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Case Report

A rare case of thoracoscopic management of post operative chylous neck fistula

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ABSTRACT

Background: Thoracic duct injury is commonly iatrogenic. It can present as chylothorax, chylous neck fistula or rarely as chylopericardium. Injury to the main thoracic duct, rarely closes spontaneously while a chylothorax after lung resection rarely requires operative intervention as the leak is through the tributaries of the main duct. Chyle fistula can lead to high morbidity due to fluid loss causing nutritional deficiency and immunosuppression with mortality up-to 50%.
Methods: A 37 years old male was referred to our hospital with left supraclavicular malignant swelling which was a spindle cell tumor for which his local neck exploration and the excision of tumor was done. Patient had iatrogenic thoracic duct injury in the neck and developed a chylous neck fistula on post operative day 2, with output of 1200-1400 ml chyle per day in drain. We did a video assisted thoracoscopic ligation of thoracic duct just at its entry point in right hemithorax between azygous vein and aorta.
Results: Patient had an uneventful post operative recovery with complete stoppage of chyle leak in the neck.
Conclusions: Conservative management of chyle leak is rarely successful and has high incidence of morbidity and mortality due to nutrition loss. VATS introduced in early 90's has been applied in the management of chyle leak also. Injury to the main thoracic duct rarely closes spontaneously and surgical management in the form of thoracoscopic thoracic duct ligation is the treatment of choice.

Keywords: Thoracic duct injury, Chylous neck fistula, Chylothorax, Video-assisted thoracoscopic surgery, Thoracic duct ligation, Lymphatic system

INTRODUCTION

Thoracic duct is a tubular structure with beaded appearance and is 2 to 3 mm in diameter, valved and is papery thin. It is the main conduit of lymphatic system. It is a fibrin less system that runs in the posterior mediastinum which originates as the cisterna chyli, which lies on the top of L2 vertebral body and ascends anterior to the vertebral body usually on right side, enters the chest through aortic hiatus crosses from right to left at the level of 4th or 5th thoracic vertebra and empties into the left jugulo-subclavian venous junction. The cisterna chyli and thoracic duct drains lymph from the entire body except head, neck, arms and right thorax which instead uses right broncho-mediastinal jugular and subclavian trunks to form the right lymph duct.[1] Anatomic course is constant in only 65 % of population and in the rest, we get variations, even then its anatomic relations are relatively constant at two sites-A).[2] Where it enters the right side of thorax between the azygous vein and the aorta. B) In left chest cavity in poirier's triangle, which is bounded by arch of aorta, left subclavian artery and the vertebral column. Injuries to thoracic duct is seen after-neck surgeries, oesophageal surgeries, cardiac surgeries, blunt trauma to thorax and penetrating injuries to neck. In this paper we aim to present a rare case of cervical neck

fistula post neck dissection which was managed by thoracoscopic ligation of thoracic duct by right sided VATS approach. Injuries to thoracic duct presents as chylothorax, chylous neck fistula or chylopericardium.[3] Trauma to main thoracic duct rarely closes spontaneously, while a chylothorax after a pulmonary resection rarely requires re-exploration as the leak is mainly though the tributaries of the main duct as a result of lymph node dissection.[4] Though chylous fistula is a rare complication, but is associated with high morbidity and mortality. Only a little literature is available regarding the guidelines for management of such complication.

CASE REPORT

A 37 years old male presented with complaints of swelling in left supra-clavicular fossa (gradually increasing) since 1 ½ months. Swelling and heaviness of left upper limb since, 15 days (Figure 1). Apart from past history of pulmonary koch's and daily alcohol intake there was no other significant past history. General examination was normal. On local examination, there was a swelling of size 6×4cm in left supra-clavicular fossa which was hard and fixed. No other palpable swelling or lymphadenopathy. CT neck (Figure 2) revealed soft tissue enhancing lesion of size 7 by 6 cm in left supraclavicular region compressing the left subclavian vein suggesting left supraclavicular lymph node (no evidence of any infiltration of left subclavian vessels).

CT Thorax revealed multiple calcific foci with fibrotic scarring in left upper lobe suggestive of old healed pulmonary Koch's FNAC from the swelling was suggestive of spindle cell soft tissue lesion and appearing low grade on cytology. Patient was explored by generous left supraclavicular oblique skin incision and deepened in layers.

Tumor was excised in toto while taking care of not injuring left subclavian vein and left internal jugular vein which were just posterior and compressed by tumor. Gel foam was packed in fossa and wound closed after keeping the suction drain. Patient was kept NBM for 6 hours and his drain output on first post operative day was 50 ml hemorrhagic. On day 2 his drain was 50 ml hemorrhagic plus milkish white.

There after his drain output was 1200 to 1500 ml milkish white (Figure 3). Patient had iatrogenic thoracic duct injury while operating the left supra-clavicular spindle cell tumor and had a chylous fistula in left side of neck. After appearance of milkish white drain patient was managed conservatively with I. V fluids, total parenteral nutrition (TPN), low fat diet and compression dressings but without any significant response. Biochemical analysis of drain fluid confirmed it to be chyle and having high triglyceride count. Patients histopathological report obtained on 4th post operative day was of intermediate grade spindle cell sarcoma. Decision to do thoracoscopic ligation of thoracic duct was taken over re exploration of patient's neck wound as, despite conservative measures his drain output was not reducing. His serum albumin level had decreased from 4.4 gm % to 2.6 gm% in a span of 5 days. Thoracoscopic approach was preferred over local re-exploration as it is always better, if possible, to re explore the patient through a virgin area. Some preoperative measures were taken to ease the identification of thoracic duct during thoracoscopy. He was given methylene blue orally 6 hours preoperatively. The first web spaces of both of his feet were injected with methylene blue just preoperatively. Patient was given lipid infusion intraoperatively.

Operative procedures

Patient was given general anesthesia, with single lung ventilation with thoracic epidural. Patient was put in prone position. Right sided thoracoscopic approach was used. Right side lung collapsed by anesthetist. 3 ports created, 1st 10 mm camera port in right infra-scapular region., 2nd 10 mm port along medial border of scapula, 3rd 5 mm port in 7th I.C.S. Right inferior pulmonary ligament was cut and collapsed right lung pushed superiorly. Parietal pleura over the azygous vein near the diaphragm was incised (Figure 4) and azygous vein was clipped (Figure 5).

Dissection was done between aorta and azygous vein but we could not identify the thoracic duct. We started dissection again lower down and found a whitish tubular structure with beaded appearance (Figure 6). A small nick was given on that tubular structure and free flow of chyle from it confirmed it to be a thoracic duct (Figure 7). Lower end of thoracic duct was doubly clipped and ligated with an endoloop of no 1 chromic catgut (Figure 8), upper end was also doubly clipped. I.C.D. was inserted in right thorax and all the three ports were closed.

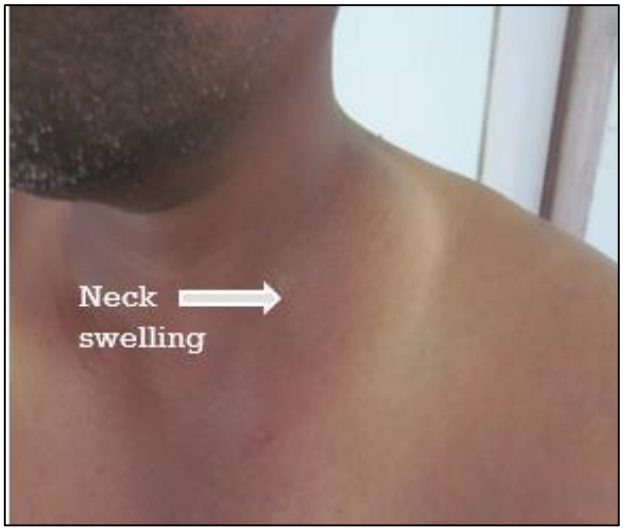

Figure 1: Clinical photograph of the neck swelling.

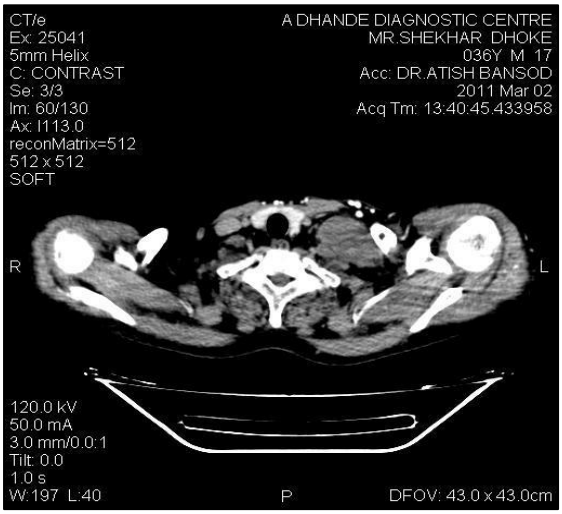

Figure 2: CECT neck showing soft tissue enhancing lesion in left supraclavicular fossa.

Figure 3: Milkish White output in the suction drain placed in left supraclavicular fossa.

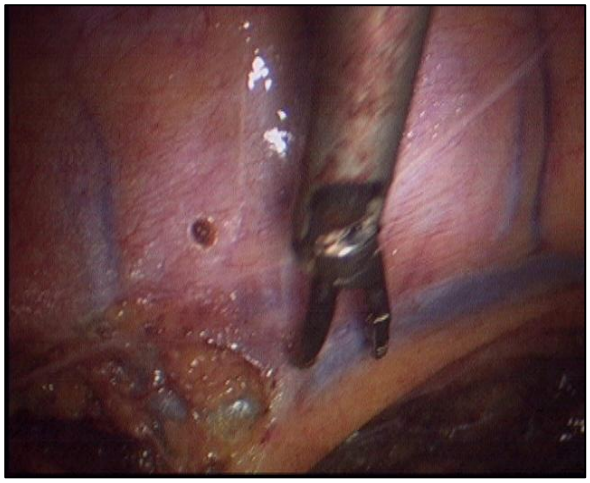

Figure 4: Incision of parietal pleura over the azygous vein near diaphragm.

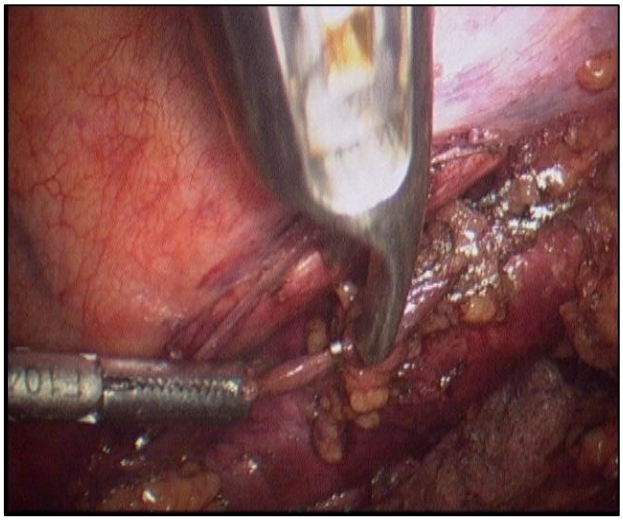

Figure 5: Clipping of azygous vein.

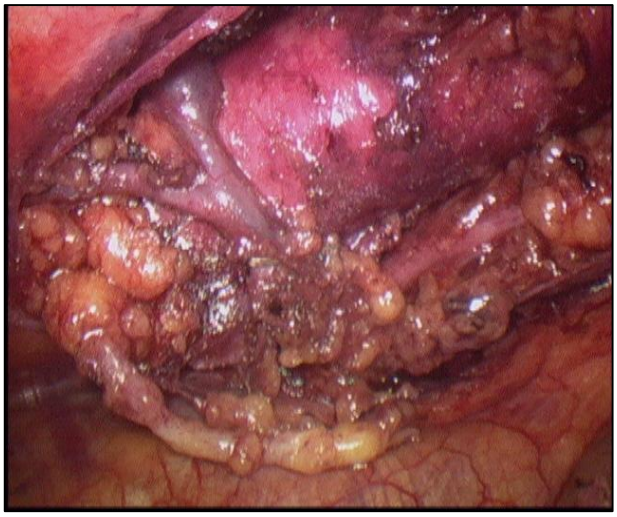

Figure 6: Identification of azygous vein by its appearance as whitish tubular structure with beaded appearance.

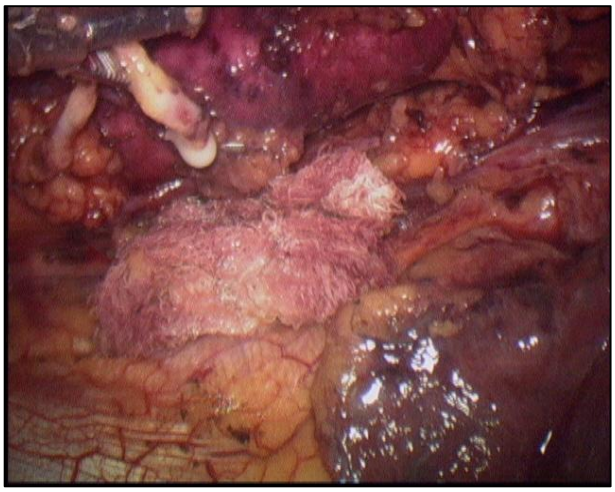

Figure 7: Confirmation of thoracic duct by free flow of chyle after giving a nick on thoracic duct.

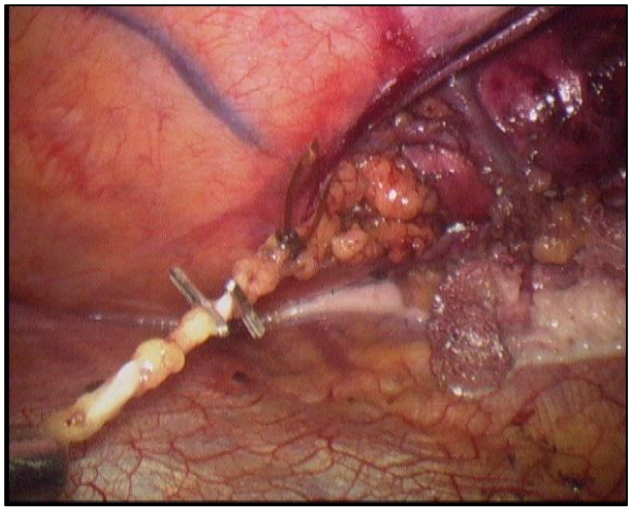

Figure 8: Ligation of lower end of thoracic duct by double clipping and ligation with an endoloop of chromic catgut no. 1.

Patient post operative recovery was good and neck drain drastically changed from milkish white to serous and drain output reduced to 20 to 30 ml serous per day from approx. 1500 ml previously.

DISCUSSION

Conservative management of chyle leak is rarely successful and consist of low-fat diet with medium chain triglycerides. TPN, correction of electrolyte imbalance and adequate drainage.[5] Drugs like somatostatin and more recently etliferine an adrenergic agent that acts by causing smooth muscle contraction of thoracic duct have been reported to be effective. It takes several weeks for the chylous fistula to resolve with an overall failure rate up to 50% requiring surgical intervention later on. When fistula output is more than 800-1000 ml over a period of 5-7 days of non-responding conservative management, decision regarding surgical intervention is to be taken.

Definitive treatment is ligation of thoracic duct first reported by Lampson et al.[6] VATS introduced in early 90's has been applied in management of chyle leak also.[7] Approach may be either thoracotomy or thoracoscopy. Inderbitzi et al, first reported successful management of post op chylothorax by fibrin glue application.[8] Many authors including but not limited to Kumar et al, have reported that early intervention in patients with high output fistula (>1000 ml/24 hrs) and one week of conservative trial in others should be the preferred line of management for thoracic duct injury.[9]

New Techniques have been emerging for identification of thoracic duct such as use of Indocyanine Green (ICG) dye with near-infrared fluorescence imaging (NIR-FI). Kamiya et al, reported the first ever case using NIR-FI for chylous fistulas detection in open thoracotomy. Then, Ashitate et al, demonstrated that NIR-FI could provide sensitive, sustained, and real-time imaging of TD anatomy and function during both open and video-assisted thoracoscopic surgery (VATS) in animal models.[10,11] Yang et al, proved the feasibility of NIR-FI in VATS interventions of chylothorax in the humans for first time.[12]

At present times, NIR-FI is used intraoperatively for real time detection of thoracic duct as well as to identify the chyle leak and ligate the thoracic duct to prevent post operative chylothorax. Introduction of ICG dye and NIR-IF has brought a paradigm shift in the management of chylothorax. ICG based imaging has also been successfully in treatment of chylothorax.[13] To locate a chyle leak, lymphoscintigraphy with technetium-99 m or magnetic resonance-thoracic ductography can be considered, however, this method does not allow real-time imaging or pinpointing of the exact leakage site. NIR-FI with ICG provides real-time visual confirmation of running of the TD and lymphatic fluid leakage from the thoracic duct.

CONCLUSION

To conclude, with this article we aim to focus that though rare, an injury to the thoracic duct can result in increased morbidity and mortality if not managed appropriately. Surgical treatment is the mainstay in case of injury to the main thoracic duct. Advent of novel techniques like use of ICG with NIR-F help a great deal and have changed the scenario of thoracoscopic management.

Earlier the need for thoracotomy and morbidity associated with an open surgery and expertise required to identify the thoracic duct forced the surgeons to try more conservative methods of management leading to increased mortality eventually due to complication like immunosuppression and need for surgery at a later more debilitated stage, but now it is safe to shift to early management by thoracoscopic ligation of thoracic duct in a case of thoracic duct injury or even use ICG dye to prevent the injury itself, and for on table identification of injury if done inadvertently.

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