

Post-paracentesis scrotal edema: A case report

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Abstract

Abdominal paracentesis is a common and safe procedure used to remove ascitic fluid from the body. It is performed in both the inpatient and outpatient setting and can be used for both diagnostic and therapeutic purposes. The most common complications of this procedure include a persistent fluid leak, an infection from the puncture site and an abdominal wall hematoma. The finding of sudden-onset massive genital swelling is a rare, and only occasionally reported, complication of a paracentesis. This article will discuss the case of a 58-year-old male with decompensated liver cirrhosis who presented with sudden-onset scrotal and penile swelling within 12 h after a paracentesis. After ruling out other causes of scrotal swelling, it was concluded that this is likely a complication of the recent paracentesis. The scrotal swelling was treated with conservative management including oral diuretic therapy and scrotal elevation, and the patient showed significant improvement in symptoms in 2 days. The cause of post-paracentesis scrotal edema is not widely studied; however, it is hypothesized to be caused by a fistula tract that forms between the peritoneal cavity and the Camper's and Scarpa's fascia which causes fluid to collect in the scrotum.

Keywords

Gastroenterology/hepatology, paracentesis, post-paracentesis, scrotal edema, post-paracentesis, case report, recurrent ascites

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Introduction

Paracentesis is a common, safe procedure used either for therapeutic or diagnostic purposes in patients with ascites. When a patient presents with abdominal distension due to ascites, whether it is new-onset or recurrent, as is typical for a patient with decompensated liver cirrhosis, a paracentesis is used to gain a sample of the fluid for further analysis to assist in diagnosis. Removing the fluid also provides relief to the patient's discomfort. Although there are numerous causes of ascites, the most common cause in the United States is liver cirrhosis, making up about 80% of patients.¹ In liver cirrhosis, fluid accumulates in the abdomen due to multiple factors, including sodium retention and local splanchnic vasodilation. Sodium retention occurs as the kidneys fail to excrete sodium in an attempt to increase blood flow to the kidney. As sodium levels in the serum increase and the liver experiences splanchnic vasodilation, there is a resultant increase in sinusoidal pressure. The elevated pressure pulls fluids from the arterial circulation into the surrounding areas, creating ascites.² In patients with liver cirrhosis, it is also important to obtain cultures and neutrophil counts of the peritoneal fluid to rule out

spontaneous bacterial peritonitis (SBP) which is a feared complication of ascites.

Known risks associated with a paracentesis include bleeding, low blood pressure, electrolyte imbalances such as hypokalemia and penetration of the needle into organs or vessels.³ In rare cases, however, patients can experience post-paracentesis scrotal edema. After the paracentesis is performed, within a few hours, the patient will experience sudden, massive scrotal swelling that may or may not involve the penis. This complication has only been reported in case reports.^{4–6}

Case presentation

A 58-year-old man with a known history of hepatitis C treated in 2019 with decompensated liver cirrhosis,

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hepatocellular carcinoma status post transcatheter arterial chemoembolization/radiofrequency ablation (TACE/RFA) and microwave ablation (MWA) with the last chemotherapy session in October 2020, and esophageal varices status post a banding in July 2021 presented to the emergency department at Saint Michael's Medical Center on 26 May 2022 with a chief complaint of abdominal pain and distension that had been worsening over the last few days. The patient has a history of recurrent ascites with build-up occurring every 5 to 7 days, causing abdominal discomfort and early satiety. The patient had been frequently going to various hospitals with similar complaints. The patient last had a therapeutic paracentesis performed 4 days prior at a different institution. At that time, 2200 mL of cloudy fluid was removed with paracentesis. The patient had outpatient paracentesis with interventional radiology scheduled, but he came to our hospital when he experienced discomfort between the scheduled procedures. The patient has a model for end stage liver disease with sodium (MELD-Na) score of 15 and is Child-Pugh Class B. The patient is not a candidate for liver transplant due to poor social support. The patient was initially diagnosed with hepatocellular carcinoma in 2020 and was treated with TACE/RFA with final chemotherapy treatment in October 2020; however, after 2 years of remission, the patient was found to have a new lesion in the liver which was treated with MWA in April 2022. On admission, the patient was found to have signs of ascites on physical examination, including distended abdomen, positive shifting dullness and positive fluid wave. The patient had no signs of hepatic encephalopathy, no scleral jaundice and no asterixis on physical examination. For therapeutic purposes, as well as to rule out spontaneous bacterial peritonitis in the setting of known liver cirrhosis with abdominal pain, the patient underwent an abdominal paracentesis. For the paracentesis, an ultrasound was used to find a pocket of fluid in the peritoneal cavity and a needle was placed through the right lower quadrant, above the inguinal ligament. During the procedure, 2000 mL of ascitic fluid was removed. The fluid was described as turbid, with 104 white blood cells (WBCs)/mm³ and 979 red blood cells (RBCs)/mm³. The total neutrophil count in the fluid was 8, which ruled out spontaneous bacterial peritonitis. The serum ascitic albumin gradient (SAAG) was 1.9. The total protein in the fluid was 1 (Table 1). These findings are consistent with liver cirrhosis. After the paracentesis, the patient remained hemodynamically stable with no complaints and was discharged home. Later in the evening, approximately 12 h after the paracentesis was performed, the patient presented to the emergency department due to sudden-onset scrotal edema and mild penile edema (Figure 1). The patient was admitted to the hospital due to scrotal discomfort without signs of infection. The patient denied tenderness, erythema, penile discharge or changes in urinary habits. Patient's laboratory data at that time is provided (Table 1). An ultrasound was done which showed scrotal edema without torsion. The Urology service was consulted and recommended

Table 1. Laboratory values.

Lab	Value	Parameter
Ascitic fluid total protein	1	
Ascitic fluid albumin	0.5	g/dL
Ascitic fluid WBC	104	/mm ³
Ascitic fluid neutrophil percentage	8	%
Sodium	136	136–145 mmol/L
Potassium	4.4	3.5–5.3 mmol/L
Chloride	106	98–110 mmol/L
Bicarbonate	25	20.0–31.0 mmol/L
BUN	24	6.0–24.0 mg/dL
Creatinine	1.4	0.5–1.0 mg/dL
AST	35	10–36 U/L
ALT	25	9–46 U/L
Alkaline phosphatase	92	40–115 U/L
Serum albumin	2.4	3.6–5.1 g/dL
Total bilirubin	1.2	0.2–1.2 mg/dL
Serum protein	5.8	6.4–8.4 g/dL
WBC	3.70	4.4–11.0 × 10 ³ /μL
Hemoglobin	10.3	13.5–17.5 g/dL
Hematocrit	30.2	38.8%–50.0%
MCV	102	81.2–95.1 fL
Platelet	103	150–450 × 10 ³ /μL
PT	14.4	10.6–12.9 s
INR	1.23	0.91–1.1

WBC: white blood cell; BUN: blood urea nitrogen; AST: aspartate aminotransferase; ALT: alanine aminotransferase; MCV: microcytosis; PT: prothrombin time; INR: international normalized ratio.

that the patient be treated conservatively with continuation of his oral diuretic therapy, including furosemide 40 mg daily and spironolactone 50 mg daily, as well as supportive measures such as scrotal elevation. Unfortunately, the patient was unable to tolerate higher doses of diuretic therapy that otherwise would have been ideal due to low blood pressure. The patient also takes midodrine 10 mg three times a day for blood pressure support. Over the course of 2 days at his usual diuretic dosing, the patient's scrotal and penile swelling significantly improved (Figure 2). The patient was able to be discharged with no further complications. The patient was informed to follow up with his hepatologist and to follow up with interventional radiology outpatient for further scheduled outpatient paracentesis.

Discussion

A paracentesis is a common procedure used to remove fluid from within the peritoneal cavity for either diagnostic or therapeutic purposes. A paracentesis can be performed safely by any clinician who has received proper training.^{7,8} The diagnostic evaluation of ascites includes an assessment of its cause by calculating the SAAG and the exclusion of complications, for example, spontaneous bacterial peritonitis.⁹ Abdominal paracentesis is a simple bedside procedure in

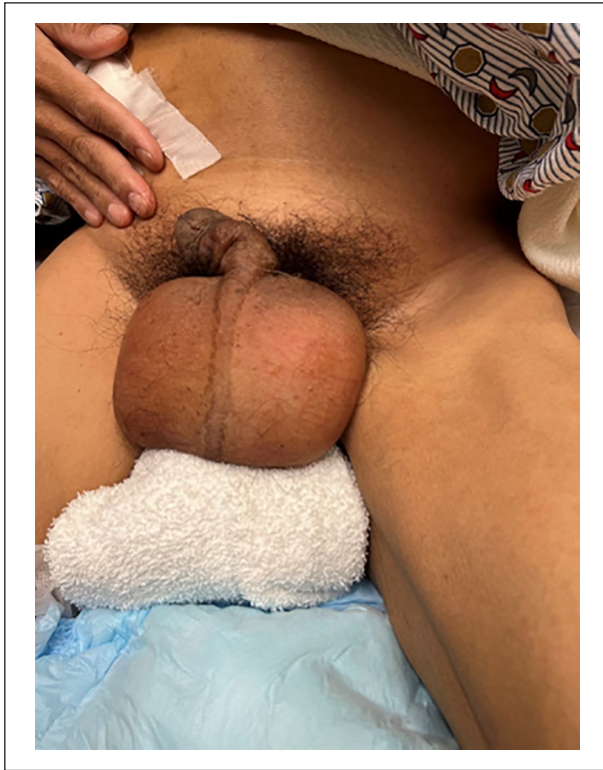


Figure 1. The patient presents with significant scrotal swelling approximately 12 h after paracentesis.

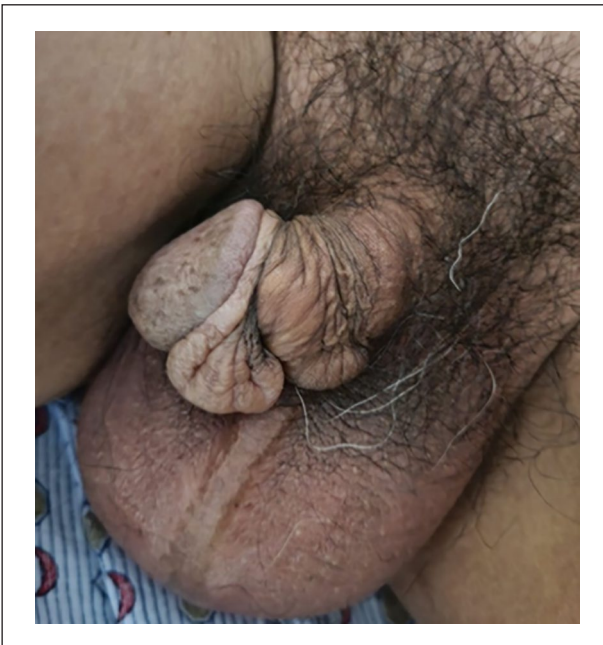


Figure 2. The patient's scrotal swelling improved with the use of oral diuretics as well as scrotal elevation.

which a needle is inserted into the peritoneal cavity, commonly under ultrasound guidance, and ascitic fluid is removed. Serious complications from abdominal paracentesis are

uncommon, but a number of complications have been described, such as ascitic fluid leak, which represents the most common complication,¹⁰ bleeding,^{8,10} bowel perforation, infection and electrolyte imbalance.^{10,11} Mortality after paracentesis is exceedingly rare.^{7,10,12} Paracentesis is typically performed by passing a needle and catheter through the abdominal wall in the left lower quadrant. This location is preferred because the abdominal wall is thinner in the left lower quadrant than at the midline and the pool of ascitic fluid is deeper in the left lower quadrant.¹³ The subumbilical midline in patients with portal hypertension is commonly a vascular area, and therefore should be avoided as it increases risk of post-paracentesis bleeding.¹⁴

Post-paracentesis genital edema, as seen in the patient presented above, is an exceedingly rare complication of the procedure.^{4-6,15,16} The edema can present in the scrotum or the penis in males or in the labia in females.^{4-6,15,16} The proposed mechanism is by the creation of a fistula between the peritoneal cavity and the subcutaneous tissues, with dissection of ascitic fluid between Camper's and Scarpa's fascia downward into the continuous tissues of the scrotum.⁶ Although this complication is not generally life-threatening, it can be bothersome to patients. It can also lead to unnecessary testing and treatments, especially if the treating physician is not familiar with this complication. The management is largely conservative. Patients need reassurance that the swelling usually resolves promptly with the use of oral diuretics and scrotal elevation. As with the patient presented above, over the course of 2 days with oral diuretic therapy and scrotal elevation, the patient's swelling significantly decreased. It is important to note that this complication might recur with future paracentesis procedures.¹⁶ For patients who receive multiple therapeutic paracentesis for recurrent ascites, it is important to educate them on the risk of recurrence.

Conclusion

The presentation of sudden-onset scrotal edema after abdominal paracentesis is a very uncommon complication; therefore, education regarding this potential complication and its preferred method of treatment is important. Physicians should be cautious when inserting the needle for a paracentesis to ensure that they use the proper technique to minimize this complication. Further education on this potential complication can help to mitigate costs and unnecessary testing for patients who present with scrotal edema without signs of infection after having a paracentesis.

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Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

Informed consent

Written informed consent was obtained from the patient for their anonymized information to be published in this article.

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