CASE REPORT

HEPATIC HYDROTHORAX WITHOUT ASCITES: A DIAGNOSTIC AND MANAGEMENT CHALLENGE

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Hepatic hydrothorax refers to the presence of a pleural effusion (usually >500 mL) in a patient with cirrhosis who does not have other reasons to have a pleural effusion (e.g., cardiac, pulmonary, or pleural disease). Hepatic hydrothorax occurs in approximately 5–6% of patients with cirrhosis. It results from the ascitic fluid draining into the pleural cavity through the diaphragmatic defects. The presentation of patients with hepatic hydrothorax includes chest pain, hypoxemia, cough, shortness of breath and fatigue. The atypical feature, in this case, is the presence of hepatic hydrothorax in a patient with chronic liver disease without ascites. The management of hepatic hydrothorax is difficult. The initial treatment should be a low-salt diet plus diuretics. The best diuretic regimen is probably the combination of furosemide and spironolactone. However, about 25% of patients are refractory to this regimen, and additional therapy is indicated. This patient underwent thoracentesis, however, considering the re-accumulation of fluid, a pigtail catheter was placed which drained up to 8 liters of fluid.

Keywords: Hepatic hydrothorax; Chronic liver disease; Pleural effusion; Ascites

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INTRODUCTION

Generally, the initial and common presentation of chronic liver disease is the collection of fluid in the abdominal cavity, however in rare cases, the seeping of fluid into the pleural cavity through the diaphragmatic pores can result in right-sided transudative pleural effusion called hepatic hydrothorax. The course in this patient is unusual as the patient presented with right-sided transudative pleural effusion without any evidence of ascites, and diagnostic workup revealed it as the case of decompensated chronic liver (DCLD) disease on ultrasonography which manifested first time solely as pleural effusion without any other clinical feature of DCLD.

CASE DETAIL

In March 2023, an unstable 51-year-old female presented to the emergency department due to her inability to lie flat. She had been experiencing various symptoms including decreased appetite, dry cough, and lethargy for a couple of weeks. Upon evaluation, it was discovered that she had been diagnosed with hepatitis C one year prior, but had not sought medical treatment and instead turned to homeopathic remedies for relief.

Upon presentation to the emergency department, the patient exhibited visible respiratory distress and was utilizing accessory muscles. Her respiratory rate was elevated at 32 breaths per minute and her saturation was dropping below 90% so the patient was promptly started on supplemental oxygen. The patient's pulse was feeble and she exhibited tachycardia, with a heart rate of 130 beats per minute. Visible temporal wasting was observed and the patient appeared malnourished. A general physical examination revealed icteric skin and palmar erythema, indicative of chronic liver disease. Additionally, palpation revealed splenomegaly. Upon examination of the chest, stony dull percussion and decreased air entry were observed, consistent with the presence of pleural effusion. A subsequent chest x-ray confirmed the presence of a massive right-sided pleural effusion with compressive atelectasis.

After performing a diagnostic pleural tap and analyzing the sample, it was determined that the pleural fluid was transudative according to Light's criteria. A subsequent ultrasound of the abdomen revealed a coarse liver with irregular margins, portal vein and splenomegaly, but no ascites were observed. This presented a diagnostic challenge, as hepatic hydrothorax is typically associated with the presence of ascites in most cases. Additionally, the patient had been experiencing dry cough and intermittent fevers in the last few days.

The diagnostic question was whether the patient was suffering from consolidation with para pneumonic effusion or hepatic hydrothorax. To obtain further insights, the hospital's pulmonology and gastroenterology experts were consulted. It was decided to perform a CT scan of the abdomen with

contrast to better assess the presence of ascites, as ultrasound is an operator-dependent modality that can be prone to missing small amounts of fluid. The CT scan revealed a massive pleural effusion on the right side, but no ascites or consolidation was observed, and the sign of chronic liver disease.

Cardiopulmonary and renal causes were ruled out, as echocardiography was normal with no systolic or diastolic dysfunction, and kidney functions were within normal limits. A formal diagnosis of chronic liver disease, Child-Pugh Class C and MELD score of 19 with hepatic hydrothorax was eventually made, which a valuable learning point was given the atypical presentation of the condition in this case.

The patient was initially managed with intravenous furosemide 40 mg twice daily, and spironolactone 100mg twice daily was added to the regimen. However, the initial therapeutic drainage via needle tapping provided only temporary relief to the patient, and the fluid re-accumulated the next day, with no improvement in the radiographic findings.

Given the need for ongoing pleural fluid drainage, a pigtail catheter was placed on the right side after careful clinical observation for any signs of hypotension. Over the next few days, a total of > 8,000 ml of pleural fluid was drained. Although chest x-ray showed some improvement, it was anticipated that this would be an ongoing occurrence. Moreover, the patient developed hepatic encephalopathy during admission due to diuretic therapy for massive pulmonary effusion. Diuretic therapy was de-escalated and purgation and gut probiotics were given to improve hepatic encephalopathy. The patient's consciousness level was improved. The gastroenterology team was involved in the definitive management of recurrent pleural effusion/hepatic hydrothorax which was unable to subside by diuretics and also generated a management challenge by prone to develop recurrent hepatic encephalopathy which contraindicated TIPSS as a management strategy.

The patient was discharged with the pigtail catheter in place, and she and her caretaker were educated on the proper method of draining and the signs of complications that may arise with the pigtail in place. Furthermore, the patient was referred to the Gastroenterology department for further management. A pigtail was placed for the long term to prevent recurrent hepatic hydrothorax. Due to recurrent hepatic hydrothorax, repeated episodes of hepatic encephalopathy and poor response to diuretics, the patient was referred to a liver transplant centre for liver transplantation.

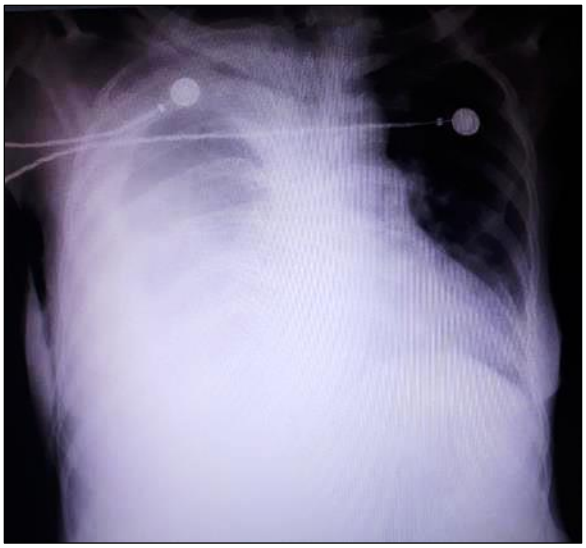

Figure-1: Chest X-ray on the day of admission, showing right-sided massive pleural effusion.

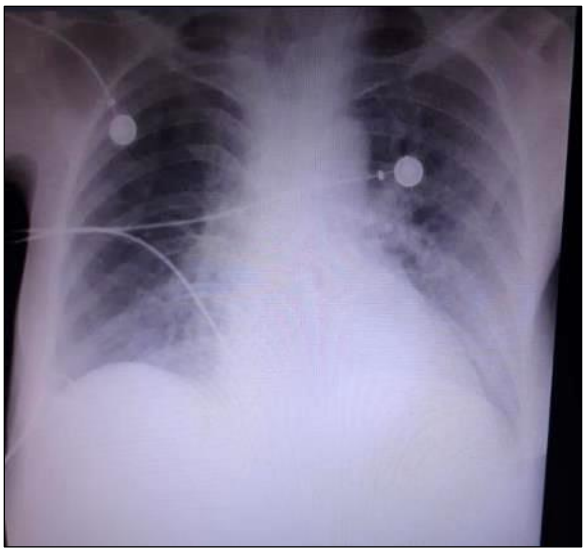

Figure-2: Chest X-ray after thoracocentesis showing improvement in pleural effusion and pigtail in place

DISCUSSION

Hepatic hydrothorax is one of the uncommon complications of end-stage liver cirrhosis. Its estimated prevalence is 4–12%.[1,2] Refractory hepatic hydrothorax is also considered an independent predictor for mortality in patients with end-stage liver disease. Karim T. Osman *et al* described that 1-year mortality in the hepatic hydrothorax group is higher as compared to the refractory ascites group (51% vs. 19.5%).[3] Hepatic hydrothorax is caused by the flow of ascites towards the pleural cavity due to negative pressure in pleural cavity pressure and positive abdominal pressure. Normally filling pressure in the

pleura equilibrates with negative pleural cavity pressure and positive abdominal pressure, causing ascites to accumulate in the peritoneal cavity and inhibiting its accumulation in the pleural cavity. However, if the pleural re-absorption rate of ascites equilibrates with the production of ascites in the abdominal cavity, hepatic hydrothorax without ascites will persist.[4,5] Diagnosis can be established by injecting technetium Sulphur colloid intraperitoneally, where the movement of dye from the abdomen to the chest cavity is demonstrated. The movement is unidirectional since intrapleural injection of dye is not recovered in the peritoneum. It is also believed to be specific to hepatic hydrothorax as it does not occur in pulmonary or cardiac causes of pleural effusions.[6,7] Medical treatment includes salt and water restriction diuretics, and thoracocentesis. Mostly hepatic hydrothorax is difficult to treat and more likely to develop AKI, hepatic encephalopathy, septic shock and mortality. In our case, diuretic therapy fails to resolve the pleural effusion and causes hypovolemia along with recurrent attacks of hepatic encephalopathy along with acute kidney injury, so it became a challenge from a management point of view, despite multiple attempts of large-volume thoracocentesis. In refractory cases, trans jugular intrahepatic portosystemic shunting (TIPSS) seems to be the procedure of choice for symptomatic hepatic hydrothorax, but due to the increased risk of hepatic encephalopathy, TIPPS was not planned.

Some reports have shown that video-assisted thoracoscopic surgery (VATS) repair of diaphragmatic defects is one of the promising treatment modalities that can be used in patients with hepatic hydrothorax where TIPSS is contraindicated.[8] Hepatic hydrothorax usually indicates advanced cirrhosis of the liver, so liver transplantation should be considered.[9]

This case discusses the potential benefits of pigtail catheter placement for the management of pleural effusion in patients with liver disease, particularly when ongoing drainage is required. Close clinical observation, patient education, and appropriate referral for definitive management are crucial for successful outcomes in these complex cases. The use of pigtail catheters warrants further investigation in larger studies to better understand its safety, efficacy, and optimal patient selection criteria.

Overall, this case report highlights the importance of considering Hepatic Hydrothorax as a differential diagnosis in patients with pleural effusion and liver disease, even in the absence of ascites. This case also underscores the value of multidisciplinary collaboration and imaging modalities such as CT scans in arriving at a definitive diagnosis, and it also highlights the management difficulties of hepatic hydrothorax due to its recurrence, refractory to diuretics, and recurrent encephalopathy due to diuretic therapy.

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