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Case Report

Transcatheter arterial embolization for postoperative hemorrhage complicating surgical repair of incarcerated umbilical hernia subsequent to Denver peritoneovenous shunting: A case report^{☆,☆☆}

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ABSTRACT

A 50-year-old man with a refractory ascites was inserted a peritoneovenous shunt under local anesthesia. On the fifth postoperative day, abdominal pain occurred and were diagnosed as incarcerated umbilical hernia. Due to unsuccessful manual reduction, emergent hernia repair was performed. Postoperatively, wound bleeding was not controlled, and endovascular treatment was planned because enhanced computed tomography detected arterial extravasations. Bilateral inferior epigastric arteries were embolized with a 33.3% n-butyl-2-cyanoacrylate lipiodol mixture. The patient's symptoms subsequently improved without complications. Patients with refractory ascites develop incarcerated umbilical hernia after the decompression procedure, such as a peritoneovenous shunt. The coagulopathy caused by the Denver peritoneovenous shunt makes perioperative bleeding control difficult. Therefore, physicians should be aware that laparotomy performed after Denver peritoneovenous shunting sometimes requires transarterial embolization for hemostasis.

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Introduction

Refractory ascites is a severe liver cirrhosis condition associated with poor survival [1]. Peritoneovenous shunt is one of the treatment options for refractory ascites [2]. However, complications, such as disseminated intravascular coagulation, sepsis, and heart failure, still occur. Here, we report an intractable surgical site bleeding requiring transarterial embolization after an emergent surgical repair for incarcerated umbilical hernia after the Denver peritoneovenous shunting [3].

Case report

A 50-year-old man with a history of alcoholic cirrhosis and refractory ascites lasting for one year had undergone treatment for ascites with diuretics, large-volume paracentesis, and cell-free and concentrated ascites reinfusion therapy for 6 months. He was referred to our department for further intervention. Because transjugular intrahepatic portosystemic shunt (TIPS) has not been covered by the health insurance in Japan, Denver peritoneovenous shunting was performed. Liver function data were as follows: aspartate aminotransferase, 26 IU/L; alanine aminotransferase, 14 IU/L; total serum bilirubin, 1.35 g/dL; serum albumin, 2.4 g/dL; prothrombin time and international normalized ratio, 1.32. His Child–Pugh score was 9 (Grade B). The ascites data were negative leukocytes and bacteria, and albumin of ascites of 3.72 g/dL.

Based on the previously reported method, a Denver shunt (Mihama Medical; Inc, Tokyo, Japan) was inserted with an ascites replacement by normal saline solution [4]. The chamber was placed on the right lower rib cage. Through a subcutaneous tunnel, the venous catheter was pulled out through a small incision on the upper chest wall and inserted into the right subclavian vein, with a 12-F peel away introducer, under ultrasonography and fluoroscopy. The peritoneal catheter was inserted into the abdominal cavity using a 16-F peel-away introducer. This operation was performed without any complication, and the ascites was significantly reduced.

Although the postoperative course was uneventful, the coagulation panel showed elevated D-dimer (128.5 [normal range, <0.99] $\mu\text{g/mL}$), fibrin, and fibrinogen degradation products (253.2 [normal range, <5] $\mu\text{g/mL}$) and decreased fibrinogen and platelet levels (191 [normal range, 200–400] mg/dL) on the second postoperative day.

On the fifth postoperative day, the patient complained of nausea and abdominal pain. Computed tomography (CT) showed umbilical hernia (Fig. 1), which seemed to be incarcerated and difficult to reduce manually. Hernioplasty was performed using the mesh-plug method. The incarcerated loop of the small bowel was ischemic but viable, and no resection was required; however, surgical site bleeding was difficult to control intraoperatively. After the intensive care unit (ICU)

admission, bleeding from surgical site and the inserted drainage continued. The patient required a continuous blood transfusion to maintain hemodynamic stability.

Enhanced CT detected an abdominal wall hematoma due to arterial extravasations at the surgical site (Fig. 2). Due to the risk of re-operation, endovascular treatment was performed. Using a transfemoral approach, selective catheterization of the inferior epigastric artery (IEA) was performed, and showed bilateral IEA active bleeding. Therefore, bilateral IEA embolization was performed using 33.3% n-butyl-2-cyanoacrylate (NBCA) lipiodol mixture (Fig. 3), to achieve complete hemostasis. After the procedure, the patient was transferred to the post-operative ICU. The patient's clinical parameters improved, and he was discharged 21 days after the Denver peritoneovenous shunting.

Discussion

We managed a case of incarcerated umbilical hernia after Denver peritoneovenous shunting, and trans arterial embolization was required for postoperative hemostasis.

Patients with ascites secondary to cirrhosis have a 20%–24% risk of developing umbilical herniation [5]. In these patients, ascites decompression using TIPS or peritoneovenous shunting decreases the tension and diameter of the hernia ring, resulting to incarcerated umbilical hernia [5,6]. A physician should consider incarcerated umbilical hernia when patients complain of abdominal discomfort or nausea after Denver peritoneovenous shunting.

One of the major adverse events of peritoneovenous shunting is post-shunt coagulopathy [3]. The Disseminated Intravascular Coagulation with clinical symptoms was observed in 5.3% of patients who underwent Denver peritoneovenous shunting for cancer ascites, whereas asymptomatic laboratory coagulation panel abnormalities were observed in 27.8% of patients [3]. Coagulopathy caused by Denver peritoneovenous shunting is thought to be caused by increased coagulation activity due to a the direct inflow of coagulation factors and endotoxin in ascites into the blood [7]. Physicians should recognize that hemostasis of the invasive procedure could be difficult immediately after the peritoneovenous shunting even asymptomatic patients.

Several studies have shown that emergency surgery is generally associated with higher morbidity and mortality risks than elective surgery, particularly in patients with liver cirrhosis [8]. Furthermore, the presence of coagulopathy is associated with higher mortality among decompensated cirrhosis. Based on these reports, patients who develop incarcerated umbilical hernia immediately after the Denver shunting could have a poor prognosis. Therefore, some reports recommended repairing the umbilical hernia before TIPS or Denver peritoneovenous shunting [6]. However, patients already being considered for Denver shunt placement are at high perioperative risk due to advanced liver dysfunction and a high recurrence



Fig. 1 – Computed tomography performed on the fifth postoperative day showed incarcerated umbilical hernia (arrow).



Fig. 2 – Selective angiography showed extravasation from left inferior epigastric artery (arrow).

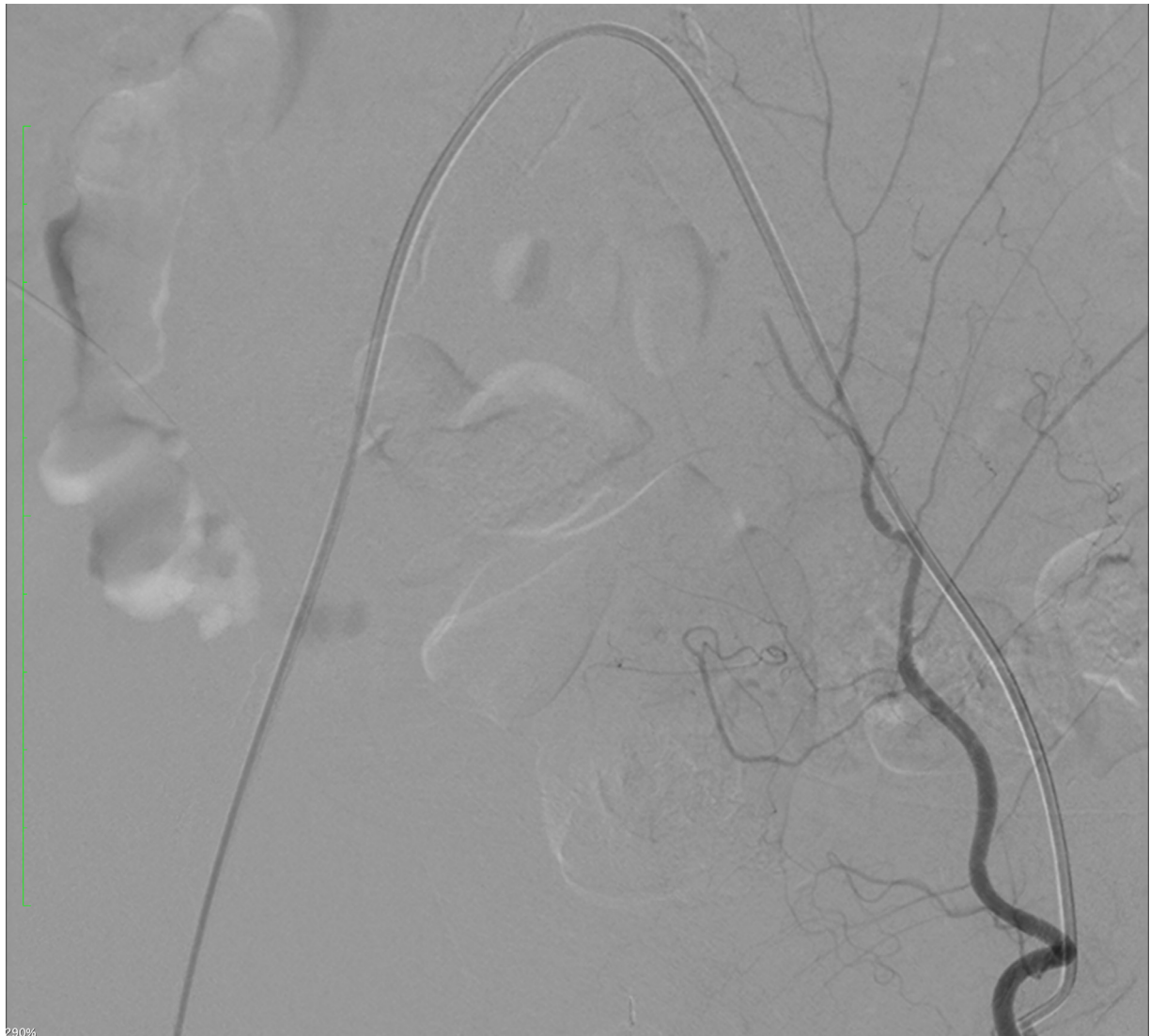


Fig. 3 – Transarterial embolization after 33.3% n-butyl-2-cyanoacrylate lipiodol mixture.

rate. Therefore, the proper timing of umbilical hernia repair remains unclear.

In this case, a patient with refractory ascites due to cirrhosis had incarcerated umbilical hernia during the coagulopathy, which developed after the Denver peritoneovenous shunting, and thus, trans arterial embolization was required for arterial bleeding after surgical repair. NBCA has been a suitable embolic material for this case because it is a permanent embolic material with the potential for immediate hemostasis independent of coagulation factors [9]. Endovascular therapy should be considered when experiencing difficulties in maintaining the hemostasis of surgical procedures after peritoneovenous shunting.

In summary, the umbilical hernia was incarcerated after Denver peritoneovenous shunting, and required trans arterial embolization for postoperative hemostasis. Therefore, the possibility of postoperative hemostatic difficulty due to the occurrence of coagulopathy immediately after Denver peritoneovenous shunting and the use of consider endovascular therapy as a hemostatic option should be considered

Patient consent

Informed consent for publication has been obtained from the patient.

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