

CASE REPORTS

Chylothorax Management four Years post Spine Surgery: A Successful Conservative Treatment.

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Abstract

Background: Chylothorax is a pathological condition associated with a high mortality and morbidity rate. The first observation of chylothorax associated with thoracic vertebral injury was documented by Krabbell in 1885. Since then, several cases have been described in the literature.

Non traumatic chylothorax several years after spine surgery is a rare condition. We described a case of a patient who sustained a thoracic spine fracture-dislocation and presented with a right sided chylothorax as a late complication to his thoracic spine trauma. A right thoracentesis was performed, providing partial relief of respiratory symptoms. The collected fluid was sent to the laboratory for further examination. Biochemical analysis of the milky pleural fluid confirmed the suspicion of chylothorax, with elevated levels of triglycerides and lymphocytes. These findings supported the diagnosis of chylothorax.

Conclusion: Non-traumatic chylothorax occurring several years after spine surgery is a rare condition, and there is limited literature available on this particular pathology. The diagnosis can be simplified through laboratory examination of the milky fluid. Conservative treatment is typically the approach of choice in the majority of cases, involving total parenteral nutrition and the insertion of a chest tube into the chest cavity, followed by chemical pleurodesis.

Keywords: Thoracic fracture; Trauma; Chylothorax

Introduction

Chylothorax is a rare condition characterized by chyle leakage into the pleural space due to thoracic duct damage within the lymphatic system [1-3]. It typically occurs on the right side and presents as a pleural effusion. Diagnosis involves measuring cholesterol and triglyceride levels in the pleural fluid [4].

Complications of chylothorax include malnutrition, immunosuppression, and respiratory distress.[3] Treatment approaches range from conservative to aggressive, depending on the clinical scenario [4]. Malignancy accounts for approximately 50% of cases [5], while iatrogenic disruption of the thoracic duct during surgery, blunt trauma, and spine trauma contribute to about 25% of cases [6].

However, chylothorax associated with vertebral fractures appears relatively rare or underreported. In this case report, we present a patient with chylothorax following an anterior fracture of the T11 vertebra, resulting from vertebral plate dislocation.

Literature Review

A PubMed search was conducted (filters: English language, human subjects, up to October 2022) using the terms “chylothorax,” “chyle leakage,” and “thoracic duct injury.” The search yielded 24 articles on spinal trauma, 30 articles

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on spine injury, and 25 articles on spinal injury. Among the 98 articles obtained, the following exclusion criteria were applied: nontraumatic chylothorax, articles reporting iatrogenic chyle leakage as a complication of anterior/ anterolateral spine surgery, purely descriptive technical articles focusing on anatomical nuances, articles providing a general overview of chylothorax as a consequence of chest and/or abdominal trauma, and articles discussing cases of polytraumatized patients with spinal fractures and multiple thoracic and/or abdominal posttraumatic injuries where the exact cause of chylous leakage cannot be determined. Ultimately, 21 articles describing chylothorax cases associated with spine fractures were selected.

Case Presentation

A 55-year-old male with paraplegia was admitted to our hospital due to symptoms of dyspnea, cough, and chest pain.

A CT-scan indicated the presence of a right-sided pleural effusion (Fig.1.). Four years prior to admission, the patient experienced a severe accident resulting in significant motor impairment of the lower extremities. A CT scan revealed a fracture between the T10 and L1 vertebrae. Subsequently, he underwent surgical intervention involving transpedicular T10-L1 screw-rod fixation. Following the surgery, the patient has remained disabled with paraplegia.

Diagnosis of Chylothorax

A right thoracentesis was performed, providing partial relief of respiratory symptoms. The collected fluid was sent to the laboratory for further examination. Biochemical analysis of the milky pleural fluid confirmed the suspicion of chylothorax, with elevated levels of triglycerides (473 mg/dL) and lymphocytes (94%). These findings supported the diagnosis of chylothorax.



Figure. 1 Axial contrast computer tomography of patient's thoracic cavity demonstrating the right-sided chyle accumulation

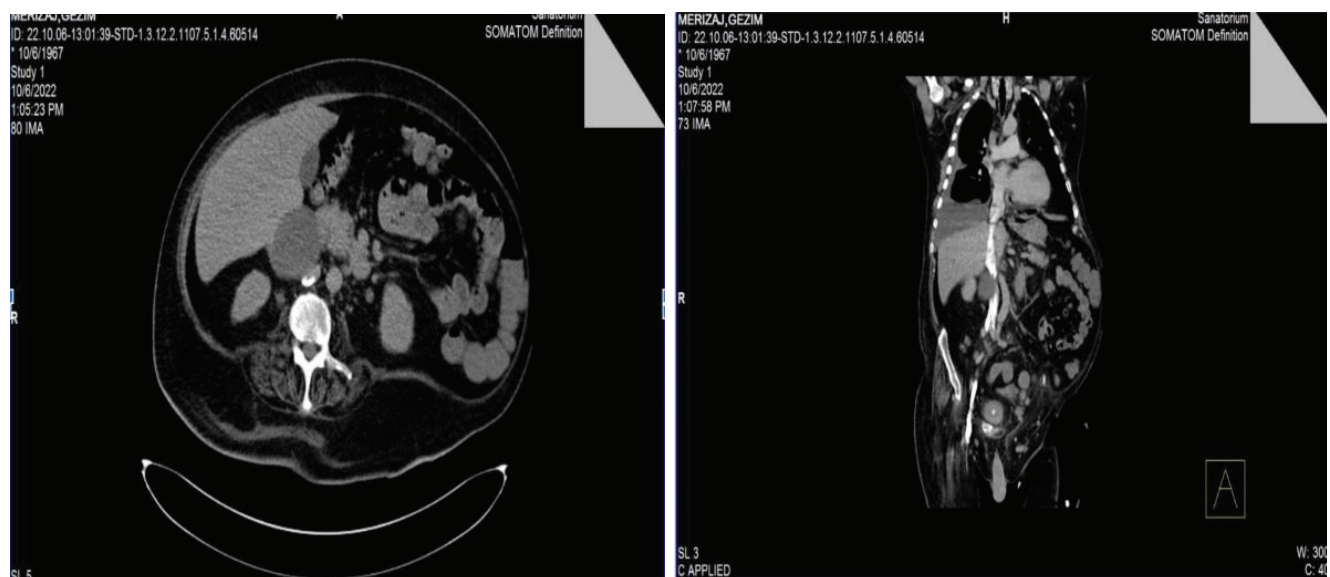


Figure. 2 Axial contrast CT scanner and sagittal view of patient's abdominal cavity demonstrating cystic mass in caudal lobe with "effect mass" on IVC.

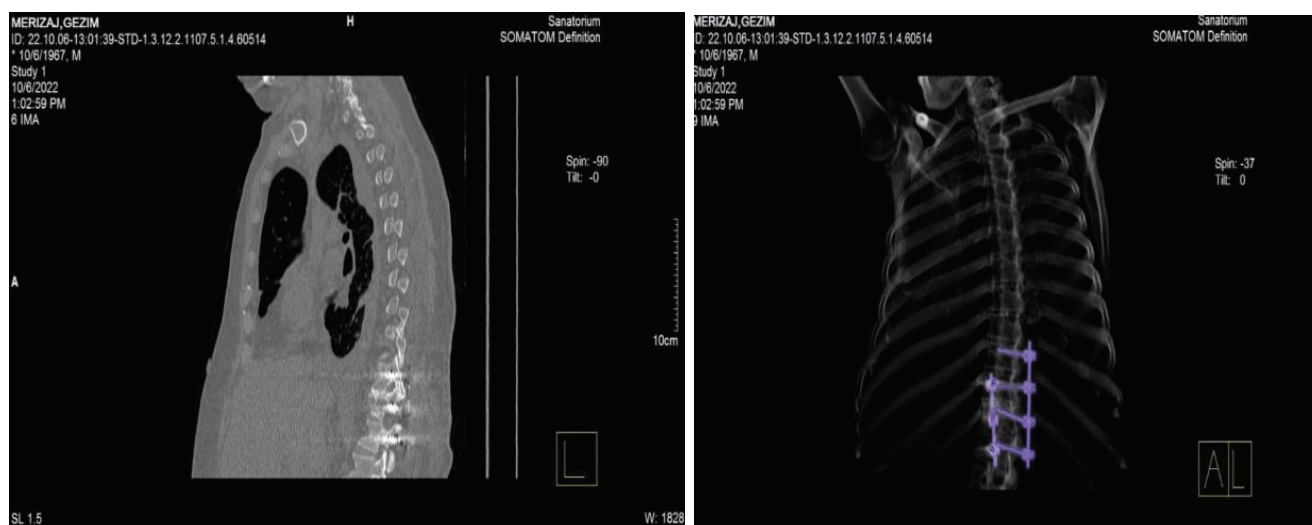


Figure 3 A thoraco-abdominal CT scan revealed an anterior fracture at the L1 vertebra and dislocation of the screw-rod.

Radiological Images

A thoraco-abdominal CT scan revealed an anterior fracture at the L1 vertebra and dislocation of the screw-rod (Fig.3.). Additionally, a cyst measuring 75x60mm was observed in the caudal lobe of the liver, causing a mass effect on the inferior vena cava (IVC) as shown in Fig. 2. Furthermore, the CT scan confirmed the presence of right pleural fluid.

Chest Tube Placement and Pleurodesis Regimen

The patient underwent a chest tube thoracostomy procedure along with bed rest, total parenteral nutrition, and maintenance of electrolyte balance. After three days of interrupted feeding, the chyle flow rapidly decreased from approximately 1500 ml to less than 70 ml. Chemical pleurodesis was performed using povidone iodine, which was injected into the pleural cavity through the chest tube. Following the injection, the chest tube was clamped for two hours. During this period, the patient engaged in light exercise, such as gently rolling in bed, to facilitate the diffusion of the solution throughout the pleural cavity. After two hours, the chest tube was released. Chest X-ray and thoracic echo performed after the chest tube drainage procedure did not indicate the presence of pleural effusion. On the 5th postoperative day, the patient consumed a meal consisting of 50 grams of butter, and no pleural effusion was observed. Subsequently, the pleural drain was removed from the chest cavity, and the patient was discharged home in good condition.

Discussion

Chylothorax is a pathological condition associated with a high mortality and morbidity rate. [7].

The first observation of chylothorax associated with thoracic vertebral injury was documented by *Krabbell* in 1885. [8, 9]

Since then, several cases have been described in the literature. Typically, chylothorax is noted immediately to several days after the occurrence of the injury. However, in our case, chylothorax was identified four years after the injury, which is a rarely documented phenomenon. Chyle extravasation in chylothorax can occur through two major mechanisms [1, 2].

It can result from direct trauma to the lymphatic vessels in the chyle pathway or from occlusion of the thoracic chyle duct. Clinical manifestations of chylothorax include hypovolemia due to significant chyle loss, dyspnea, malnutrition resulting from the loss of proteins, fats, and vitamins, as well as electrolyte imbalances.[10]

A clinical suspicion of chylothorax arises when milky or white fluid is drained from the thorax. However, it is important to note that this classical appearance can also be observed in pseudo chylothorax.[11]

Various diagnostic approaches can be employed to confirm the presence of chylothorax. Lymphangiography can help identify the site of chyle leakage or blockage. [12]

Thoracentesis and laboratory analysis of the pleural fluid can provide further diagnostic evidence based on the presence of chylomicrons. [11]

Recently, near-infrared fluorescence imaging of the thoracic duct and scintigraphy using SPECT/CT with orally administered ^{123}I -betamethyl-*p*-iodophenyl-pentadecanoic acid (^{123}I -BMIPP) have shown promise in revealing chylous leakage [13].

The management of traumatic chylothorax primarily involves conservative treatment, which includes chest drainage, chemical pleurodesis, total parenteral nutrition (TPN), and a medium-chain triglyceride diet. This approach has been supported by numerous authors and has yielded satisfactory results in terms of reducing chyle production within a few days to 3-4 weeks. [14]

In some cases, administration of octreotide has shown positive outcomes for patients.[15] Surgical intervention

should only be considered if chyle production does not decrease after the second or third week of conservative management.[16] The aim of surgical treatment is to ligate the thoracic duct, a procedure that has been performed in a few documented cases in the literature.

Conclusion

Non-traumatic chylothorax occurring several years after spine surgery is a rare condition, and there is limited literature available on this particular pathology. The diagnosis can be simplified through laboratory examination of the milky fluid. Conservative treatment is typically the approach of choice in the majority of cases, involving total parenteral nutrition and the insertion of a chest tube into the chest cavity, followed by chemical pleurodesis.

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