Use Caution in Draining Effusions in Patients with Liver Disease

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Introduction

Reexpansion pulmonary edema (REPE) is a rare, but well reported complication of pleural effusion[1] and a number of articles reporting hepatic hydrothorax with minimal ascites have been published.[2-6] To our knowledge, there are no reports of REPE occurring after therapeutic thoracentesis of hepatic hydrothorax in the setting of minimal ascites.

The development of hepatic hydrothorax is thought to be due to the passage of transudative fluid from the peritoneal cavity to the pleural cavity through diaphragmatic defects.[7] In the absence of ascites, rapid fluid shifts from the peritoneum to pleural cavity are thought to take place due to a combination of elevated intraperitoneal pressure and negative pressure in the pleural space resulting in hepatic hydrothorax with minimal ascites.[8]

We present a case with a rare presentation of hepatic hydrothorax complicated by both reexpansion pulmonary edema and pneumothorax.

Case Report

A 52-year-old female with a history of end stage liver disease (ESLD) presented to the emergency department with a chief complaint that she "could not get air." She reported a five-day worsening of shortness of air, dyspnea with minimal conversation, 4-pillow orthopnea, chest pain when laying supine, and a non-productive cough. She denied fevers, chills, and night sweats, but reported a significant weight gain of 15 pounds in the prior 10 days.

Her past medical history was significant for ESLD secondary to primary sclerosing cholangitis, portal hypertension, ulcerative colitis, and insulin dependent diabetes mellitus type II. She was hospitalized one week earlier for melena and anemia (hemoglobin 6.0 mg/dL) that required transfusion of four units of packed red blood cells. Endoscopy revealed only grade 1 esophageal varices. She denied alcohol, tobacco, or illicit drug use and family history was significant for lung cancer, liposarcoma, and colon cancer.

Vital signs included a temperature of 37˚C, blood pressure of 165/94 mmHg, pulse of 107 beats/min, respiratory rate of 22 breaths/min, and an O_2 saturation of 95% on room air. She was in mild respiratory distress; her sclera was anicteric. Heart rate was regular with a 2/6 systolic ejection murmur. Lungs were clear to auscultation on the left with no breath sounds and dullness to percussion throughout the right hemi-thorax. Her abdomen was soft, diffusely tender to palpation, and non-distended. Bilateral lower extremity edema was noted, cranial nerves were intact, and there was no asterixis.

A complete blood count was significant only for mild anemia with hemoglobin of 10.2 mg/dL. A comprehensive metabolic

panel revealed potassium of 3.2 mg/dL, total bilirubin 2.8 mg/dL, and albumin 1.3 mg/dL. Her calculated Model for End Stage Liver Disease (MELD) score was 14.

A chest x-ray showed a large right pleural effusion (Figure 1). Computed tomography (CT) of the chest and abdomen showed massive right pleural effusion and complete atelectasis of the right lung in addition to cirrhosis, portal venous hypertension, splenomegaly, mild peri-hepatic ascites, and gastroesophageal varices. Thoracentesis was performed and two liters of clear yellow fluid was aspirated and determined to be transudative by Light's criteria[9] with a pleural fluid/serum total protein ratio less than 0.5, pleural fluid/serum LDH ratio less than 0.6, and serum-to-pleural-fluid albumin gradient greater than 1.1. Due to the transudative nature of the fluid and the right-sided accumulation, the effusion was deemed likely hepatic hydrothorax.

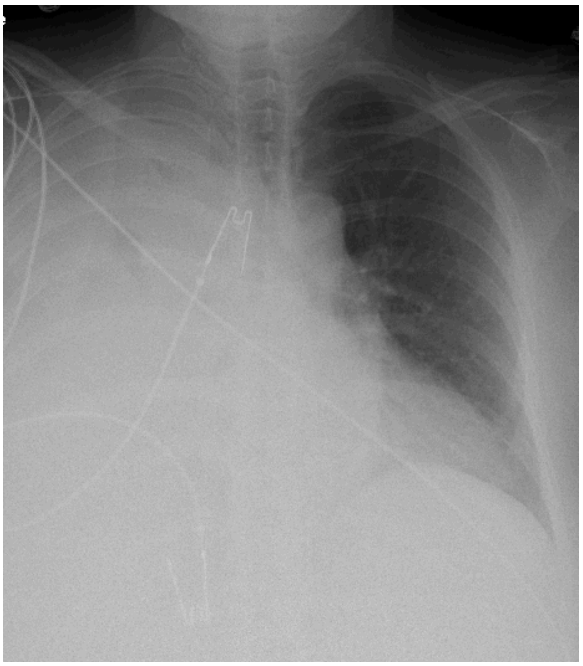

Figure 1. Right-sided pleural effusion.

Shortly after the procedure, the patient began coughing. A follow-up chest x-ray showed a right apical pneumothorax and the patient was started on 100% non-rebreather mask (Figure 2). Due to persistence of the cough and continued respiratory distress, another chest x-ray was obtained, revealing increased edema on the right upper lobe consistent with reexpansion pulmonary edema (Figure 3).

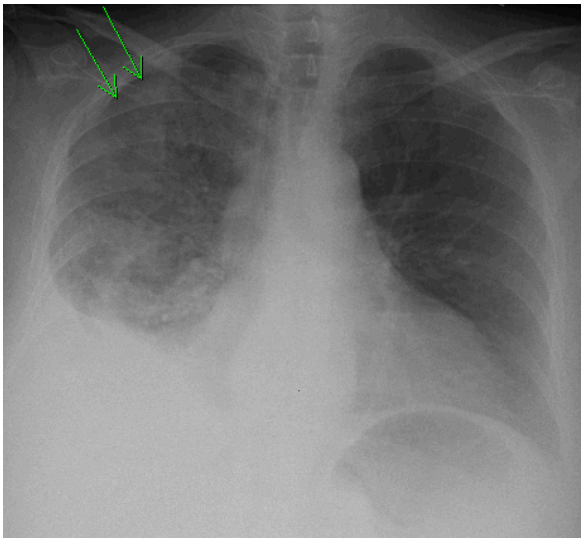

Figure 2. Development of small right apical pneumothorax status post thoracentesis.

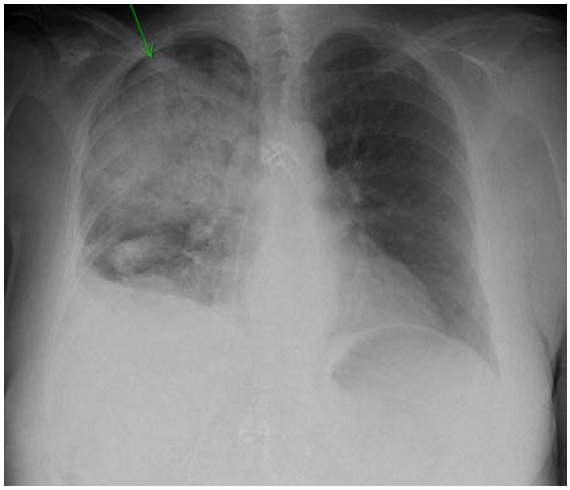

Figure 3. Development of reexpansion pulmonary edema (arrow denotes small residual pneumothorax).

The goal of management initially should be to control the formation of transudative

fluid. Therefore, the patient was started on furosemide and spironolactone, placed on 1.5 liter fluid restriction, and a two gram sodium restriction diet. Over the course of four days, serial chest x-rays showed gradual improvement with complete resolution of the pulmonary edema and pleural effusion (Figure 4). The patient was discharged to home in stable condition and able to ambulate with good oxygen saturations on room air.

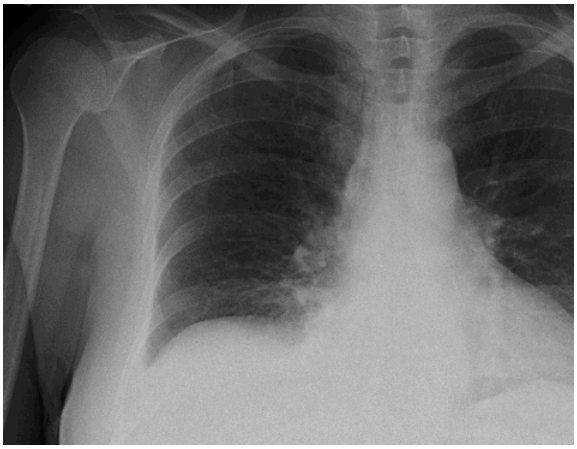

Figure 4. Resolution of pulmonary edema and pleural effusion after diuresis.

Discussion

There are situations in which the effusion is refractory to medical treatment alone. In these cases, serial thoracentesis is recommended. When thoracentesis is needed more frequently than every two to three weeks, alternative treatment options should be discussed.[10] While definitive treatment is orthotopic liver transplantation,[11] options including transjugular intrahepatic portosystemic shunt (TIPS)[12] and video-assisted thorascopy (VATS)[13] to repair diaphragmatic defects with and without pleurodesis have been identified as the best available "bridging" procedures for those awaiting transplantation.[14] Chest tube placement has long been considered a relative contraindication in the treatment of hepatic hydrothorax.[15]

Prevention of complications associated with thoracentesis is not well-known, given the different circumstances contributing to a pleural effusion. Pneumo-thorax is the most common complication.[16] Reexpansion pulmonary edema has been studied, and there are some potential prevention recommendations available, including taking into account the duration of time the effusion has been present, the presence of underlying lung disease, the pleural pressure, and the presence of symptoms while doing the thoracentesis.[17] In general, consensus appears to be that less than 1.5 liters should be removed, unless pleural pressures are used for guidance.

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