



Refractory Chylothorax After a COVID 19 Infection

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NO DISCLOSURES





1 in 5775- 24,000 neonates born with congenital chylothorax
Mortality rate 25%-50%





Chylothorax

Accumulation of chyle in the pleural cavity

Can be

1. Congenital
2. Neoplastic
3. Infectious
4. Traumatic
5. Obstruction/ destruction of the thoracic duct







Received: 22 May 2021 | Accepted: 9 August 2021

DOI: 10.1002/rcr2.836

CASE REPORT

Official Case Reports Journal of the Asian Pacific Society of Respiration
Respirology Case Reports   WILEY

Chylothorax found in a patient with COVID-19


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Proposed pathogenesis behind COVID 19 induced chylothorax:

Inflammatory response leading to arterial and venous vasculopathy associated with a prothrombotic state

Pre-existing altered course of the right subclavian that is compromised by the prothrombotic state





Clinical images

Bilateral Chylothorax and COVID-19: Report Case

Quilotórax bilateral y COVID-19: reporte de caso

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Reported a case of chylothorax without
thrombus in the SVC





Article

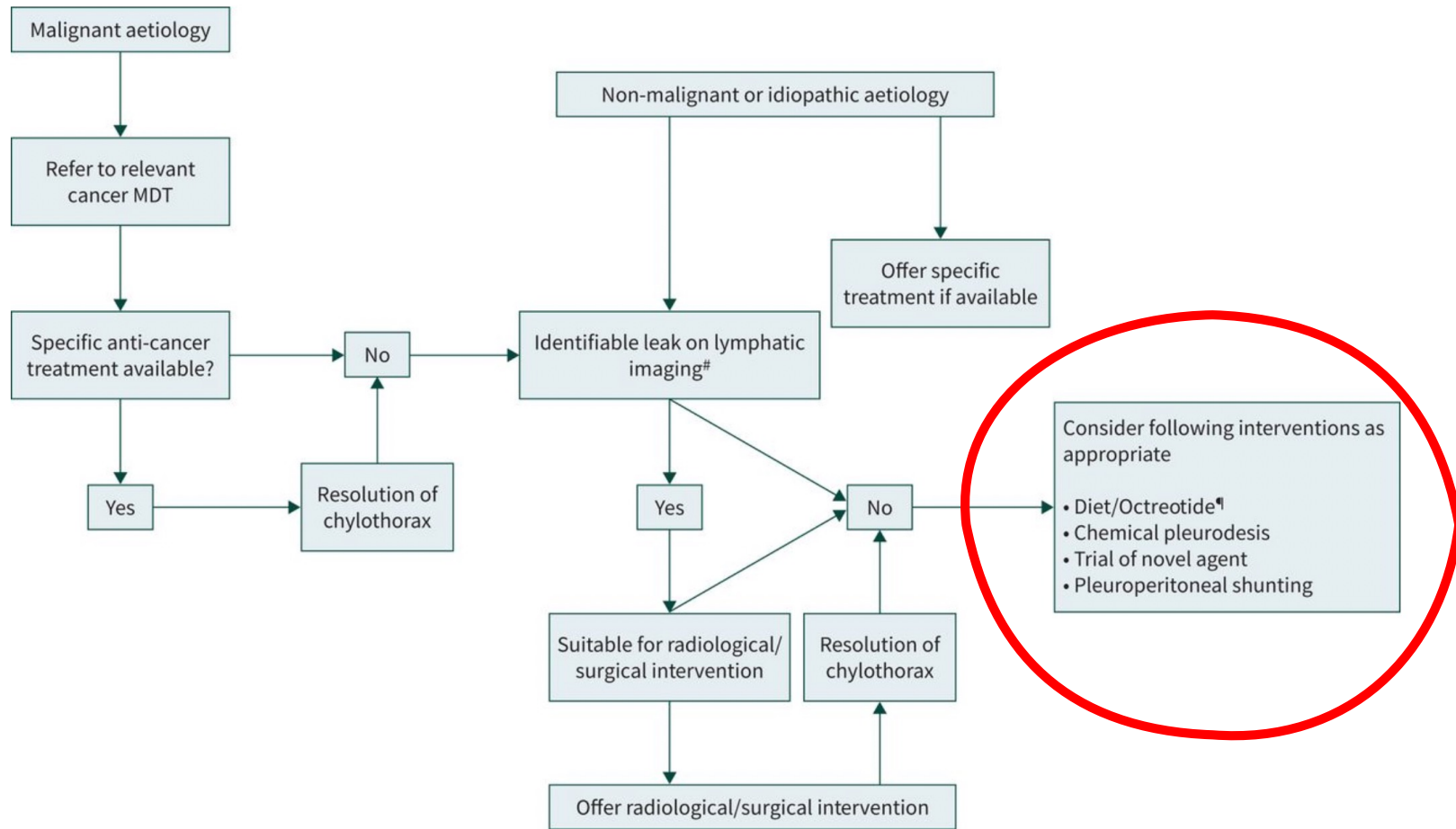
Frequency of Spontaneous Hemothorax, Chylothorax, Pleural, and Pericardial Effusion in Patients Who Had Thorax Tomography during Prepandemic and Pandemic Period

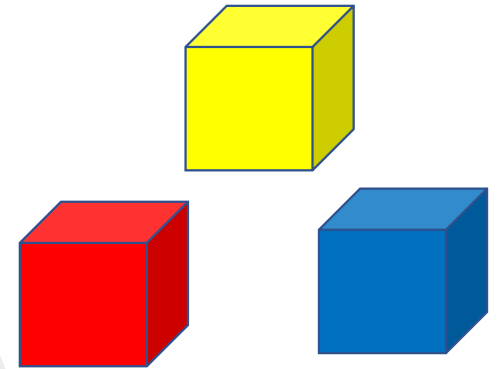
Figen Funalı Türkdoğan¹, Abuzer Coskun^{2*} and Kenan Ahmet Türkdoğan³

**Frequency of chylothorax identified using
computed tomography with serologic positivity:**

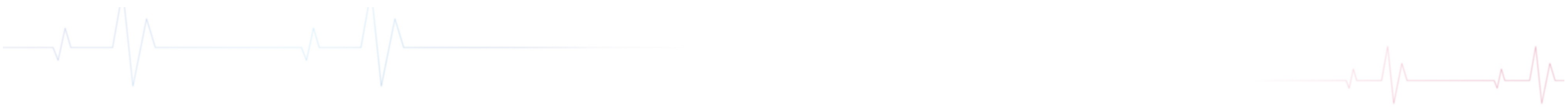
3.4%







Taking
a
Leap

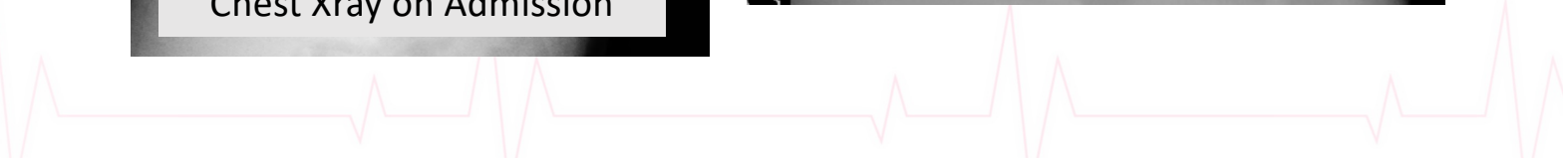
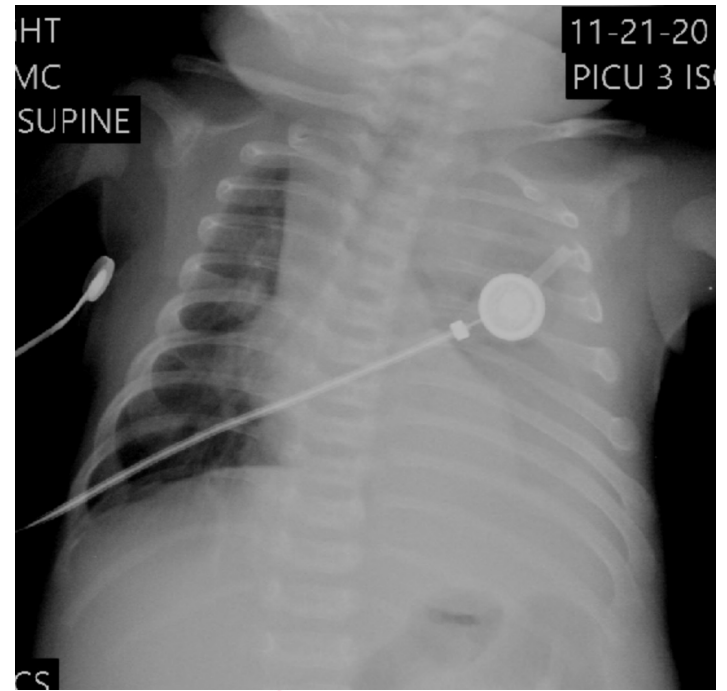
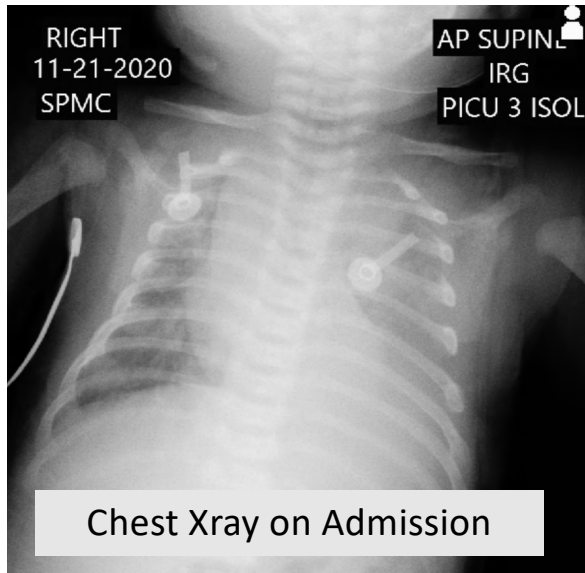


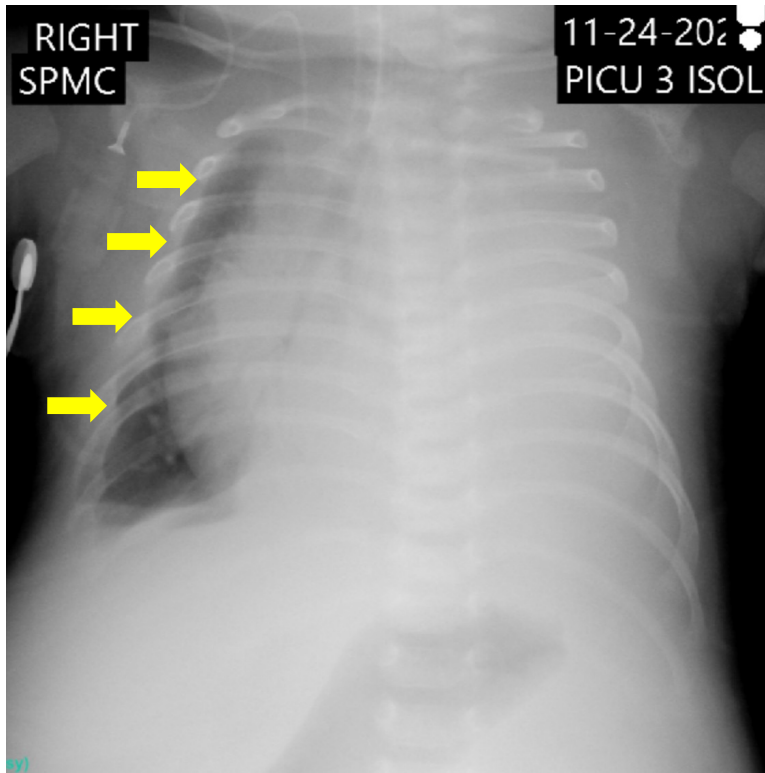
(+) difficulty of breathing
(+) chest retractions

3rd Hospital Day
Developed (+) desaturation & hypotension
(+) pleural effusion left`

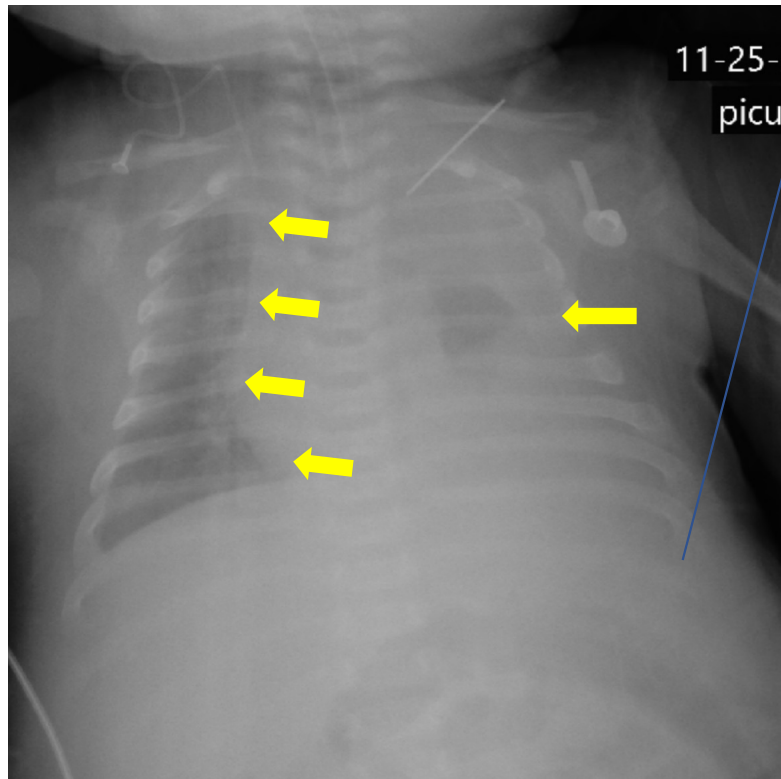


Previously healthy 1 month old neonate
G1P1, unremarkable perinatal history

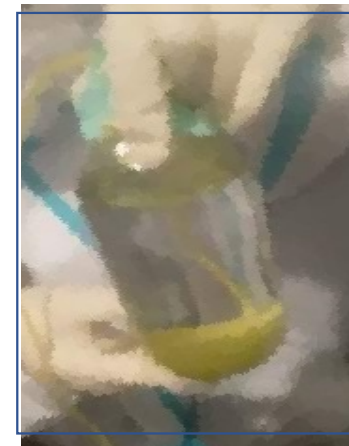




Preoperative Chest Xray



Post Chest Tube Chest Xray



(+) triglycerides

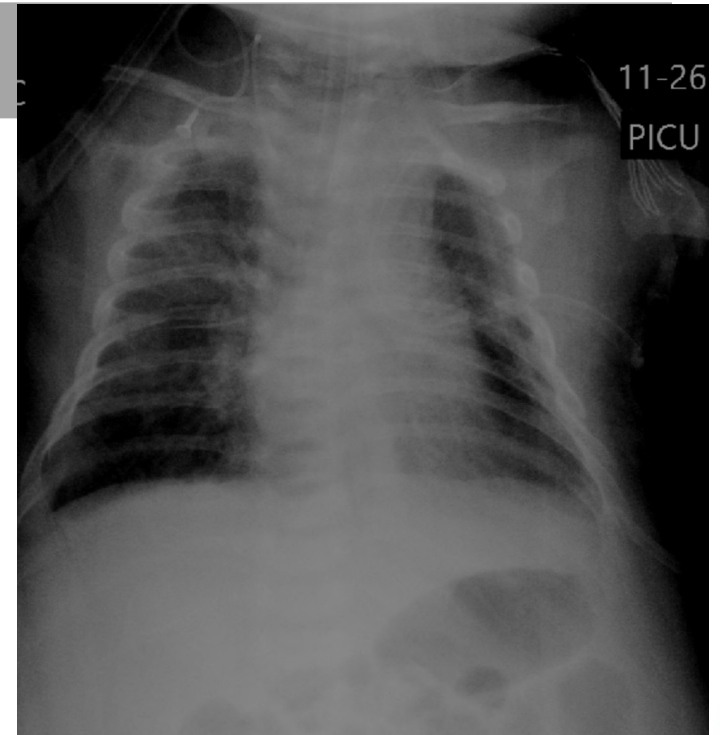




Nothing per orem, on parenteral nutrition

Surveillance Xray

Chest tube removed
Sent home on Monogen formula milk





EMERGENCY
ROOM

Subcostal retractions

Chest CT scan

- Recurrence of pleural effusion on the left
- CTT inserted showing chylothorax



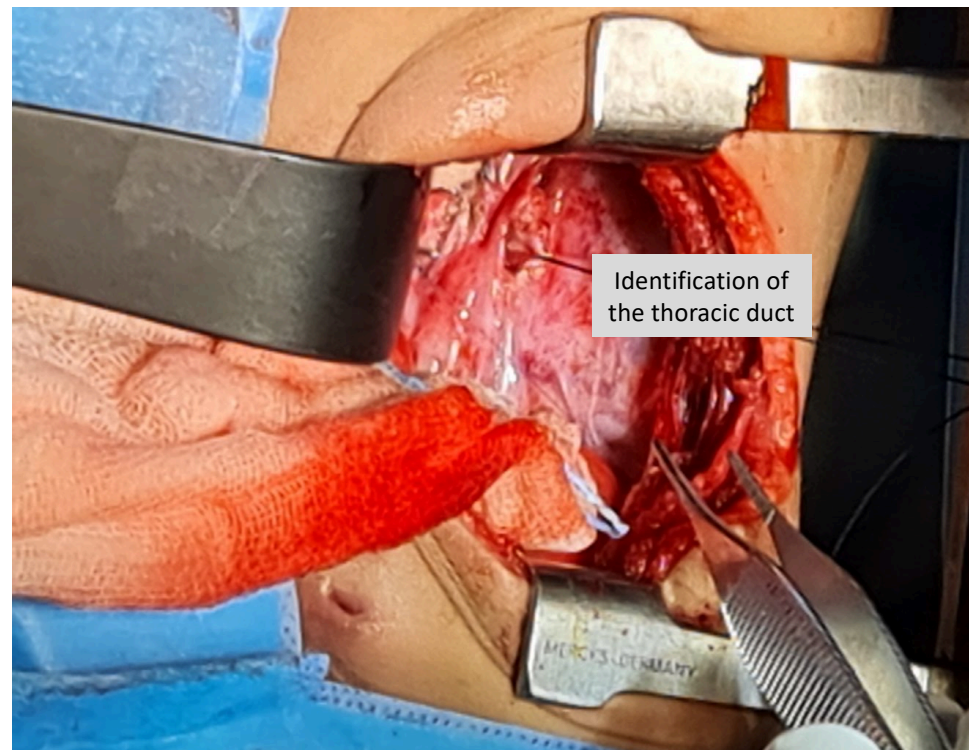


CEPHALAD



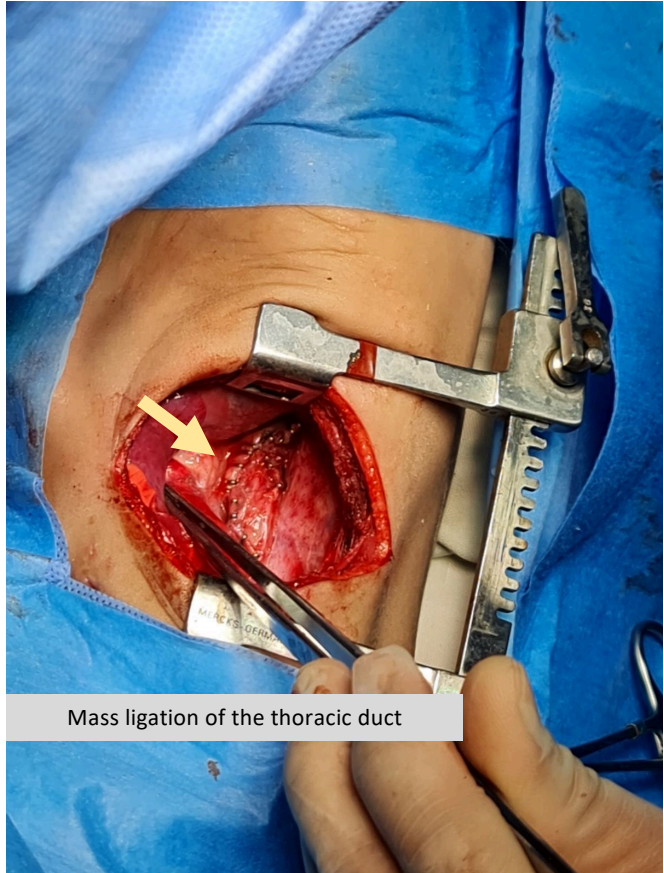
CAUDAD

CEPHALAD



CAUDAD





Mass ligation of the thoracic duct



Postoperative Chest Xray

After the 2 procedures, the patient was sent home improved.







- Cachexia
- Tachycardia
- Tachypnea
- Dehydration
- Abdominal bloatedness
- IgA Deficiency
- Chest Tube Drain ~400cc/day, abdominal drain 1000cc/day

READMITTED

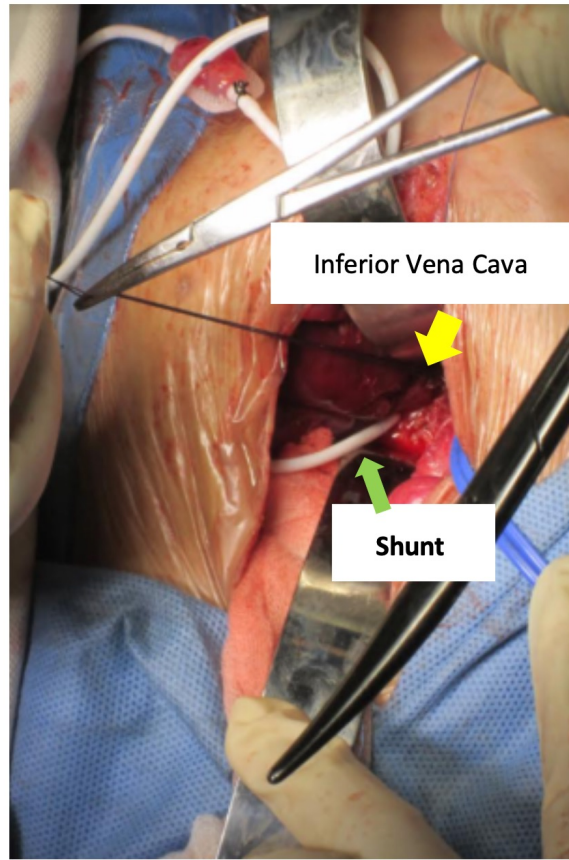
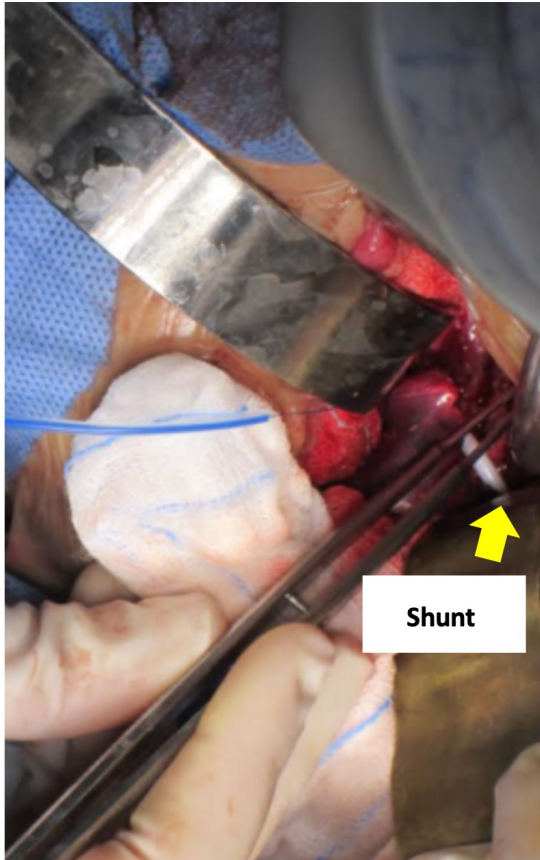




Laparotomy, Pleura-peritoneal-inferior vena cava shunting



INTRAOPERATIVE PHOTOS





POST OPERATIVE CARE

- Caregivers were instructed to manually pump the valve every 4 hours
- Chest tube removed on 15th postoperative day
- Abdominal drain removed on 24th postoperative day
- Discharged 30th postoperative day



*Posted with parents permission**



Cite this article as: Bender B, Murthy V, Chamberlain RS. The changing management of chylothorax in the modern era. Eur J Cardiothorac Surg 2016;49:18–24.

The changing management of chylothorax in the modern era

Bradley Bender^{a,b}, Vijayashree Murthy^c and Ronald S. Chamberlain^{a,c,d,*}

Table 4: All published reports on CTx outcomes following operative management (1981–2009)

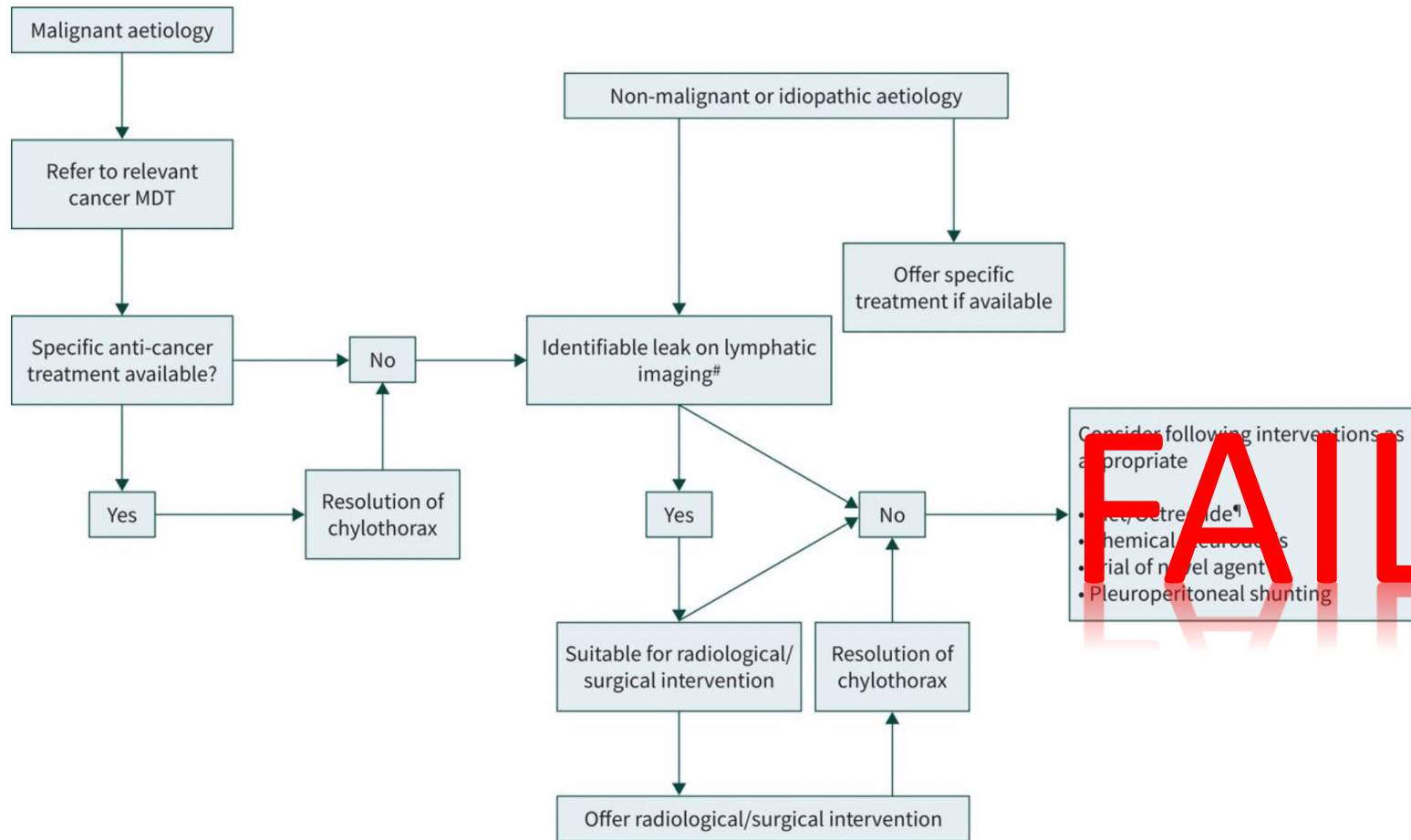
Study (year)	Number of patients (n)	Cause of CTx	Surgical management	Success rate ^a
Strausser <i>et al.</i> (1981) [39]	4	Non-traumatic	Thoracic duct ligation ± pleurodesis	75%
Orringer <i>et al.</i> (1988) [16]	11	Traumatic	Thoracic duct ligation	100%
Bolger <i>et al.</i> (1991) [40]	3	Traumatic	Thoracic duct ligation	67%
Marts <i>et al.</i> (1992) [32]	6	Traumatic	Conservative therapy failed → Thoracic duct ligation	67%
Cerfolio <i>et al.</i> (1996) [42]	47	Traumatic	Dietary restrictions, drainage and TPN/thoracic duct ligation ± pleurodesis	91.2%
Dugue <i>et al.</i> (1998) [34]	9	Traumatic	Thoracic duct ligation	77.8%
Merigliano <i>et al.</i> (1999) [17]	15	Traumatic	Thoracic duct ligation	93.3%
Christodoulou <i>et al.</i> (2006) [53]	6	Non-traumatic	VATS thoracic duct ligation	83%
Paul <i>et al.</i> (2009) [44]	22	Traumatic	Thoracic duct ligation	95%

VATS: video-assisted thoracic surgery.

^aSuccess rate was defined by the absence of chylous effusion and without recurrence in the follow-up period.

Success rate of surgical ligation thoracic duct 75%
-83% for nontraumatic chylothorax







Ligation of the Thoracic Duct for the Treatment of Chylothorax in Heart Diseases

Paulo M. Pêgo-Fernandes, Fábio B. Jatene, Clayton Cesar Tokunaga, Danielle Tiemi Simão,
Ricardo Beirutty, Eliza Rumiko Iwahashi, Sérgio Almeida de Oliveira

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Identified possible causes of failure:

1. Anatomic variations and
2. ***Impossibility of identifying the leakage sites***

Some studies demonstrate that the ligation of the thoracic duct by using video-assisted thoracic surgery or thoracotomy for the treatment of chylothorax in children may fail due to the anatomic variations of the thoracic duct or due to the impossibility of identifying the leakage sites²¹.



Normal Thoracic Duct Anatomy

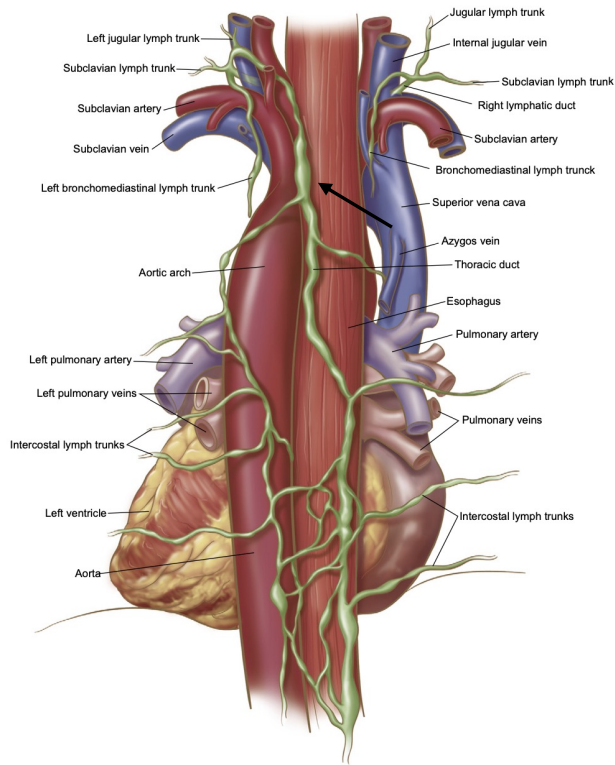


Fig. 5. Posterior view of the thoracic duct and its tributaries. Note that the remnant of the right lymphatic duct in the neck forms from the union of 3 lymphatic trunks: right jugular, right subclavian, and right bronchomediastinal trunks.

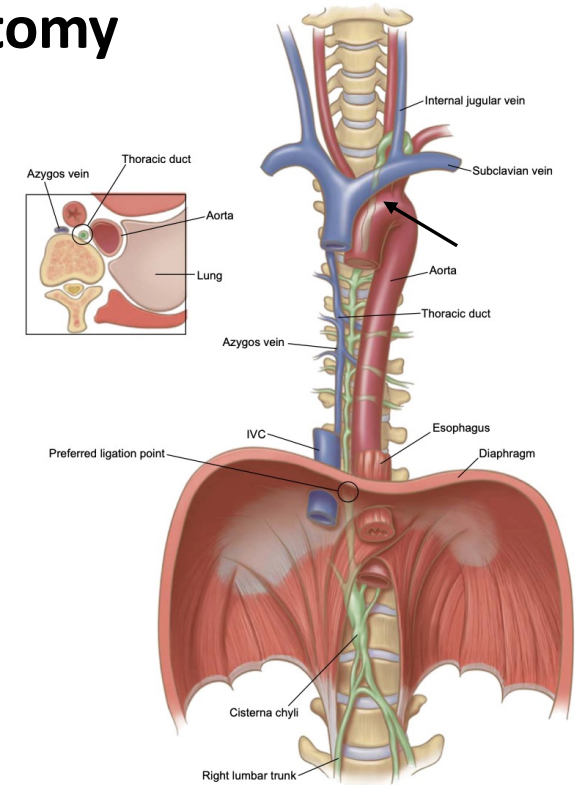


Fig. 2. Surgical anatomy of thoracic duct showing the preferred point of thoracic duct mass ligation in the surgical treatment of chylothorax. IVC, inferior vena cava.

Adapted from Mehan & Hematti, *Anatomy of Thoracic Duct*

https://www.pediatricir.com/uploads/5/4/7/8/54786829/anatomy_of_thoracic_duct.pdf





Return the flow of chyle to the Vena Cava

How can we re establish the flow of chyle to the vena cava without:

1. Leakage of blood out of the systemic circulation
2. Leakage of chyle back to the peritoneal/ pleural space



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The changing management of chylothorax in the modern era

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If conservative or VATS ligation of the thoracic duct fails, and the CTx becomes intractable, a pleuroperitoneal or pleurovenous shunt may be the last resort. The two different types of shunts that





Taking a Leap

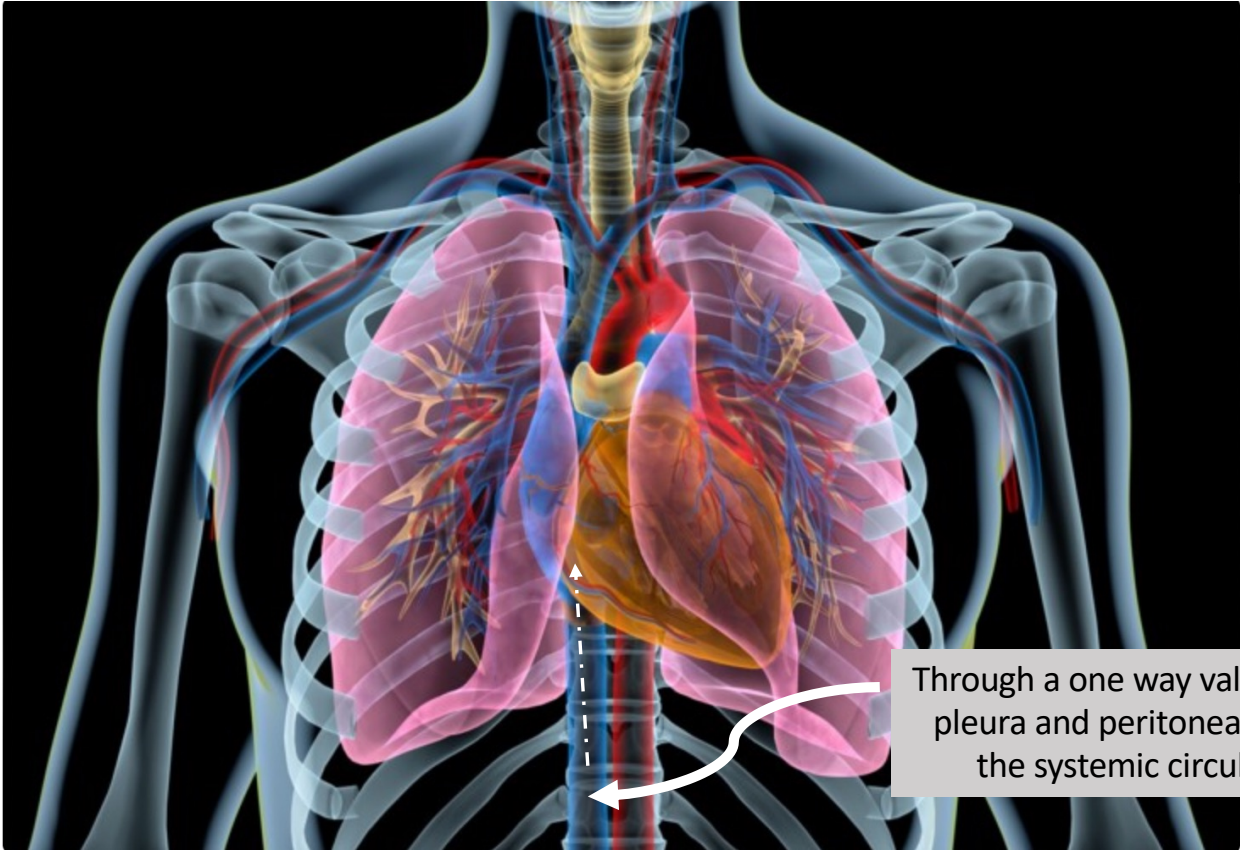
One way valve system.

Fixed pressure valves

One way valve system that drains fluid to a dependent area of the body (inferior vena cava)

- ✓ Prevents leaks
- ✓ Flow of fluid is dependent on the accumulation of pressure on the proximal end
- ✓ Aided by gravity





Through a one way valve system, chyle in the pleura and peritoneal cavity is returned to the systemic circulation (via the IVC)





CONCLUSION

Pleurovenous shunting is an effective way of returning the flow of chyle to the systemic circulation.

Advantages:

1. Return the essential fatty acids and proteins in chyle back to the systemic circulation for absorption
2. Transports immunoglobulins and T lymphocytes to the body
3. Prevents dehydration



Thank You

