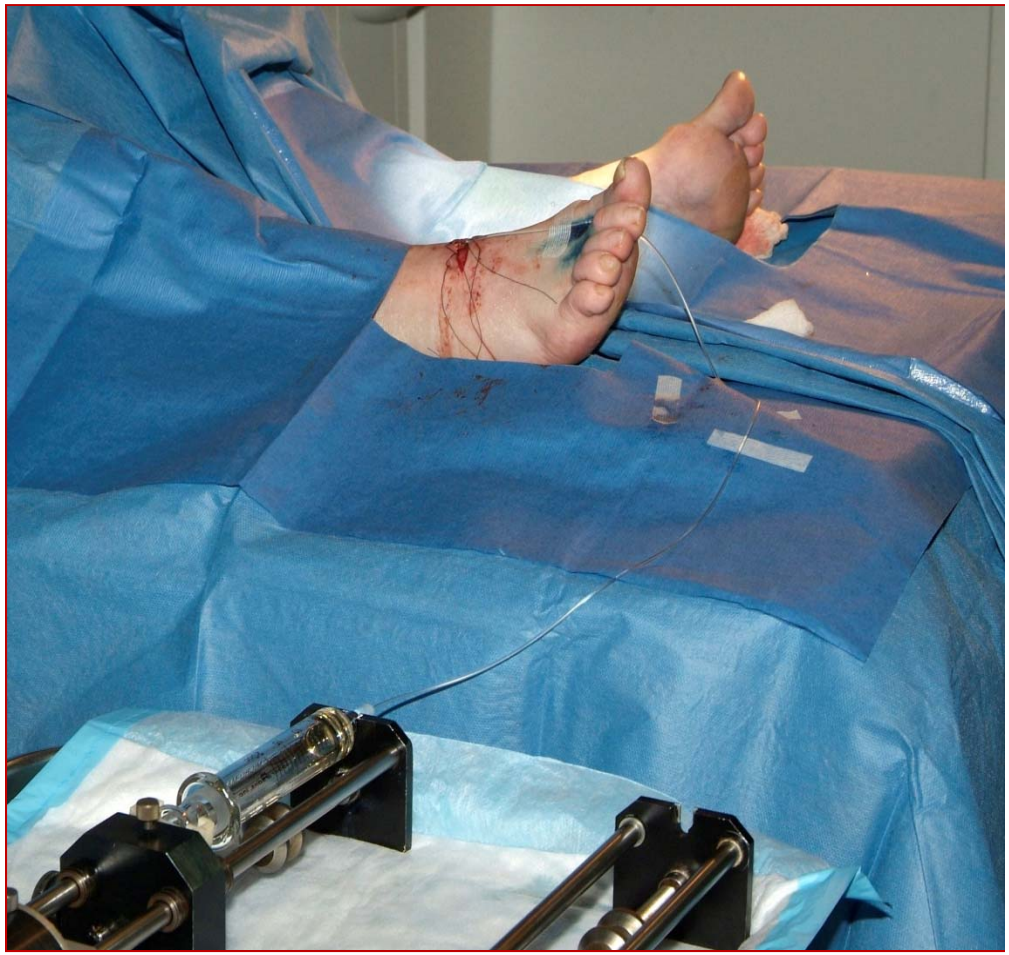
- 500cc of milky fluid containing no chylomicrons. TG=0.6mmol/L
- A chylothorax was diagnosed anyway since TG can be low because of the total IV nutrition
- No clinical improvement over the next few weeks
- 2200cc drained/day
- Patient transferred on June 4th 2009

Procedure

- Methylene blue injected S/C between toes 1-2-3 of each foot
- 3cm transverse incision on the dorsal face of the foot at the base of the 1^{st}-2^{nd} metatarsi

Procedure

- Catheterization of a lymphatic canal in the right foot with a lymphography needle (Cook 30G)
- Slow injection of Lipiodol (6cc/h), 13cc total (2hrs)



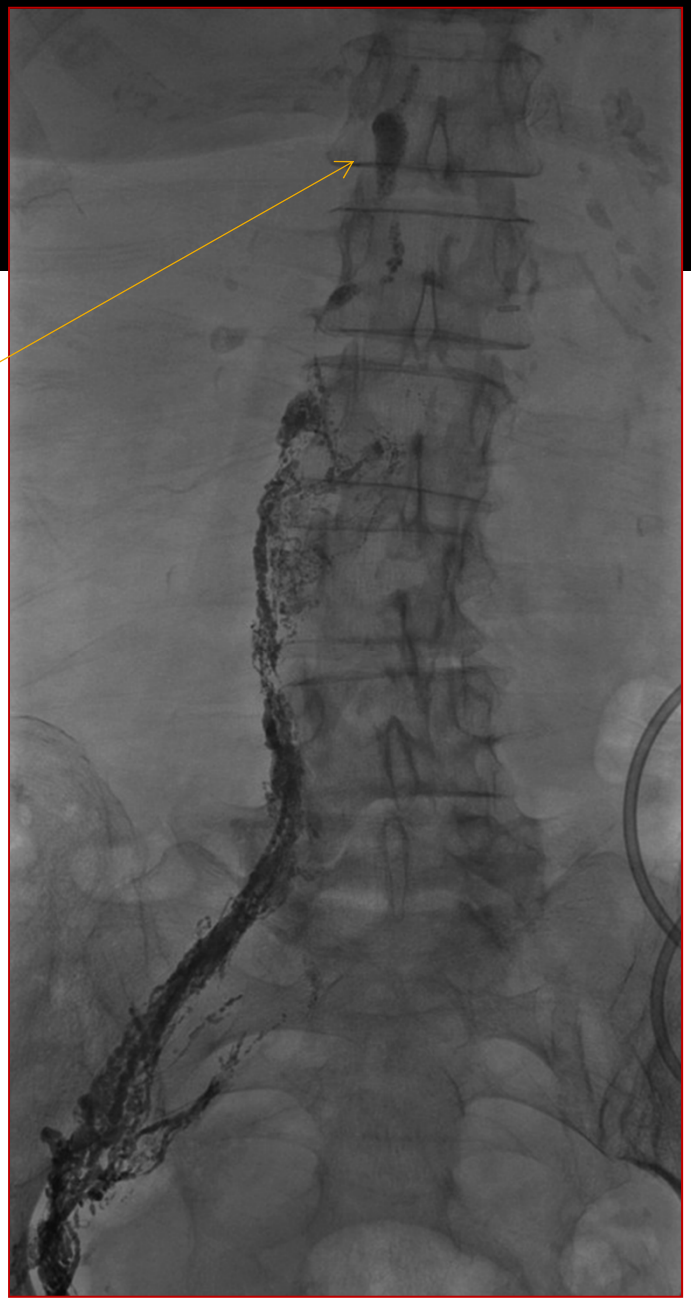
Procedure

- Fluoroscopic images acquired to follow the progressive opacification of lymphatic vessels…

Procedure

Procedure

- … All the way to the cisterna chyli which is the structure we try to aim for
- Unfortunately, it is visualized in only 53% of all cases

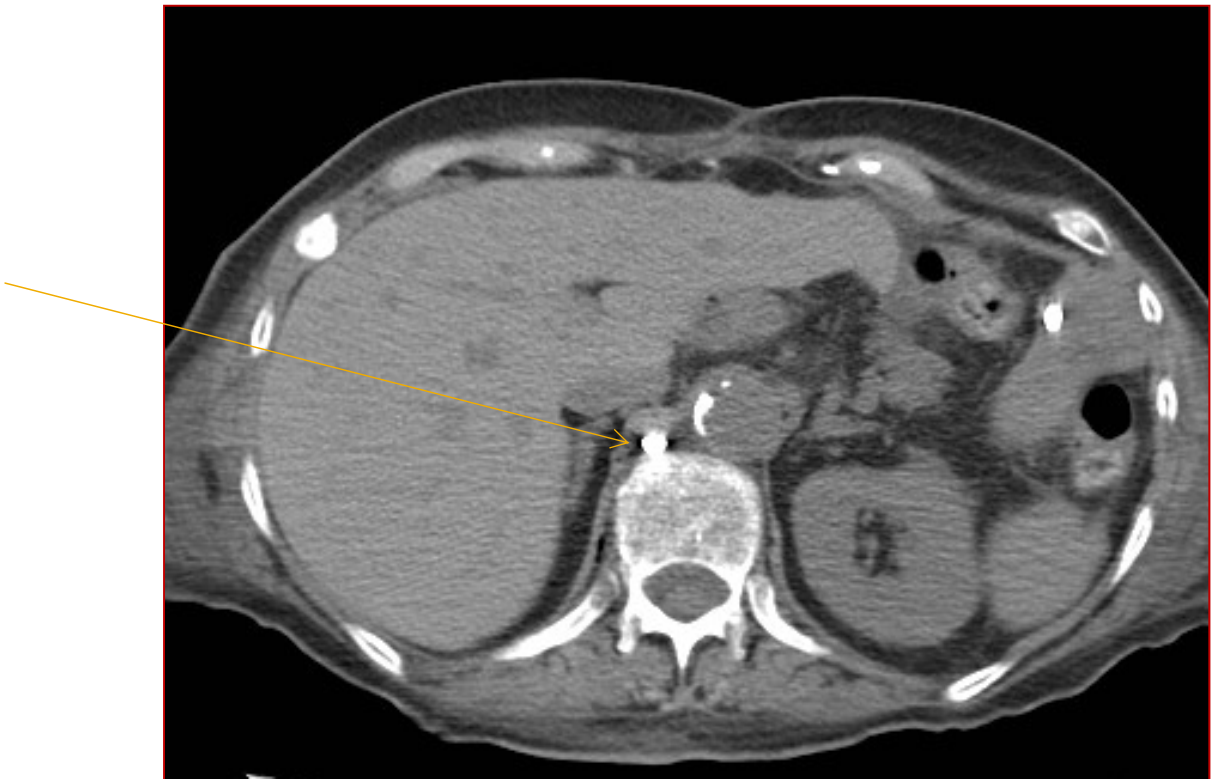


Procedure

- … And we continue to follow the opacification of the lymphatic system to identify the location of the chylous leak from the thoracic duct

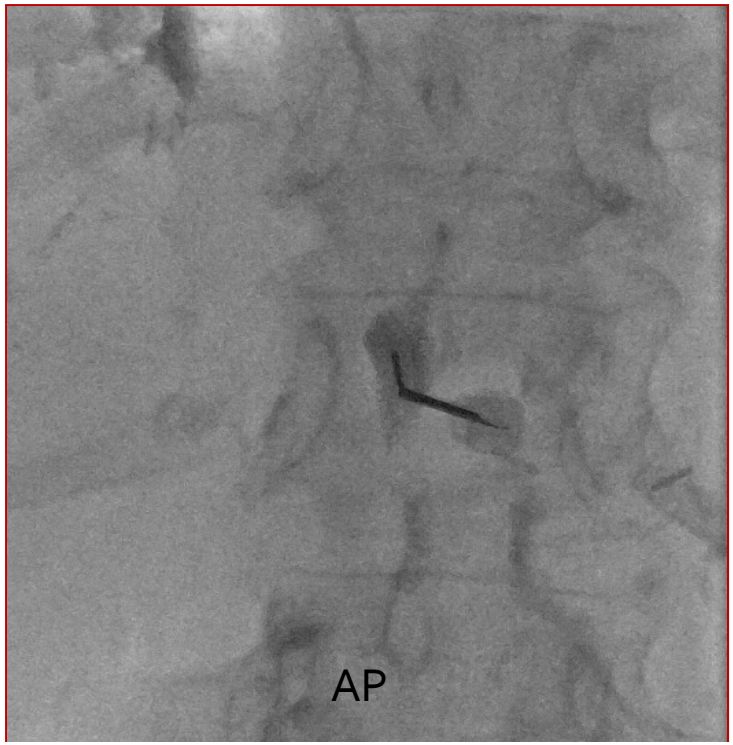
Procedure

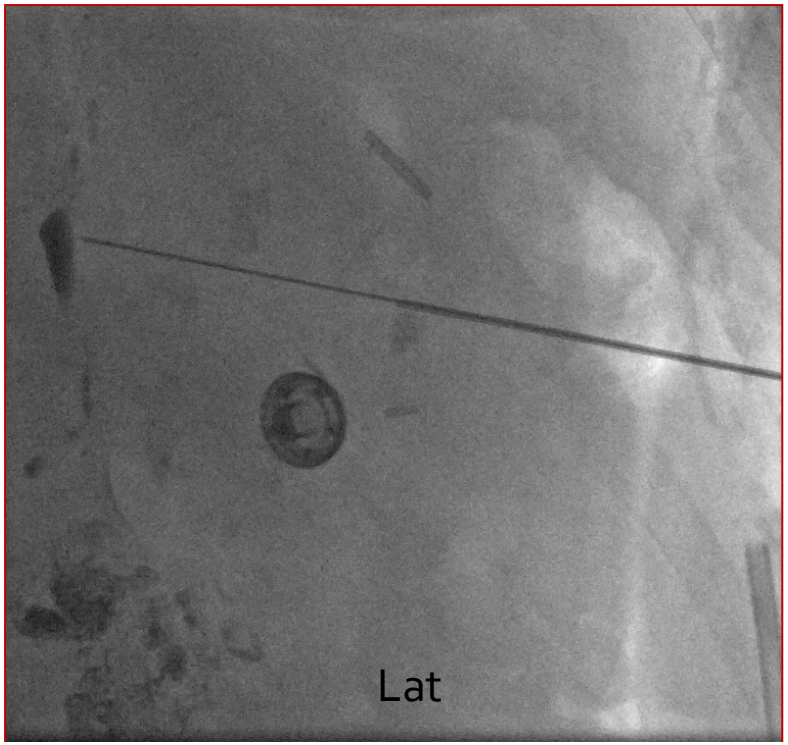
- We ordered a CT-scan to locate the exact site of the cisterna chyli and to plan the puncture



Procedure

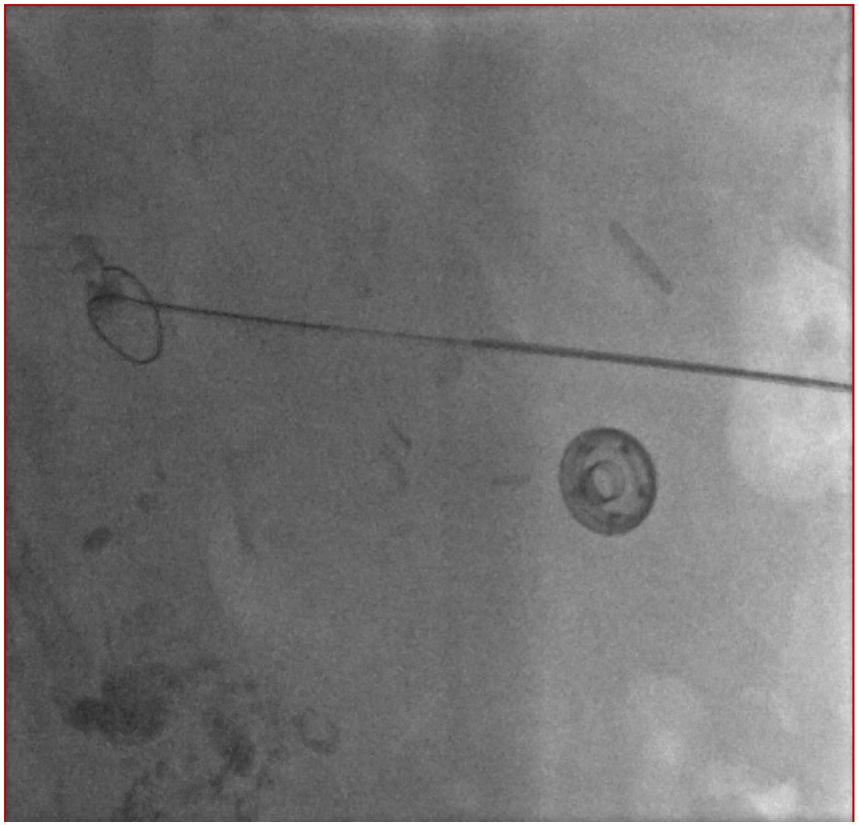
- Puncture of the cisterna chyli with fluoroscopic guiding, trans-hepatic and through the vena cava with a Mitty-Pollack (Cook) 22G needle





Procedure

- Insertion of a Transend 0.018 guide and catheterization with a FasTracker (Boston Scientific)

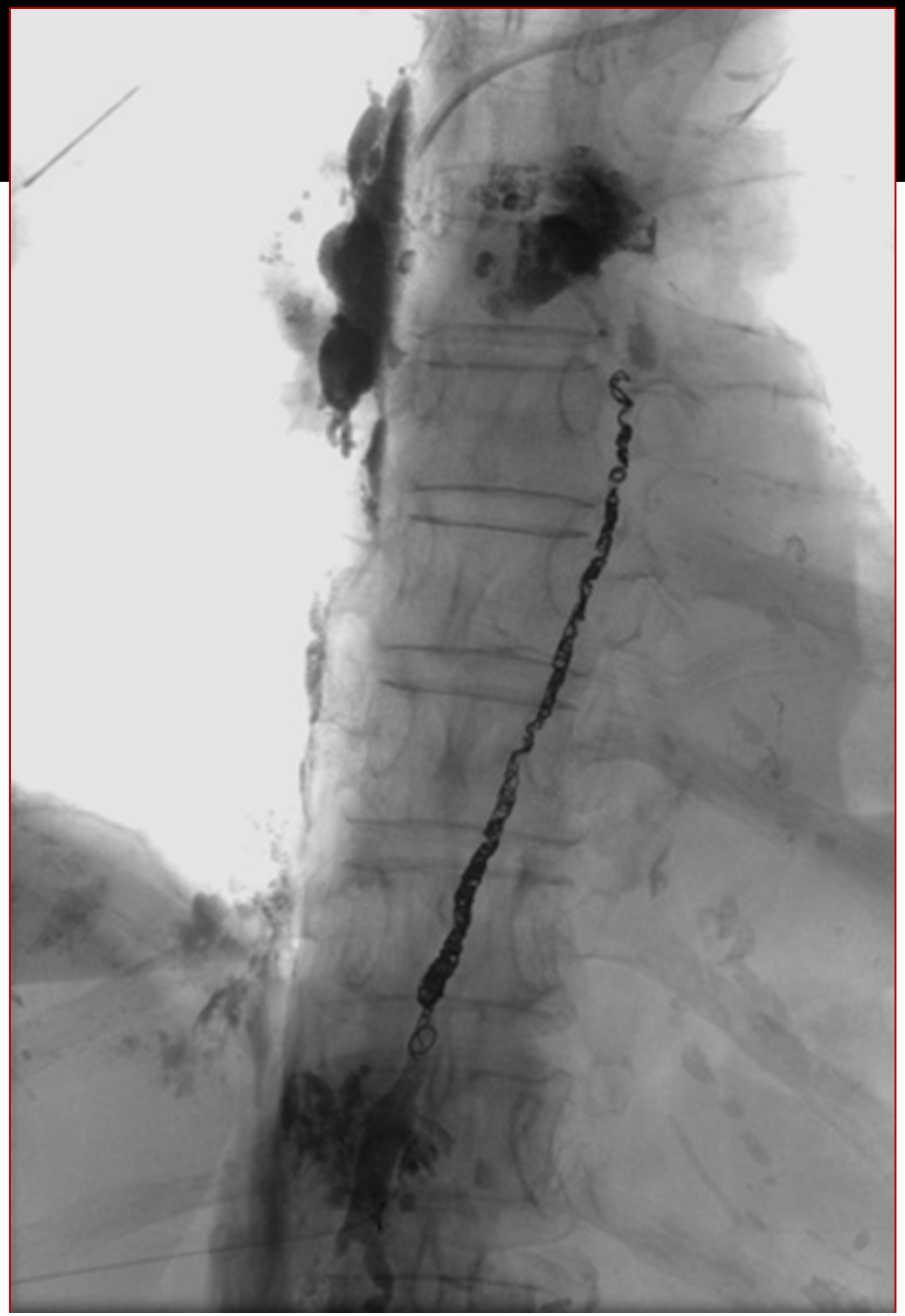


Procedure

- Opacification of the thoracic duct directly through the catheter to confirm the leak

Procedure

- Embolization of the thoracic duct with 20 metallic coils (Vortx by Boston Scientific and Tornado by Cook) with sizes varying from 4 to 10 mm



Procedure

- Complete occlusion of the thoracic duct was obtained with no more leak at the end of the procedure

Post procedure evolution

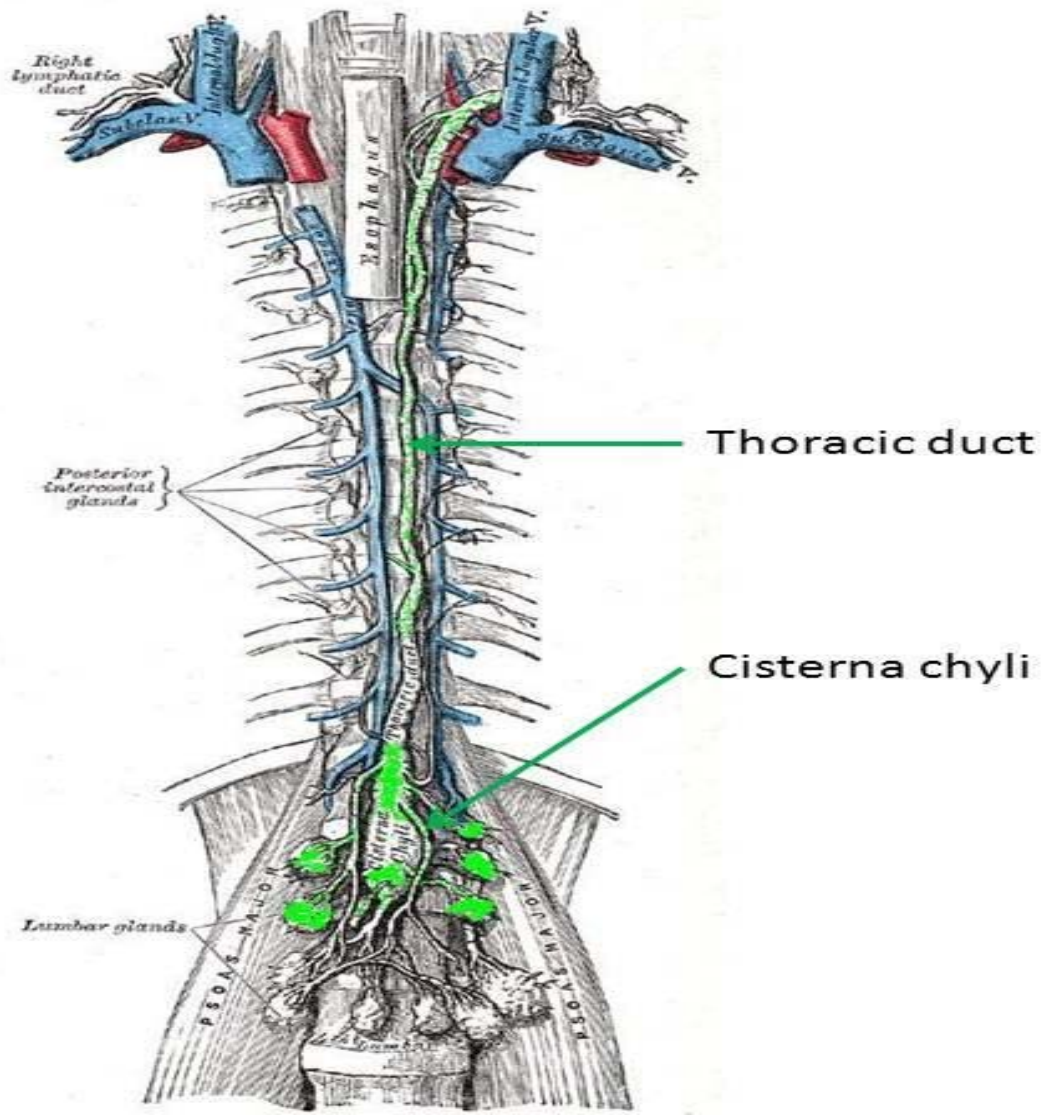
- Return to PO diet on the 2nd day
- The thoracic drain was taken out 7 days after
- Patient left the hospital July 3rd 2009
- Died from metastatic disease in January 2010
- No relapse of chylothorax over a 7 month follow-up

Thoracic duct anatomy

- Diameter = 2-3 mm
- Length = 36-45 cm
- Valves insuring unidirectional flow
- Numerous collaterals
- Multiple lymphatico-veinous anastomoses
- Many variants; normal anatomy in 65%

Lymphatic system

- The thoracic duct extends from the cisterna chyli to the left subclavian vein
- Crosses the midline at T4-T6
- The cisterna chyli is located at the level of L1-L2



The thoracic duct

- Enters the thorax (posterior mediastinum) through the aortic hiatus (between the aorta and azygos vein)
- Drains the majority of the body's lymphatic fluid which contains WBC, Ig, enzymes…
- And the chyle coming from the intestines which contains cholesterol, triglycerides, chylomicrons and liposoluble vitamins (this explains its milky appearance)

Chylothorax

- Caused by a chylous leak from an interruption of the thoracic duct or one of its branches
- Usually iatrogenic
- Occurs in 4% of oesophagal surgeries and 0.42% of all thoracic surgeries
- May also be caused by H&N radiation, vomiting, coughing, giving birth, trauma, neoplastic invasion, sarcoidosis, LAM, amyloidosis, congenital anomalies…

Chylothorax

- 50% in the right pleural space, 33% left and 17% bilateral
- High grade if >1000cc/day; low if ≤500cc/day
- Pleural fluid aspiration reveals TG >110mg/dl or 1.24mmol/L and the presence of chylomicrons

Treatment

- The conservative treatment consists of: NPO, IV nutrition (with TG, octreotide and somatostatin to lower chylous fluid production), installation of a thoracic drain to allow lung expansion, monitoring of lytes, WBC, albumin

Surgical treatment

- For high grade leaks persisting for more than 2 weeks or with metabolic repercussions
- Thoracic duct ligation has a success rate of 90%, but a mortality rate of 11.8%
- Other approaches are: pleurodesis, pleurectomy and pleuro-peritoneal shunting

Thoracic duct embolization

- Efficacy and safety are well proven
- A 109 patients study showed a success rate of 90%, minor complications in 3% and no major complications or deaths

Conclusion

- Chylothorax is a rare but serious complication from thoracic surgery (especially oesophagus)
- Different therapeutic approaches exist depending on the grade, duration and patient's condition
- For high grade chylothorax, percutaneous embolization of the thoracic duct is as effective as the surgical approach, but results in a lot less complications

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