

Chylothorax After Thoracic Vertebral Fracture

Karamustafaoglu YA MD, Mammedov R MD, Reyhan G MD, Yank F MD, Yoruk Y MD

Department of Thoracic Surgery, Faculty of Medicine, Trakya University, Edime, Turkey

Abstract

Traumatic chylothorax usually occurs as a complication of intrathoracic surgery. We describe a 20-year-old man with chylothorax who presented at another hospital 3 days after sustaining blunt chest trauma in a vehicular accident. Right pleural effusion was detected and treated by chest drainage. On referral to our center, neurological examination was unremarkable, although the patient complained of back pain. Magnetic resonance imaging demonstrated compression fractures of the T7-T8 vertebrae and a burst fracture of T9, without significant cord injury. Conservative management of a chylothorax with a low-fat diet was unsuccessful. The chylous leak was treated with right posterolateral thoracotomy and thoracic duct ligation. The postoperative course was uneventful. Chylothorax in the setting of blunt chest trauma is thought to be induced by hyperextension of the spine. Therefore, occult thoracic spine injuries should be meticulously excluded by physical and radiologic examination. Magnetic resonance imaging or computerized tomography is preferred over plain radiography as rib fractures or other pathologies may mask the injury.

MeSH Words: chylothorax, vertebra, trauma, thoracotomy

Introduction

Chylothorax is caused by rupture of the thoracic duct or one of its branches, usually as a complication of intrathoracic surgery [1]. In the rare cases in which it is induced by blunt chest trauma, it is usually associated with a flexion-extension injury to the thoracic spine [2]. The aim of the present report was to describe a case of chylothorax after blunt chest trauma.

Case Report

A 20-year-old man presented to another hospital with shortness of breath on effort and right chest and back pain 3 days after sustaining a high-speed motorcycle accident. A chest tube inserted to alleviate right massive pleural effusion drained 500 ml of blood-stained serous

fluid. The next day, an additional 2000 ml of milky fluid was drained, and biochemical analysis revealed a triglyceride level of 970 mg/dl.

The patient was then referred to our medical center. On arrival, he was hemodynamically stable, with a Glasgow Coma Score of 15/15 and oxygen saturation 95%. Neurological examination revealed no abnormalities, although the patient complained of back pain. Chest x-ray showed the right chest drain and a blunt right diaphragmatic sinus. Magnetic resonance imaging (MRI) demonstrated compression fractures of the T7-T8 vertebrae and a burst fracture of the T9 vertebra, with no significant cord injury (Fig. 1). The neurosurgeon suggested thoracolumbosacral orthosis. On the basis of the clinical evidence, a diagnosis of traumatic

chylothorax was made, and the patient was started on total parenteral nutrition with a low-fat diet and medium-chain triglycerides. After 10 days, however, the chest tube continued to drain 1000 -1500 ml per day of cloudy fluid, and the patient was referred for surgery.

A right posterolateral thoracotomy was performed through the sixth intercostal space. After the milky fluid in the cavity was evacuated, a laceration in the parietal pleura on the body of the T8 vertebra could be visibly seen discharging chyle (Fig. 2). The proximal duct was ligated at the T10 vertebral level together with the distal cut ends using absorbable sutures. The chest tube was removed on the third postoperative day with the patient still on a fat-free diet, without pleural drainage. The postoperative course was uneventful.

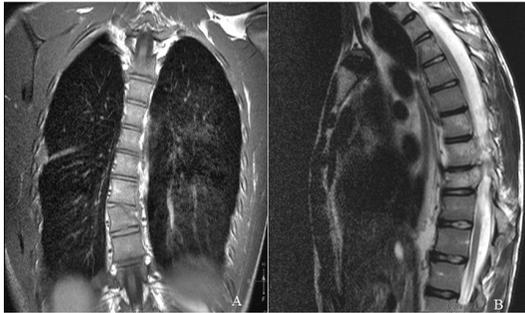


Figure 1: Magnetic resonance images showing a burst fracture in the T9 vertebra (A) and compression fractures at T7-T8 vertebrae (B), without significant cord injury.

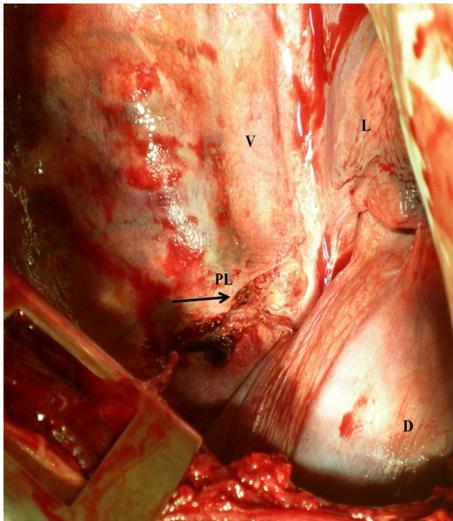


Figure 2: Intraoperative picture showing a laceration in the parietal pleura on the body of the T8 vertebra. D: diaphragm, V: vertebra, L: lung, PL: pleural laceration

Discussion

The thoracic duct runs extrapleural along the right anterior surface of the vertebral bodies and crosses to the left side of the mediastinum up to the level of the fifth to seventh thoracic vertebrae. It transports up to 4 l of chyle a day, rich in fat, protein and white blood cells. Chylothorax is the accumulation of pleural fluid from a leak in the thoracic duct. It may occur on the right or left side, depending on the duct level at which the damage occurred. The pleural fluid contains a high concentration of neutral fat and fatty acids but little cholesterol. Chylothorax usually occurs as a complication of chest surgery. In the rare cases in which it is due to blunt chest trauma, it is associated with fractures of the spine and/or posterior ribs caused by acceleration–deceleration forces on the thorax [3]. Ikonomidis et al. [4] reported that chylothorax in cases of blunt chest trauma is usually attributable to a sudden hyperextension of the spine. Gartside and Hebert [5] identified only one patient with chylothorax out of 925 patients who had sustained fractures of the thoracic or lumbar spine over a 12-year period. Because fat-rich foods stimulate chyle production, damage to the thoracic duct may sometimes become evident in patients only when feeding is started.

Chylothorax can be mild or severe, depending on the volume of chyle loss. Large leaks can cause nutritional deficiencies, respiratory dysfunction, dehydration and immunological dysfunction [6,7]. Conservative treatment is recommended initially for post-traumatic chylothorax. Standard methods include chest tube drainage, dietary restriction and total parenteral nutrition. If these prove ineffective, somatostatin can be given by continuous infusion. Ikonomidis et al. [4] proposed conservative management for 2 weeks unless thoracotomy is indicated for associated injuries. If 500 ml fluid or more is still being drained at that point, surgery should be performed. Itkin et al. [8] recently demonstrated the efficacy of a minimally invasive, nonoperative, catheter-based approach of cannulation and embolization in the treatment of traumatic chyle leak which proved successful in the majority (71%) of patients. However, experience is very limited and it is not yet available in many centers. At present, aggressive surgery is recommended for both posttraumatic and postsurgical chylothorax [9].

Supradiaphragmatic ligation of the thoracic duct can be performed either by thoracotomy or by video-assisted thoracic surgery, according to the level of leakage. To assist the surgeon in identifying the thoracic duct, which can be difficult even during open thoracotomy, cream or olive oil may be administered via the oral or nasogastric tube 30 minutes before operating time.

The case described here is a rare example of chylothorax resulting from blunt trauma. In these cases, we suggest that occult thoracic spine injuries be meticulously excluded by physical and radiologic examination. Chest x-rays have been shown to have a low sensitivity for thoracic injuries in patients with significant chest trauma [10,11]. MRI or computerized tomography of the spine is preferred, because rib fractures and other pathologies may initially mask the thoracic duct damage and, thereby, the risk of serious neurological consequences. Left untreated, chylothorax is associated with considerable morbidity and mortality. Therefore, when there is no response to conservative treatment, our general approach is to treat traumatic chylothorax by surgical intervention.

References

1. Dulchavsky S, Ledegerwood AM, Lucas CE. Management of chylothorax after blunt chest trauma. *J Trauma* 1988;28:1400-1401.
2. Glyn-Jones S, Flynn J. Traumatic tension chylothorax. *Injury*. 2000;31:549-550
3. Forster E, Le Maguet A, Cinqualbre J, Piombini JL, Schilz E. A case of chylothorax consecutive to a closed vertebro-costal trauma. *Chirurgie* 1975;101:605-16.
4. Ikonomidis JS, Boulanger BR, Brenneman FD. Chylothorax after blunt chest trauma: a report of 2 cases. *Can J Surg* 1997;40:135-8.
5. Gartside R, Hebert JC. Chylothorax following fracture of the thoracolumbar spine. *Injury* 1988;19:363-4.
6. Sieczk EM, Harvey JC. Early thoracic duct ligation for postoperative chylothorax. *J Surg Oncol* 1996;61:56-60.
7. Townshend AP, Speake W, Brooks A. Chylothorax. [Emerg Med J](#). 2007;24:11.
8. Itkin M, Kucharzuk JC, Kwak A, Trerotola SO, Kaiser LR. Nonoperative thoracic duct embolization for traumatic thoracic duct leak: Experience in 109 patients. *J Thorac Cardiovasc Surg* 2009;[Epub ahead of print] (Abstract).
9. Sukumaran KN, Petko M, Hayward MP. Aetiology and management of chylothorax in adults. *European Journal of Cardiothoracic Surgery* 2007;32:362-369.
10. Lawrason JW, Noveline RA, Rhea JT, Sacknoff R, Rao PM. Early detection of thoracic spine fracture in the multiple trauma patient. Role of the portable chest radiograph. *Emergency Radiol* 1997;4:309-319.
11. Potter MJ, Little C, MacDonald JW. Case report thoracic fracture dislocations without vertebral clinical signs. *Injury* 2003;34:942-943.

Contribution of Authors: All authors contributed to the article

Competing Interests: None

Funding: None

This manuscript has been peer reviewed.

Correspondence:

Dr. Yekta Altemur Karamustafaoglu
Trakya Universitesi Tip Fakultesi, Saglik
Uygulama ve Arastirma Hastanesi
Gogus Cerrahi AD, Kat:4, 22030
Edirne/TURKEY
Tel/Fax: 90 284 2355936
E-mail: altemurk@hotmail.com