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Case Report

Transudative chylothorax in a liver cirrhosis patient: A case report

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A B S T R A C T

Chylothorax defines chyle in the pleural space, usually from defects in thoracic duct. Chylothoraces are usually exudative, as defined by light's criteria but in rare instances, chylothoraces can be transudative. The leading cause of non-traumatic chylothorax is malignancy, but a non-traumatic chylothorax can be a rare manifestation of liver cirrhosis. In this case report, we present a case of an 82-year-old male with a history of non-alcoholic liver cirrhosis requiring multiple paracenteses for chylous ascites in the past, who was found to have a transudative non-traumatic chylothorax. His chylothorax existed despite his ascites being resolved for over a year. We will describe this case of a transudative chylothorax associated with liver cirrhosis and discuss the common findings associated with chylothoraces.

1. Introduction

A chylothorax is defined as the presence of chyle in the pleural space. This usually results from obstruction or disruption of the thoracic duct. Chylothorax pleural fluid studies often reveal triglyceride (TG) levels of >110 mg/dL and chylomicrons, leading to their milky white appearance. In addition, they have been found to contain a significant number of lymphocytes and immunoglobulins. Chylothorax can be classified as traumatic or non-traumatic, with traumatic being more commonly associated with surgery [1]. The most common surgeries associated with chylothoraces are thoracic, including esophagectomy, lung and cardiac surgeries [2,3]. Although rare, thoracic duct injury has also been reported in abdominal surgeries including hepatectomy [4] and pancreatectomy [5]. Non traumatic chylothorax can be from neoplastic processes, e.g., lymphoma (most common) [6], hepatocellular carcinoma [7] and infections like Filariasis [6] and Tuberculosis [8]. Idiopathic and congenital causes account for almost 10% of all causes of chylothorax [1].

Reported chylothoraces have typically been exudative. Transudative chylothoraces are rare, with reported cases being associated with heart failure, amyloidosis, nephrotic syndrome, and liver cirrhosis [9]. Here we report the case of transudative chylothorax in the absence of concomitant ascites in an 82-year-old man with history of liver cirrhosis, and multiple prior paracentesis.

2. Case presentation

An 82-year-old man with past medical history significant for cryptogenic hepatic cirrhosis complicated by portal venous thrombosis and need for multiple paracentesis, presented to our hospital for management of a right sided pleural effusion. Patient had been evaluated at an outside emergency department eleven days prior for shortness of breath and fatigue. CT angiography of the chest at that time revealed a large right-sided pleural effusion with complete collapse of the right lower lobe of the lung with no signs of malignancy. Unfortunately, the patient left the emergency department before further evaluation; however, he did follow up with his primary care physician who ordered a chest x-ray which again showed large right sided pleural effusion with overlying atelectasis (Fig. 1). Patient was then sent to the hospital for further work up. Upon hospital evaluation, he was in no acute distress with only a com-

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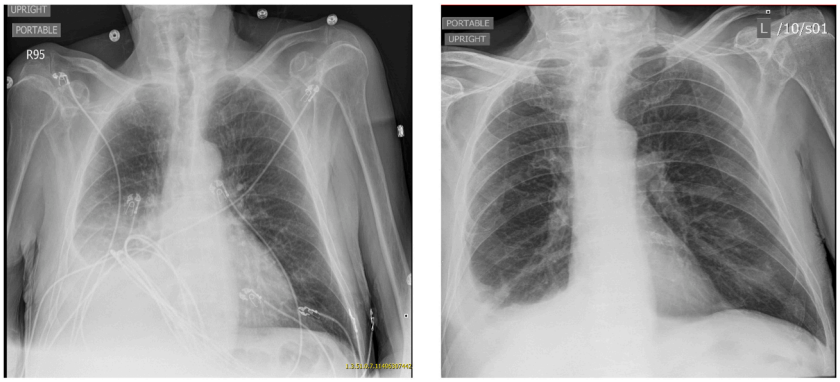

Fig. 1. Chest X-ray imaging showing pleural effusion before (left) and after (right) thoracentesis.

plaint of baseline mild shortness of breath. He denied fever, cough, chest pain, abdominal pain, or abdominal distension. Physical exam was remarkable for stable vital signs, decreased right-sided breath sounds, 1+ bilateral lower extremity edema and normal bowel sounds, no abdominal tenderness, distention, or ascites. Patient underwent a thoracentesis, with approximately 1.5L of an opaque yellow fluid obtained from the pleural space (Fig. 2). He had no complications post procedure and follow up imaging showed significant reduction of the pleural effusion (Fig. 1).

Initial workup revealed a hemoglobin of 10.7, consistent with the patient's baseline. WBC and platelet count were within normal limits. CMP was remarkable for persistent hypoalbuminemia and slight elevation of his alkaline phosphatase, AST, and total bilirubin. BNP was unremarkable and COVID test was negative. No abdominal imaging was performed, although most recent abdominal ultrasound from 3 months prior showed no ascites. The results of the pleural fluid analysis were consistent with a transudative pleural effusion with elevated TG as summarized in the table below (Table 1). Fluid culture revealed no growth and gram stain was negative for organisms. Cytology was negative for malignancy. Given patients mild symptoms, he was treated with diuretic therapy and recommended to start a low-fat, high-protein diet and follow up with both GI and pulmonology.

Over the next year work up from multiple hospitalizations and outpatient appointments with pulmonology, thoracic surgery and GI showed similar findings including liver imaging (CT and ultrasound) showing persistent cirrhosis with no hepatic lesions or metastatic disease on PET scan. Patient continued to have persistent symptoms and he eventually underwent a Video Assisted Thoracoscopic Surgery (VATS) procedure with right lower lobe lung resection to improve symptoms of recurrent pleural effusions. GI then followed up with EGD and colonoscopy which were only remarkable for grade 1 esophageal varices. It was not until a year later that

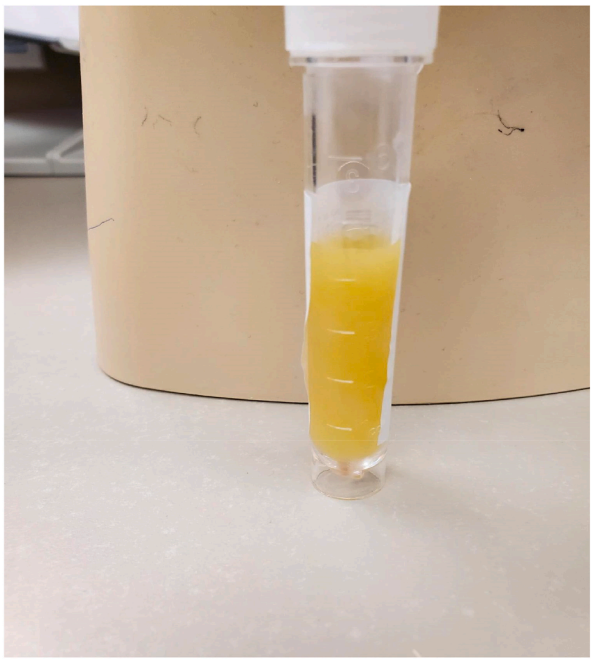

Fig. 2. Image showing a sample of the yellow, turbid, pleural fluid collected after thoracentesis. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

Table 1
Table showing a summary of the pleural fluid analysis.

LDH	101 (serum 299)
Protein	2.8 g/dL (serum 6.7)
WBCs[a]	158
RBCs	>2000
pH	8.0
Glucose	119 mg/dL
TG	175 mg/dL

[a] = differential was noted as 28% neutrophils, 35% lymphocytes, and 37% monocytes.

CT abdomen revealed a right hepatic lesion highly suspicious for hepatocellular carcinoma. Patient was seen at GI multidisciplinary conference and at that time opted for hospice care.

3. Discussion

Transudative chylothorax is rare and has been reported in a few case reports in association with liver cirrhosis [10,11], nephrotic syndrome [12], heart failure [9], hepatocellular carcinoma [7] and lymphangioleiomyomatosis [13]. In most of these instances, there has been documented association between the chylothoraces and chylous ascites [14]. The findings from the case indicates an association between our patient's liver cirrhosis, chylous ascites and the chylothorax. However, the patient did not have concurrent ascites when he presented with the chylothorax. While chylothorax formation in cirrhotic patients is rare, there has been discussion pertaining to the pathophysiology of its development. It is thought that, in decompensated hepatic cirrhosis, the increased intraabdominal pressure due to portal hypertension leads to leakage of chyle from the thoracic duct leading to the chylothorax. Given our patient had no ascites for months before presentation, the question becomes whether intermittent increased portal hypertension is enough to lead to leakage of chyle out of the thoracic duct in the absence of ascites.

Reported conservative management of non-traumatic chylothorax, as well as chylous ascites involves dietary modification by switching to a high-protein, low-fat diet with medium chain triglycerides [15]. Additionally, the use of Octreotide or Somatostatin, Midodrine and Sirolimus have been documented as aiding in reduction of chyle formation [15]. In the case of our patient, we opted to start with dietary modification that included a significant decrease in fat-containing foods, along with close outpatient follow up. This however was not enough, and patient had multiple recurrence of his pleural effusion.

The cytology of both his pleural and ascitic fluids remained negative, puzzling enough, given the high likelihood that the patient has HCC. It is also remains unclear why the pH of the chylothorax was elevated. Reported normal chylothorax pH range is between 7.4 and 7.8 [1]. With recent evidence concerning for HCC, we wonder if this probable HCC affected the pH. Although the newly found liver lesion is thought to be HCC, it remains difficult to decipher whether the recurrent chylothoraces correlate malignancy as opposed to worsening cirrhosis.

4. Conclusion

Although rare, there have been several reports of chylothoraces associated with hepatic cirrhosis. We have reported a case of one such patient who even without ascites, presented with a transudative pleural effusion that was determined to be a chylothorax. Our aim in this report is to present this association and to increase provider awareness of this possibility in a patient with a history of cirrhosis, with or without ascites. Additionally, we desire to increase consideration for hepatocellular carcinoma work up in similar patients with negative fluid cytology and no obvious lesion seen on initial imaging. Given the documented association between chylous ascites and chylothorax, we propose early conservative management of either presentation to prevent the formation of the other.

Declaration of competing interest

The authors declare no conflict of interest.

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