Radiology Case Reports 17 (2022) 4276–4279

Available online at www.sciencedirect.com

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journal homepage: www.elsevier.com/locate/radcr

Case Report

Large volume paracentesis of 39.5 liters chylous ascites in the setting of high-grade follicular lymphoma ☆

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ARTICLE INFO

Article history:
Received 3 August 2022
Revised 8 August 2022
Accepted 12 August 2022

Keywords:
Large volume paracentesis
Paracentesis
Ascites
Albumin
Postparacentesis circulatory dysfunction (PPCD)
Paracentesis-induced circulatory dysfunction (PICD)

ABSTRACT

The American Association for the Study of Liver Diseases recognizes large volume paracentesis as draining greater than 5 liters of ascites and states there is no limit in the amount of ascites drained with appropriate replacement of albumin. For many practitioners performing safe large volume paracentesis between 5 and 10 liters or even 20 liters is not an uncommon practice. However, drainage of higher volumes outside common practice may raise concerns of patient intolerance and complication. The largest volume paracentesis reported in the literature to date is 41 liters. However, few other reports approach this volume. This case report demonstrates patient tolerance of a 39.5-liter paracentesis performed with close monitoring and hypertonic albumin replacement in a patient with chylous ascites due to high-grade follicular lymphoma.

Introduction

The American Association for the Study of Liver Diseases (AASLD) recognizes large volume paracentesis as draining greater than 5 liters of ascites and states there is no limit in the amount of ascites drained with appropriate replacement of albumin [1]. For many practitioners performing safe large volume paracentesis of 5-10 liters or even 20 liters is not an uncommon practice. However, drainage of higher volumes outside common practice may raise concerns of patient intolerance and complication. The largest volume paracentesis reported in the literature to date is 41 liters [2]. However, few other reports approach this volume. This case report demonstrates patient tolerance of a 39.5-liter paracentesis performed with close monitoring and hypertonic albumin replacement in a patient with chylous ascites due to high-grade follicular lymphoma.

☆ Competing Interests: None.

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https://doi.org/10.1016/j.radcr.2022.08.036

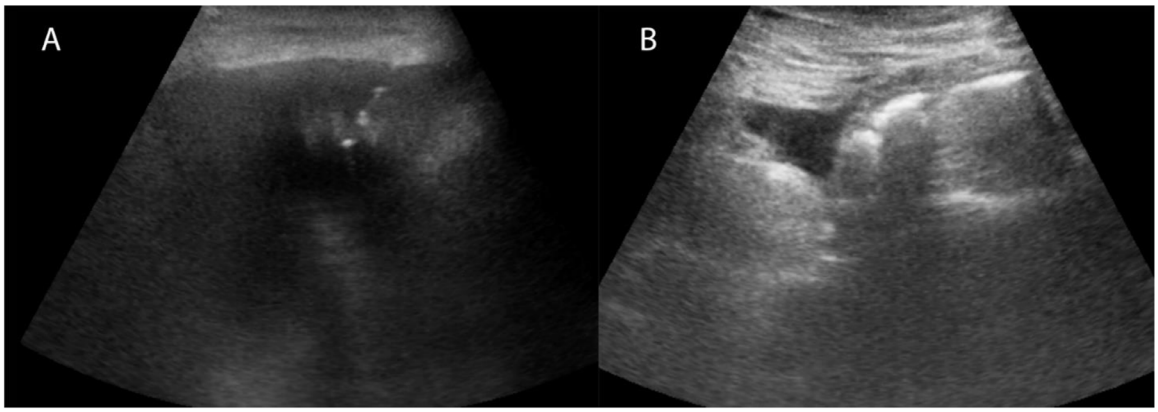

Fig. 1 – (A) Ultrasound-guided paracentesis was performed with return of chylous ascites. (B) After draining 39.5 liters of ascites the catheter was clamped and there was only trace ascites remaining.

Case report

A 53-year-old male with severe obesity (198 kg, 188 cm, BMI 56) was initially evaluated by gastroenterology for 2 months of progressive abdominal distension and weight gain. He was referred to interventional radiology for outpatient paracentesis with a working diagnosis of cirrhosis with grade 3 ascites. Past medical history included obesity and kidney stones. Social history was significant for approximately 3 decades of alcohol use, abstinent for ten years. Medications at the time of referral included spironolactone and cephalexin.

At presentation he was ambulatory but indicated decreasing mobility at home related to abdominal distension. Ultrasound demonstrated large volume ascites. Preprocedural labs were significant for glucose 131 mg/dL (ref: 70-99 mg/dL), serum sodium 146 mmol/L (ref: 135-145 mg/dL), and serum albumin 4.1 g/dL (ref: 3.2-5.5 g/dL). Basic metabolic panel, hepatic function panel and white blood cell count were otherwise normal. Blood pressure was 146/79 mmHg, mean arterial pressure (MAP) 107 mmHg, and heart rate 83 beats per minute (bpm). Paracentesis was performed under real time ultrasound guidance with an 8.5 Fr 25 cm multipurpose pigtail drainage catheter (Cook Medical, Bloomington, IN) using trocar technique (Fig. 1A). Approximately 28,000 mL of chylous ascites was removed and drainage from the catheter stopped. The catheter was slowly withdrawn without return of additional ascites and then removed. There was persistent drainage of fluid from the catheter exit site. The removed tubing was evaluated and noted to be clogged.

Ultrasound demonstrated persistent large volume residual ascites. Under real time ultrasound guidance, a 10.2 Fr 25 cm multipurpose pigtail drainage catheter (Cook Medical, Bloomington, IN) was inserted using trocar technique with return of chylous ascites. When total drainage reached 39,500 mL ascites the catheter was clamped, and ultrasound was performed demonstrating trace ascites (Fig. 1B). The procedure was ended due to performing provider concern for continued tolerance of such a large volume although there was no deterioration in vital signs or patient complaint. The drainage catheter was removed. Manual pressure was held at the catheter removal site for 10 minutes with persistent oozing. Therefore a 2-0 Ethilon suture (Ethicon US LLC, Bridgewater Township, NJ) was placed.

The patient was monitored throughout the procedure with blood pressure checks every 10 minutes. Blood pressures ranged from 110-150s/60-80s mmHg (MAPs 86-112) and heart rate ranged from 81-97 bpm with spO2 95-97% on room air. Final orthostatic vital signs were supine blood pressure 137/79 mmHg (MAP 101) and heart rate 92 bpm, sitting blood pressure 134/78 mmHg (MAP 100) and heart rate 91 bpm, standing blood pressure 147/73 mmHg (MAP 103) and heart rate 97 bpm.

Drainage was performed over approximately 4.5 hours. A total of 150 grams 25% human albumin solution (Flexbumin 25%, Baxalta US Inc, Lexington, MA) was administered in 6 separate doses with the last dose given approximately one hour before discharge. Throughout the procedure the patient was talkative and denied any complaints. At the conclusion of the procedure the patient reported discomfort at the level of his diaphragm radiating to the back and was reported to have short, labored respirations. Oxygen saturations remained stable at 95%-96% on room air. A chest x-ray was performed and did not demonstrate any abnormalities. He was discharged home.

Fluid samples from the paracentesis were sent to the laboratory for analysis, but they were lost in transit. Eight days after the initial paracentesis, a 10.5-liter paracentesis was performed with laboratory results on ascites significant for albumin 1.1 g/dL, serum ascites albumin gradient (SAAG) 3.0 g/dL, and triglycerides 2051 mg/dL (ref: $<$200 mg/dL) [3]. Notably, SAAG $>$ 1.1 g/dL is suggestive of portal hypertension from cirrhosis, liver metastasis, or right heart failure [1]. Cytology demonstrated no malignant cells. Culture demonstrated no growth. Metabolic panel 8 days after the initial paracentesis was within normal limits except for BUN/creatinine 22.6 (ref: 7-20) and total protein 5.6 g/dL (ref: 6.0-8.3).

CT abdomen 8 days after the initial paracentesis demonstrated a large central mesenteric mass (Fig. 2). A CT guided biopsy of the mass was performed and diagnostic for high grade follicular lymphoma. The patient was subsequently referred to oncology for treatment.

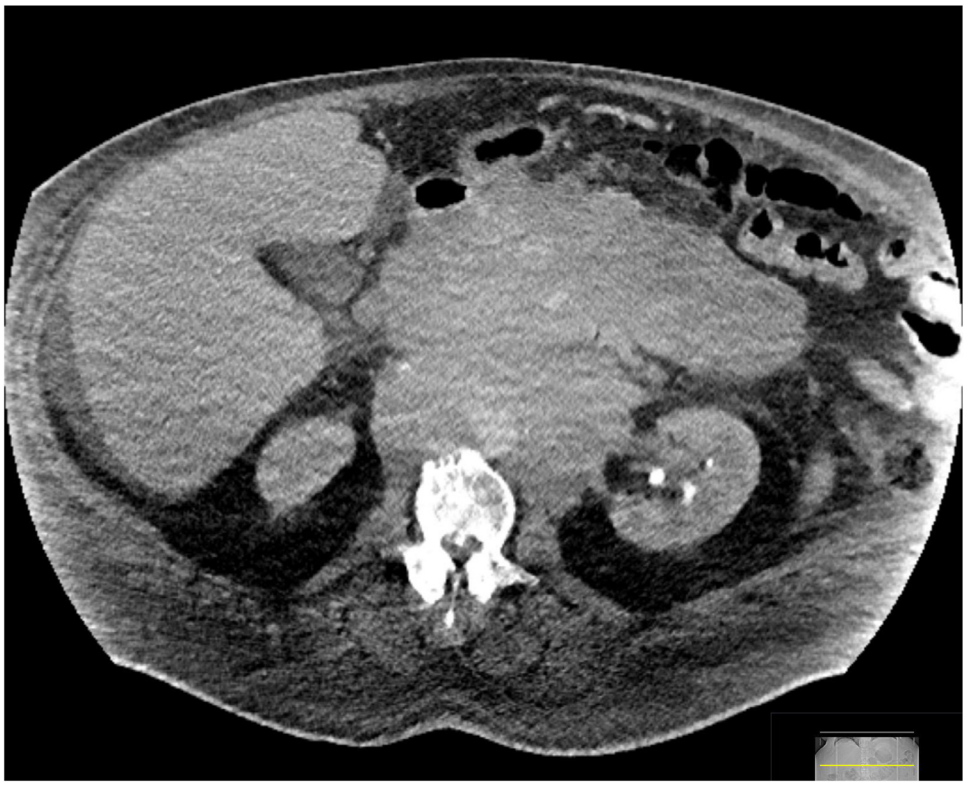

Fig. 2 – CT abdomen 8 days after the initial paracentesis demonstrated a large central mesenteric mass that was later biopsied and consistent with high-grade follicular lymphoma.

Discussion

Ascites is the result of decompensated cirrhosis in 75% of cases, with the remainder resulting from heart failure, malignancy, tuberculosis, pancreatic disease, trauma and other causes [1]. Chylous ascites is most commonly the result of cirrhosis or malignancy [3]. AASLD grades ascites on volume of fluid found on physical exam and response to treatment [1]. Grade 1 ascites requires no treatment [1]. Grade 2 ascites is primarily treated with sodium restriction and diuretics [1]. Grade 3 ascites is primarily treated with large volume paracentesis (LVP) with hypertonic (20% or 25%) albumin infusion followed by sodium restriction and diuretics [1]. Chylous ascites due to noncirrhotic reasons is treated with management of the underlying disease or injury, dietary changes, and diuretics with paracentesis reserved for refractory ascites [3].

AASLD recognizes LVP as draining 5 liters or more of ascites [1]. LVP greater than 5 liters should be treated with albumin to increase blood volume and prevent postparacentesis circulatory dysfunction (PPCD), also known as paracentesis induced circulatory dysfunction (PICD) [1,4–6]. PPCD includes hypotension, renal impairment, hyponatremia, rapid accumulation of ascites, hepatic encephalopathy, and death [1,4]. AASLD guidelines state there is no limit in the amount of ascites that can be drained in a single session if 6-8 grams of albumin replacement is given for each liter of ascites drained [1]. However, paracentesis greater than 8 liters has been associated with a greater risk of PPCD [1,4]. One small study has shown up to 64% of patients having LVP never receive albumin suggesting a better understanding of published guidelines is needed [7].

European Association for the Study of the Liver (EASL) and British Society of Gastroenterology recommend albumin replacement of 8 grams per liter of ascites drained [5,6]. EASL guidelines further recommend albumin replacement for paracentesis less than 5 liters [5]. British Society of Gastroenterology guidelines recommend albumin replacement for paracentesis less than 5 liters only in the setting of acute on chronic hepatic failure which has been shown to decrease the risk of renal impairment, hyponatremia, and death [6]. AASLD guidelines do not comment on need for albumin for paracentesis less than 5 liters.

It is important to note albumin was not given at the recommended AASLD dose in this case. The patient received 150 g albumin but based on AASLD guidelines he should have received between 237 and 316 grams of albumin. There is evidence that PPCD is also avoided with low-dose albumin (2-4 g/L) for LVP greater than 5 liters with the added benefit of significant cost savings [8,9]. In this case, the patient received albumin at a dose of 3.8 g/L with no evidence of PPCD or electrolyte abnormalities 8 days later.

The maximum recommended dose of Flexbumin 25% is 2 g/kg/day administered at a maximum rate of 1 mL/min per package insert [10]. In this case the 1 mL/min maximum recommended infusion rate was not followed. The patient received 600 mL albumin in 4.5 hours at a rate of 2.22 mL/min. At the recommended rate of 1 mL/min 150 g albumin would have required 10 hours to administer. At the AASLD recommended

dose of 8g/L a total of 316 g albumin would have required 21.1 hours to administer. Complications of hypertonic albumin infusion are due to hypervolemia and hemodilution and can include headache, dyspnea, jugular venous distension, rales, and elevated systemic and central venous pressures [10]. Risk factors for these complications include heart failure, hypertension, esophageal varices, pulmonary edema, hemorrhagic diathesis, severe anemia, and renal failure [10]. Although this patient tolerated rapid infusion of albumin, for those patients at high risk for PPCD and other complications, hospital admission may be advisable for monitoring and slow replacement of albumin.

This example of patient tolerance of a 39.5-liter paracentesis is not meant to set a limit on maximum volume paracentesis but to recognize extremely large volumes can be drained with safe practice. In this case, the patient received close patient monitoring with vital signs every 10 minutes and continued observation for any complaints. Volume replacement occurred with albumin, but a higher dose could have been considered per AASLD guidelines and over a longer period with hospital admission.

Patient consent

Written informed consent was obtained from the patient for publication of this case report and will be retained by Carilion Clinic Health Information Management.

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