



CASE REPORT

Laparoscopic transhiatal en-mass thoracic duct ligation for persistent bilateral spontaneous Chylothorax: A case report

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Key Clinical Message

Chylothorax is a rare entity associated with morbidity. Surgical thoracic duct ligation (TDL) by thoracoscopic approach is the recommended choice for persistent chylothorax. However, thoracoscopy is not feasible in case of previous pleurodesis. We describe a successful laparoscopic transhiatal en-mass TDL in a 61-year-old lady for persistent spontaneous chylothorax after failed optimal conservative management and three sessions of pleurodesis. The study shows that laparoscopic transhiatal thoracic duct ligation is an effective alternative in a case where thoracoscopy is not feasible due to various reasons.

KEYWORDS

laparoscopy, spontaneous chylothorax, thoracic duct, transhiatal ligation

1 | INTRODUCTION

Chylothorax is a rare entity associated with high morbidity and mortality rates of 38% and 25%, respectively, in a patient requiring surgical management.¹ In the modern era, the common causes of chylothorax are trauma/postoperative (50%), malignancy (20%), infections (15%), and around 9% of cases are idiopathic.² After initial conservative management, persistent chylothorax is further managed by pleurodesis or thoracic duct embolization depending upon availability.^{1,2}

If all available measure fails, surgical thoracic duct ligation (TDL) done by video-assisted thoracoscopic surgery is recommended.³ However, there are anecdotal reports on laparoscopic transhiatal TDL for persistent spontaneous chylothorax. Here we describe a case of successful laparoscopic transhiatal en-mass TDL for spontaneous persistent chylothorax after a failed attempt of pleurodesis in a tertiary care academic institution.

2 | CASE REPORT

2.1 | Case history, examination, and diagnosis

A 61-year-old lady presented to the respiratory medicine department with shortness of breath due to nonresolving bilateral pleural effusion for 15 months (Figure 1). She denied any history of trauma, fever, hemoptysis, pain abdomen, anorexia, or significant weight loss. She was initially managed with bilateral chest drains, which drained approximately 5.5 L of turbid fluid over the period of 3 days (Figure 1). Diagnostic workup revealed exudative effusion and excluded tuberculosis, malignancy, or sepsis. The pleural fluid triglyceride level was markedly raised (1398 mg/dL). After failed conservative management with multiple sessions of chest drainage, dietary modification, and escalating doses of octreotide, she underwent three attempts of pleurodesis with povidone-iodine. However,

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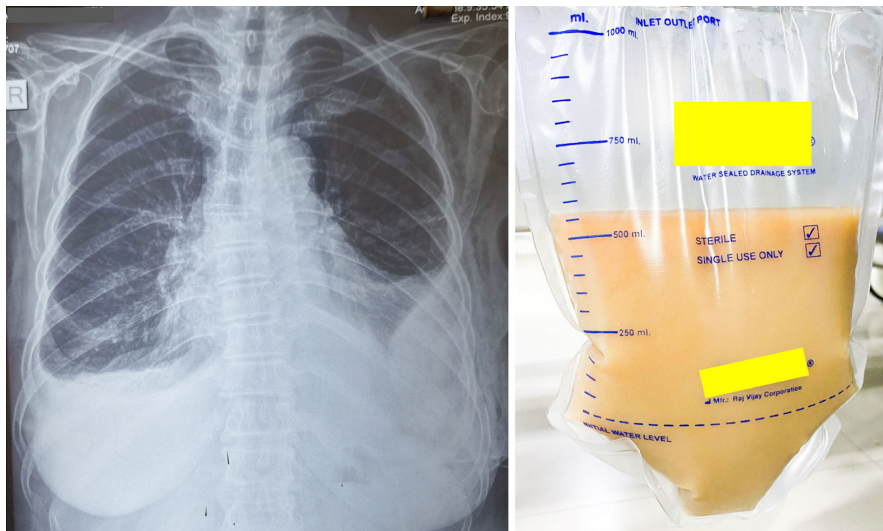


FIGURE 1 Picture on the right side showing bilateral pleural effusion due to chylothorax. The picture on the left side shows turbid fluid of chyle in the chest drain bag.

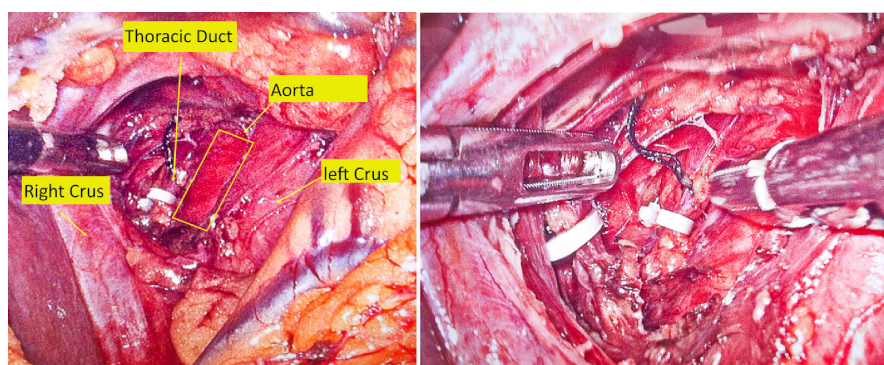


FIGURE 2 Picture on the right side showing transhiatal en-mass ligation of the thoracic duct in soft tissue lying right of the descending aorta with hemolok clip in the supradiaphragmatic region. The picture on the left side shows a closer view of the clipped thoracic duct.

she had a recurrence of chylothorax and subsequently planned for TDL. The option of thoracic duct lymphangiography and embolization was not available at our center or nearby.

2.2 | Treatment

Laparoscopic transhiatal en-mass TDL was planned as thoracoscopy was not deemed appropriate due to previous pleurodesis. After general anesthesia, 50 mL of olive oil was administered via nasogastric tube. We used the five-port approach standard for foregut surgery with a steep reverse Trendelenburg position. After the division of the gastro-hepatic omentum, the right and left crus of the diaphragm were dissected following which the esophagus was taped and retraced away from the crura. After careful dissection between the two crura, aortic pulsation was appreciated in the supradiaphragmatic region. Dissection was done between the right side of the aorta and the azygous vein till the vertebral bone was felt. All the soft tissue along with the thoracic duct was dissected and lifted with primary suture by 3/0 silk suture. A hemolok clip

was applied en-mass till the level of prevertebral fascia (Figure 2). Hemostasis was secured and no drain was placed.

2.3 | Outcome and follow-up

Postoperatively, the patient improved dramatically, bilateral chest drain output was reduced and the tubes were removed on Day 3. She was orally allowed a normal diet and discharged on Day 5. At 2 years of follow-up, there was no recurrence of the disease.

3 | DISCUSSION

The complex and variable anatomy of the thoracic duct, and the rarity of chylothorax, make its treatment difficult. After initial conservative management, persistent chylothorax is best treated with TDE which has technical and clinical success rates of 67% and 90%, respectively.⁴ However, TDE requires expertise and it is not available to many centers of developing nations like ours. The

available option prior to surgery for our patient was pleurodesis. Although the efficacy of pleurodesis is not well described, there are few case studies showing 80%–100% success rates.⁵

The standard surgical approach to chylothorax is thoracoscopic TDL with a success rate of 67%–100% of cases.⁵ However, many times thoracoscopic approach is not feasible due to unfavorable circumstances like post-surgical adhesions, lung adhesions, prior pleurodesis, etc. Laparoscopy remains an alternative approach to the thoracic duct in such cases. Diaz-Gutierrez and colleagues⁶ have described laparoscopic ligation of cisterna chyli identified posteromedial to inferior vena cava using the right crus of the diaphragm as a guide which achieved success in 2 out of 3 cases.

In our case, the laparoscopic transhiatal approach was used due to the previous pleurodesis. Transhiatal TDL in the supradiaphragmatic region was first described by Miyamura et al.,⁷ where en-mass ligation of soft tissue till prevertebral fascia locating thoracic duct between the azygous vein and thoracic aorta was performed. The same procedure can be done with better vision by laparoscopic approach with the added benefit of minimally invasive surgery. The supradiaphragmatic part of the thoracic aorta can easily be approached via hiatus with adequate dissection between the crura after retracting away the encircled esophagus. The same surgical principle was utilized in our case. This approach has the advantage of the ability for bilateral ligation of the thoracic duct, if required, in case of variant anomaly of the thoracic duct as well.⁸ The laparoscopic transhiatal approach has the advantage of magnified vision, minimizing the impact on cardiopulmonary dynamics due to one-lung ventilation or prone position requirement in thoracoscopy. Furthermore, the morbidity and pain associated with chest tubes after thoracoscopy can be avoided. The early TDL in the supradiaphragmatic region increases efficacy as injuries to the thoracic duct are usually higher.⁸

The limitation of our case study was that the anatomy of the thoracic duct before surgery was not studied due to a lack of lymphangiography. As the thoracic duct is known for frequent variation,⁹ the chance of failure, in the case of anomalous thoracic duct, was there. Recent studies have shown successful identification of the thoracic duct with a near-infrared imaging system by preoperative injection of indocyanine green dye in inguinal nodes under the guidance of ultrasound.^{10,11} However, this system is not available in many centers, especially in developing nations. In our case, we had used olive oil for thoracic duct opacification but it was not well opacified. So we chose en-mass ligation to ensure incorporation of the thoracic duct by clipping all the soft tissues.

The evidence-based efficacy of the transhiatal approach cannot be stated due to a handful of studies limited to case series or reports.^{6–8} However, our experience and these studies have established the feasibility and safety of the laparoscopic transhiatal approach. So it remains a valuable option in patients not suitable for thoracoscopy due to various reasons.

4 | CONCLUSION

In conclusion, the laparoscopic transhiatal approach to TDL is a technically feasible, well-tolerated, and safe approach that can be used as an alternative approach to thoracoscopy.

AUTHOR CONTRIBUTIONS

Kunal Bikram Deo: Conceptualization; data curation; formal analysis; investigation; methodology; project administration; resources; visualization; writing – original draft; writing – review and editing. **Sumit Kumar Deo:** Data curation; investigation; project administration; resources; validation; visualization; writing – original draft; writing – review and editing. **Sujan Gautam:** Formal analysis; investigation; methodology; project administration; resources; validation; visualization; writing – review and editing. **Narendra Pandit:** Conceptualization; formal analysis; investigation; methodology; project administration; resources; supervision; validation; visualization; writing – review and editing. **Shailesh Adhikary:** Conceptualization; data curation; methodology; project administration; supervision; validation; visualization; writing – review and editing.

FUNDING INFORMATION

None.

CONFLICT OF INTEREST STATEMENT

Nothing to disclose.

DATA AVAILABILITY STATEMENT

All relevant data about this patient is in the case report and further data about the patient can be made available on request.

ETHICAL STATEMENT

This case study was ethically approved by the Institutional Review Committee, B P Koirala Institute of Health Sciences, Dharan, Nepal (IRC/2701/023).

CONSENT

Written informed consent from the patient and her guardian for the publication of the case study was taken.

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