

Chylothorax after Blunt Trauma: Case Report and Review of Literature

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Abstract: Chylothorax is an accumulation of chyle in the pleural cavity due to a disruption of the thoracic duct. Traumatic chylothoraces are usually the result of penetrating trauma and disruption of the thoracic duct. Blunt trauma causing a chylothorax is rare but, it should be considered in patients who sustain chest trauma and then develop a pleural effusion as it can lead to significant morbidity and mortality. This article reviews the diagnosis and treatment of this condition.

Keywords: chest trauma, chylothorax, surgical emergency, trauma

1. Introduction

Chylothorax presents as pleural effusion which can be associated with both non-traumatic and traumatic causes. Most commonly non traumatic chylothorax is caused by Neoplastic obstruction and lymphoma accounts for 70% of these cases (1). Chylothorax following trauma is usually iatrogenic or as a complication of percutaneous central venous catheters in 0.37% to 2% of thoracic procedures (2,3). Traumatic chylothorax usually present as a result of penetrating trauma to the patient's neck and disruption of the thoracic duct. The diagnosis is sometimes difficult after trauma due to the possible presence of an hemothorax or empyema and delayed onset of chylothorax. Presented here is a rare case of a thoracic duct injury secondary to a blunt force trauma to the patient's chest which was successfully treated non-operatively.

2. Case Summary

A 28 yr old male was brought to the accident and emergency department of our hospital with an alleged history of road traffic accident. He had been brought to the hospital 4 hours after the event. The patient was conscious and well oriented to time and place, normotensive with pulse rate of 106 beats/min and complaining of chest pain. On further examination breath sounds were markedly decreased on the right side of his chest. The trachea was deviated to the left side. Emergency tube thoracostomy was done which drained approximately 2L of odourless white fluid. Suspecting empyema, the patient was given broad spectrum antibiotics. Chest radiographs revealed no evidence of any skeletal injury. The fluid drained was sent for analysis which revealed the triglyceride count to be 653 mg/dL. A CECT scan of the thorax did not reveal any injuries. Patient was diagnosed as a case of traumatic thoracic duct injury and managed conservatively. Patient was kept NPO for 3 days with subcutaneous octreotide and total parenteral

nutrition. Thereafter the patient was advised a fat free diet on the 3rd day with parenteral nutrition support under orlistat cover. After observing the patient for 13 days the ICD output gradually decreased. ICD was removed on day 13 and the patient was discharged on day 14 and followed up in opd.



Figure 1: Drain output on day 1



Figure 2: Chest X-ray on Day 1



Figure 3: Chest X-ray on Day 13 (with ICD)



Figure 4: Chest X-ray on Day 13 (post ICD removal)

3. Discussion

Chylothorax is usually caused by iatrogenic injuries, with 80% of these caused by damage to the thoracic duct during surgery such as oesophagectomy or pneumonectomy [4]. Blunt trauma causing chylothorax is less common, often associated with fractures of posterior ribs and/or spinal fractures. [5]. The most common form of blunt injury to the thoracic duct is produced by sudden hyperextension of the spine with rupture of the duct just above the diaphragm in the right thorax. Sudden stretching over the vertebral bodies may tear the thoracic duct, but this usually occurs in a duct previously affected by disease [6-9]. Our patient presented with isolated thoracic duct injury with no associated trauma to the ribs or spine.

Tension chylothorax may cause profound effects on cardiovascular haemodynamics[10,11]. Our patient had tension chylothorax. The left pleural cavity accommodated 2 L of chyle and the trachea was visibly displaced to the other side.

The large volume of lipid and lymphocyte-rich fluid lost in a chyle leak makes nutritional support of these patients of paramount importance to prevent malnutrition, dehydration and immunosuppression [12]. In addition, administering a diet with a predominance of medium chain triglycerides reduces lymphatic flow and therefore minimises the rate of chyle leakage. Medium chain triglycerides are absorbed directly from the gut into the portal circulation while longer chain triglycerides are packaged into chylomicrons and transported into intestinal lacteal vessels [13]. These lymphatic vessels drain into the thoracic duct, which eventually drains into the bloodstream at the subclavian vein.

Removal of fluid via intercostal chest drain is indicated when a chylothorax is large enough to cause respiratory distress [14]. Intercostal drainage is also useful in that output volumes and rates can be measured accurately. Where output remains high even with administration of a medium chain fatty acid diet, octreotide (a somatostatin analogue) has been used successfully in reducing chyle leakage [15,16]

Initial conservative therapy includes intercostal decompression of the pleural effusion along with nutritional support in the form of total parenteral nutrition, and reduction of chylous formation with somatostatin. Conservative management is advised for two weeks, unless thoracotomy is indicated for another reason, in which case ligation of the thoracic duct can be carried out, or unless the patient's nutritional status deteriorates rapidly due to significant chyle drainage[17,18]. Silen et al[19] reviewed the literature and found only 13 cases associated with thoracic vertebral fracture of whom 2 died, 6 patients required ligation of the thoracic duct, and 6 were treated conservatively. Surgical interventions include thoracic duct ligation, pleuroperitoneal shunt and percutaneous embolisation. [20] Open mass ligation through a thoracotomy above the diaphragm is the most common surgical technique.[21]

References

- [1] McWilliams A, Gabbay E. Chylothorax occurring 23 years post-irradiation: literature review and management strategies. *Respirology*. 2000;5:301-303
- [2] Guillem P, Billeret V, Houcke ML, et al. Successful management of post-esophagectomy chylothorax/chyloperitoneum by etilefrine. *Dis Esophagus*. 1999;12:155-156
- [3] Cerfolio RJ, Allen MS, Deschamps C, et al. Postoperative chylothorax. *J Thorac Cardiovasc Surg*. 1996;112:1361-1366
- [4] Nair S., Petko M., Hayward M. Aetiology and management of chylothorax in adults. *Eur J Cardio Thorac Surg*. 2007;32(2):362-369.
- [5] Townshend A., Speake W., Brooks A. Chylothorax. *Emerg Med J*. Feb 2007;24(2) e11.
- [6] Valentine VG, Raffin TA. The management of chylothorax. *Chest*. 1992;102:586-591.
- [7] Brook MP, Dupree DW. Bilateral traumatic chylothorax. *Ann Emerg Med*. 1988;17:69-72.
- [8] Birt AB, Connolly NK. Traumatic chylothorax: a report of a case and a survey of the literature. *Br J Surg*. 1952;39:564-568
- [9] Ikonomidis JS, Boulanger BR, Brenneman FD. Chylothorax after blunt chest trauma: a report of 2 cases. *Can J Surg*. 1997;40:135-138
- [10] Chamberlain M, Ratnatunga C. Late presentation of tension chylothorax following blunt chest trauma. *Eur J Cardiothorac Surg*. 2000;18:357-359.
- [11] Glyn-Jones S, Flynn J. Traumatic tension chylothorax. *Injury*. 2000;31:549-550.
- [12] Valentine V. The management of chylothorax. *Chest*. 1992;102(2):586.
- [13] Merrigan B., Winter D., O'Sullivan G. Chylothorax. *Br J Surg*. 1997;84(1):15-20.

- [14] Nair S., Petko M., Hayward M. Aetiology and management of chylothorax in adults. *Eur J Cardio Thorac Surg.* 2007;32(2):362–369.
- [15] Collard J., Laterre P., Boemer F., Reynaert M., Ponlot R. Conservative treatment of postsurgical lymphatic leaks with somatostatin. *Chest.* 2000;117(3):902–905.
- [16] Sharkey A.J., Rao J.N. The successful use of octreotide in the treatment of traumatic chylothorax. *Tex Heart Inst J.* 2012;39(3):428–430.
- [17] McCormick J, Henderson SO. Blunt trauma-induced bilateral chylothorax. *Am J Emerg Med.* 1999;17:302–304.
- [18] Ikonomidis JS, Boulanger BR, Brenneman FD. Chylothorax after blunt chest trauma: a report of 2 cases. *Can J Surg.* 1997;40:135–138.
- [19] Silen ML, Weber TR. Management of thoracic duct injury associated with fracture-dislocation of the spine following blunt trauma. *J Trauma.* 1995;39:1185–1187.
- [20] Talwar A, Lee HJ. A contemporary review of chylothorax. *Indian J Chest Dis Allied Sci.* 2008;50(4):343–351.
- [21] Chamberlain M, Ratnatunga C. Late presentation of tension chylothorax following blunt chest trauma. *Eur J Cardiothorac Surg.* 2000;18:357–359.