

Traumatic Chylothorax from a Suprascapular Stab Wound

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Summary

Reports are few of chylothorax complicating stab wounds to the left suprascapular region. We report a case of traumatic chylothorax following a stab wound to the suprascapular region in a 14-year-old boy. He presented with progressive dyspnoea and signs of a pleural effusion. This was confirmed by radiology and thoracocentesis to be a hemothorax. The hemothorax was drained by tube thoracostomy. He developed chylothorax on the third day after inserting the chest tube. Biochemical analysis confirmed chylothorax, which was managed conservatively. The chest tube was removed after it

stopped draining. We discuss the pathogenesis of this form of chylothorax and the management options.

Keywords: Chylothorax, Poirier's triangle, Stab, Trauma
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Introduction

The thoracic duct (TD) is rarely injured by blunt or penetrating trauma, because it lies deep within the thorax. Nevertheless, when chylothorax results from a penetrating chest injury, it usually is the result of trauma to the supraclavicular region or the suprasternal notch (1-3). Few reports exist of chylothorax resulting from a penetrating injury to the left suprascapular region (1). We present a patient with chylothorax following a stab wound to the suprascapular region, and also contribute to the literature on the management of traumatic chylothorax.

Case report

A 14-year-old boy with a 6-day history of stab wound to the left suprascapular region (Fig. 1) was referred to our institution on account of progressive difficulty with breathing and chest pain. He did not report any other symptoms and had no other injuries. The stab site had been sutured at the referring hospital, where he had been admitted. Main findings on clinical examination were pallor, tachypnoea with a respiratory rate of 29 breaths/minute, tachycardia with a pulse rate of 105 beats/minute, blood pressure of 90/50mmHg and clinical evidence of left pleural collection.

Thoracocentesis yielded free non-clotting altered blood. A chest x-ray revealed massive left pleural collection (Fig. 2).

A chest tube was inserted and the haemothorax intermittently drained. A total of 1.8 L of haemothorax was drained, after which no fresh bleeding occurred. The patient was placed on intravenous antibiotics and analgesics and transfused with 9 g/dL packed red cells, as recommended by current literature (4). The clinical condition changed for the better, as shown by his improved vital signs.

Three days after the chest tube was inserted, the effluent became milky (Fig. 3).

There was no report of fever. An output of 1.5 L of effluent was recorded over 24 hours. A diagnosis of post-traumatic chylothorax was considered. We also had a differential diagnosis of empyema thoracis. Pleural fluid samples were collected for pleural fluid triglycerides and microscopy, culture and sensitivity (M/C/S).



Figure 1. Stab wound to the supra-scapular region.



Figure 2. Chest x-ray showing massive left pleural collection

The pleural fluid triglyceride level was 676 mg/dL (7.64 mmol/L) while the M/C/S did not yield any growth. The patient was kept on nil by mouth but was maintained on intravenous fluids. Once the chest tube output reduced, we started him on a locally available low-fat diet and recommended daily doses of vitamins. He was started on a liberal oral diet by day 6, and the chest tube was removed on day 7. He was discharged home on the 8th day after chylothorax was first noticed.

Discussion

DeMeester classified the causes of chylothorax into congenital, traumatic, neoplastic and miscellaneous (5). Trauma is the commonest cause, with 80% of trauma cases resulting from damage to the thoracic duct during surgery (6). Penetrating chest injuries causing chylothorax are uncommon largely because the TD is protected anteriorly by the visceral mediastinal structures and posteriorly by the spine. Most of these injuries are to the supraclavicular and suprasternal areas (1-3). However, injuries to the left suprascapular region can also cause chylothorax by injuring the TD as it traverses the Poirier's triangle. A PubMed search with index words "chylothorax, chest, stab and suprascapular" failed to identify similar reports other than that of Worthington et al. (1).

The Poirier's triangle is bound inferiorly by the arch of the aorta, medially by the subclavian artery, and laterally by thoracic vertebrae (7). The esophagus lies in the base of this triangle, with the thoracic duct lateral to the esophagus. Though the TD may be found outside the triangle (7), whenever chylothorax complicates a penetrating chest injury the site of the chyle drainage has been found within the Poirier's triangle (1). The TD, when present within the confines of the triangle, lies within the floor and is not in direct contact with the overlying arteries (7). "Minor" injuries, as seen in our patient, can thus affect the TD alone or be accompanied by minor vascular injuries causing hemothorax and requiring only chest tube insertion. Major injuries can involve the esophagus and major vessels, producing hypovolemic shock (3).

Traumatic chylothorax usually has a delayed onset of between 2 and 10 days, with a mean of 7 days (8). Our case presented on day 9 post-injury, day 3 after drainage

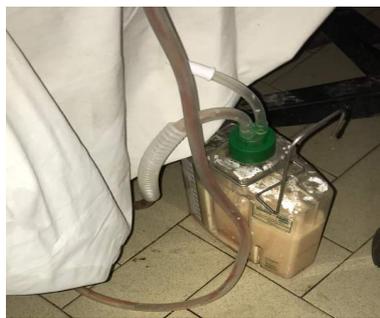


Figure 3. Underwater drainage bottle containing milky effluent

of the accompanying hemothorax. The delay perhaps relates to build up of chyle behind the mediastinal pleura, followed later by rupture through the pleura (2). Chylothorax is diagnosed with a high degree of precision when the pleural fluid triglyceride concentration is ≥ 110 mg/dL (1.24 mmol/L). The pleural fluid triglyceride level in our case was 676 mg/dL (7.64 mmol/L), and confirmed chylothorax.

The options for managing chylothorax are broadly divided into conservative and surgical approaches. The former involves draining the pleural space and achieving adequate lung expansion, reducing chyle flow, maintaining hydration and providing adequate nutrition (9). Because chylothorax can cause severe metabolic derangements and patients managed successfully by conservative means often had prolonged hospital stay, surgical treatment should be introduced earlier (1,7,10). We nonetheless managed our patient conservatively and he was discharged home on the 8th day after chylothorax was first noticed.

Keeping the patient nil per oral for the first 24 hours, as we did, may help to delineate patients who would respond to oral nutrition (11). Oral nutrition may be effective if chyle output becomes ≤ 1000 mL/day (9). Fat-free or very low-fat oral nutrition could then be initiated and the patient observed for another 24 hours (11). Recommended daily doses of fat-soluble vitamins, vitamins B complex and C—co-enzymes necessary for catabolizing carbohydrates and amino acids, and for wound healing—were administered. First, to replace daily losses from chyle as chyle contains significant quantities of fat-soluble vitamins (10); second, because of the synergistic interaction of the vitamins (12); and third, it is strongly recommended to start nutrition therapy early as soon as risks become apparent and not when severe disease-related malnutrition has occurred (13). Multivitamins are important components of enteral nutrition formulas (12) and our option of supplementing locally available low-fat diet with multivitamins is less expensive than specialized formulas.

Traditional surgical indicators include drainage of 1.5 L/day in adults or 10 mL/kg per day in children for 5 days, persistent leak >2 weeks, nutritional and metabolic complications and trapped lung. Failure of conservative management should warrant ligation of the TD in Poirier's triangle. Thoracotomy has been the long-established approach to TD ligation. Video-

assisted thoracoscopic surgery has however become the preferred approach in the treatment of chylothorax because of lower morbidity and shorter hospital stay (14). TD has been repaired (2), but ligation is preferred to repair because repair is technically difficult and offers no advantages over ligation (1,15). Non-absorbable sutures and clips are used in ligating the TD. Pleurodesis has been used as an adjunct to TD ligation or in addition to fibrin glue when the site of the injury could not be identified (14). Pleuroperitoneal shunts are useful equipment in the armamentaria for managing chylothorax but are more often inserted for patients with refractory chylothorax from non-stab causes (16,17).

Conclusion

Chylothorax can occur after left suprascapular stab wounds and can take days to become clinically apparent. It is therefore important to be alert to this potential late complication. Conservative treatment should be employed first, but if it fails the TD in the Poirier's triangle should be ligated.

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