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CASE REPORT | LIVER

Innovative Management of a Difficult Case of Hepatic Hydrothorax

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ABSTRACT

Hepatic hydrothorax affects 5%–15% of decompensated cirrhosis patients, with up to 26% being refractory to standard treatments. For those ineligible for transjugular intrahepatic systemic shunts or liver transplants, alternatives to repeated thoracentesis are limited but can include the insertion of an indwelling pleural catheter. We present the first case of the use of an automatic low-flow ascites pump (alfapump) to manage nonmalignant pleural effusion in an elderly patient with cirrhosis.

KEYWORDS: alfapump; cirrhosis; decompensation; pleural effusion

INTRODUCTION

Hepatic hydrothorax (HH) is a transudative pleural effusion that occurs in patients with decompensated cirrhosis and fluid retention, but without cardiopulmonary diseases, with an annual incidence of approximately 5%–15%, associated with a median survival of 8 to 12 months.[1-3]

HH management is similar to that for ascites, which includes dietary sodium restriction and diuretic therapy. In cases with concurrent ascites, repeat large-volume paracentesis and thoracentesis with intravenous albumin administration are needed to alleviate symptoms, but the relief is often short-lived because of rapid fluid reaccumulation.

For patients with refractory HH, options such as transjugular intrahepatic portosystemic shunt and liver transplantation might be considered, but inappropriate for the elderly, those with severe liver disease, or high risk of hepatic encephalopathy.[4,5]

We present an innovative approach to manage refractory HH in an elderly patient with limited treatment options.

CASE REPORT

An 80-year-old woman with cirrhosis from nonalcoholic steatohepatitis developed left-sided HH, despite no previous ascites. She had a history of hepatocellular carcinoma, which was under control with radiofrequency ablation.

She presented to the emergency department in August 2022 with shortness of breath, a respiratory rate of 26 breaths/min, and 90% oxygen saturation on room air. Initial thoracentesis removed 0.6 L of transudative pleural fluid, ruling out malignancy or infection, but the HH rapidly reaccumulated. Over 6 months, she had 7 hospital admissions for shortness of breath and underwent 18 thoracenteses of a mean volume of 1.5 L each. Diuretics were ineffective, and dietary sodium restrictions were challenging for cultural reasons. Transjugular intrahepatic portosystemic shunt and liver transplantation were unsuitable because of her age and recurrent hepatocellular carcinoma. She became bed-bound with reduced quality of life (QoL), requiring thoracenteses every 10 days for symptomatic relief.

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The treating team discussed the options of an indwelling pleural catheter (IPC) which she refused. Therefore, an automatic low-flow ascites pump (alfapump) (Sequana Medical NV, Ghent, Belgium), designed for refractory ascites management, was offered to treat her refractory HH (Figure 1).[6] Under general anesthesia, the alfapump was inserted into a subcutaneous pocket in the abdomen, and the catheter designed for the peritoneal cavity was placed into the pleural cavity. Access to the left pleural cavity was achieved through a 1.5-cm transverse incision below the left breast. Using ultrasound and fluoroscopic guidance, an 18-French pleural catheter was inserted. A suprapubic catheter was similarly inserted into the bladder containing 500 mL of saline with methylene blue. Both catheters were then connected to the alfapump (Figure 2). Detailed description of the implantation procedure is provided as Supplementary Digital Content (see Supplementary Material, http://links.lww.com/ACGCR/A37).

The patient initially experienced an episode of acute kidney injury (AKI), with a peak serum creatinine (sCr) of 158 μmol/L. This fully responded to intravenous albumin and crystalloids. She received prophylactic norfloxacin to prevent infection while the alfapump remained in situ. Initial pump rate adjustments were made with intermittent pump thoracentesis under albumin coverage. Although daily chest X-rays showed a gradual reduction in the HH, there was an interval increase at 3 weeks, necessitating hospital admission for thoracentesis (Figure 3). Her basal pump rate eventually settled at 450 mL per day after the patient adhered to a reduced sodium diet. At almost 6-month follow-up, her chest X-rays showed complete resolution of HH (Figure 3). Her QoL returned to normal, with plans to travel. The alfapump removed 58.5 L of pleural fluid in 166 days. Since her initial AKI, her sCr remained at baseline at 60 μmol/L, and she was weaned off albumin infusions.

DISCUSSION

Refractory pleural effusion occurs in 21%–26% of patients with decompensated cirrhosis and HH.[1] Management with serial thoracentesis carries the rare risk of pneumothorax, loculations, and bleeding.[7] IPCs are an alternative but involve some infection risks (10%–16%) and potential loculations, making future thoracentesis difficult.[8–10] IPCs also require visits from home care personnel. Spontaneous pleurodesis after IPC placement occurred in up to one-third of patients, but this is likely an overestimation, perhaps mistaking true pleurodesis rates with definite resolution of HH.[11] Chemical pleurodesis works 50% of the time, and chest tubes are discouraged because of complications, including fistula formation and sepsis.[12,13]

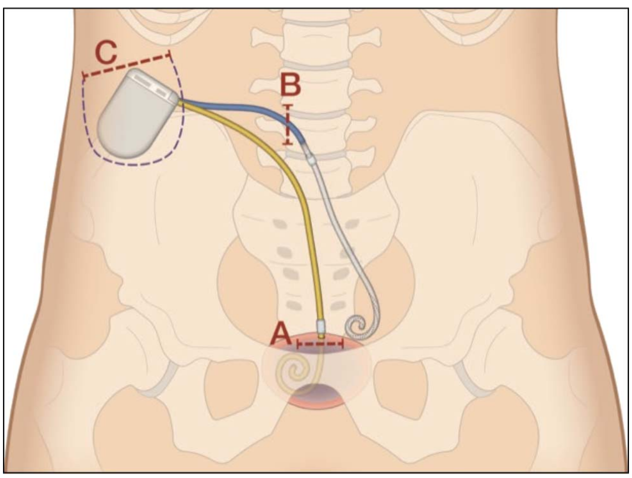

Figure 1. Alfapump in situ for patients with refractory ascites. (A) Bladder catheter, (B) peritoneal catheter, and (C) alfapump.

The alfapump allows for unidirectional fluid flow with adjustable drainage rates based on dietary sodium intake.[6] Intravenous albumin is given on an ad hoc basis if there has been excess fluid removed with evidence of dehydration biochemically or clinically or the development of AKI. It is entirely internally placed and, therefore, eliminates risks such as leakage from insertion site as in IPC. Its infection risks are controlled by prophylactic antibiotic and comparable with what has been observed in this population of decompensated cirrhotic patients.[14] Regular blood work also allows for detection of AKI and its prompt treatment. Remote monitoring of alfapump also allows for better patient supervision and reducing the need for frequent thoracentesis and hospital visits, as similarly observed in patients with refractory ascites requiring fewer paracentesis and an overall improved QoL.[15–18]

The alfapump's application for recurrent pleural effusion has been explored in 2 studies.[19,20] In the animal study, the device successfully transferred fluid from the pleural cavity to the bladder in most cases, with only one instance of failure due to improper priming of the pump before implantation.[19] The human study involved 2 patients with malignant pleural effusion. One patient had to have the pump replaced on day 60 because of catheter blockage.[20] The recent improved catheter design, with pigtail tip of the peritoneal/pleural catheter and smaller side holes has reduced this complication.[21] Any debris that gets into the pleural catheter can be grinded by the gears of the pump.

This is the first report of the use of an alfapump for the management of nonmalignant HH for a patient with cirrhosis. It seems an appropriate treatment for HH in patients without loculated, or sanguineous pleural effusion, or empyema. Other contraindications include high Model for End-stage Liver Disease score of >20, preexisting renal dysfunction with an sCr of >133 μmol/L, recent urinary tract infection, or bladder neck obstruction. Future clinical studies enrolling a larger cohort of patients for longer follow-up period are necessary to validate the alfapump for managing refractory HH.

DISCLOSURES

Author contributions: N. Tiwari contributed toward data collection and manuscript writing. E. Shlomovitz and J. Capel contributed toward manuscript editing and direct patient care.

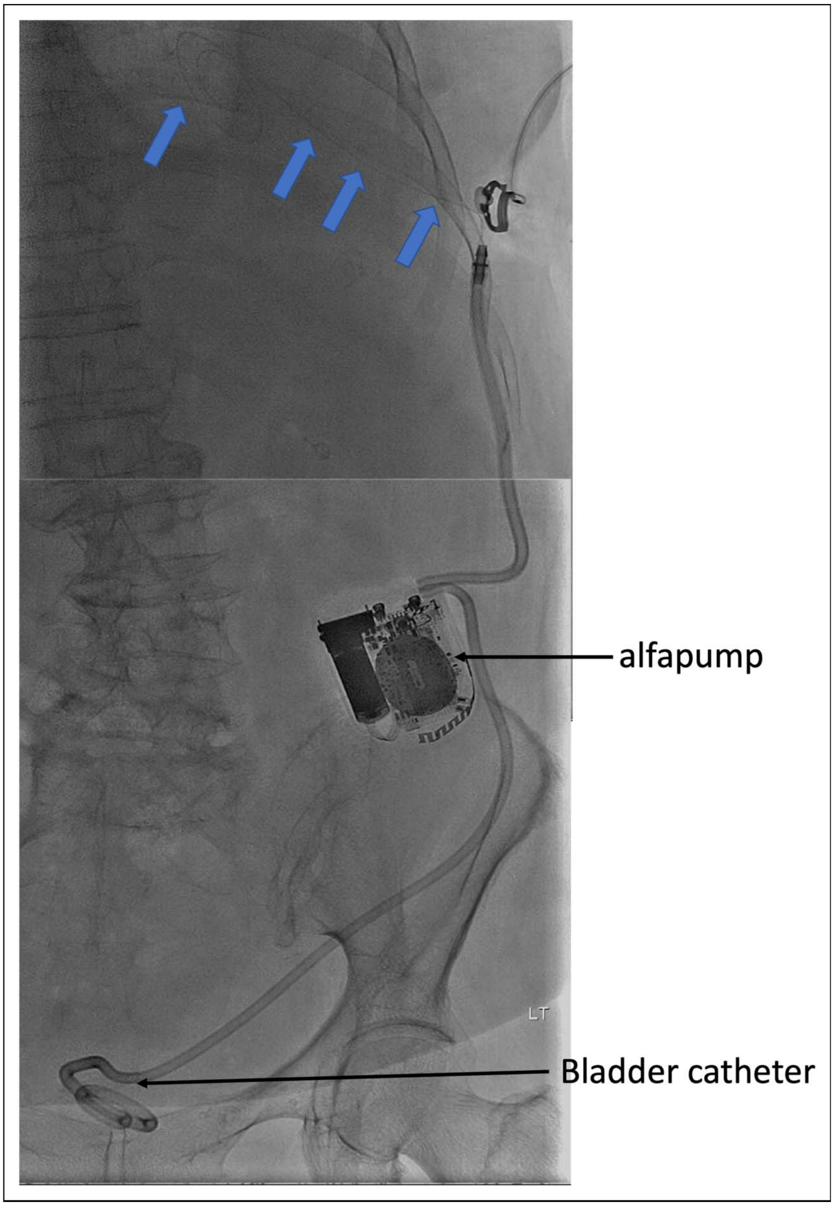

Figure 2. Radiograph of alfapump in situ in our patient. Blue arrows: non–radio-opaque peritoneal catheter in chest cavity.

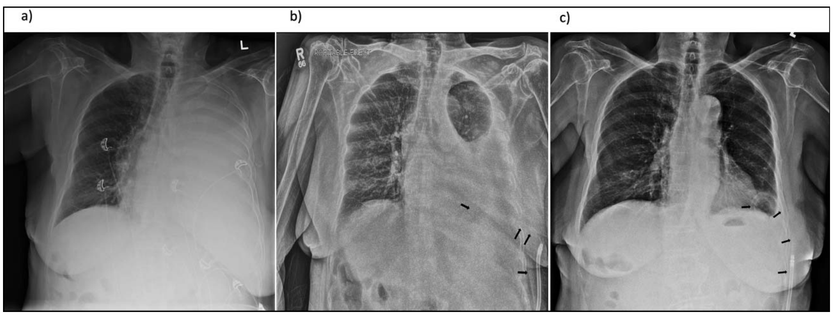

Figure 3. Serial chest X-ray of the patient: (A) Pre-alfapump implantation; (B) 3 weeks after alfapump implantation. Black arrow: Non–radio-opaque peritoneal catheter in chest cavity; (C) 8 weeks after alfapump implantation. Black arrow indicating a peritoneal catheter in chest cavity is now much more obvious.

F. Wong oversaw the overall direction and planning of case report, revised the manuscript formation, and contributed to direct patient care. F. Wong is the article guarantor.

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Informed consent was obtained for this case report.

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