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Superselective transcatheter arterial embolization of iatrogenic inferior epigastric artery after paracentesis: Unusual manifestation of hemoperitoneum

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ABSTRACT

INTRODUCTION: Paracentesis is a safe procedure and can be performed as a therapy or diagnosis in cancer patients, liver cirrhosis, heart or liver failure.
PRESENTATION OF CASE: 59-year-old man with alcoholic liver cirrhosis with ascites and coagulation abnormalities. After diagnostic paracentesis he presented hemodynamic instability with signs of hypovolemic shock and hemoperitoneum. Computed angiotomography with signs of active bleeding and pseudoaneurysm at the site of paracentesis.
DISCUSSION: The interventional radiology unit was referred and submitted to arteriography, which demonstrated active bleeding from the left lower epigastric artery. It was successfully treated by transcatheter embolization with 100–300 μm PVA particles.
CONCLUSION: Transcatheter embolization with PVA particles is a fast, safe, minimally invasive, reliable method with a high technical success rate for the treatment of active bleeding resulting from injury to the lower epigastric artery.

1. Introduction

The lower left quadrant of the abdomen is the most commonly used site for paracentesis [1]. Therapeutic paracentesis is considered safe procedure and is performed commonly for the control of massive ascites in patients with liver cirrhosis with a 1% overall complication rate [2]. Hepatopathies may present collateral circulation and coagulopathy, that increase the chance of bleeding during paracentesis. Acute hematoma in the anterior abdominal wall due to hemorrhage of the inferior epigastric artery (IEA) is an uncommon cause of abdominal pain and frequently self-limiting. The fail in the diagnostic can lead to life-threatening complications in patients with comorbidities [3]. The objective of the case report is to describe an unusual event of hemoperitoneum and the efficacy in transcatheter embolization for bleeding from the IEA. Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

2. Case report

Patient 59 years old man, cirrhotic by alcohol CHILD B9 and MELD 17 with regular general condition, ascites, pale, tachycardic, tachydyspneic, jaundice, afebrile, with worsening renal function. Laboratory findings showed white blood cells 4730, Hemoglobin 10 g / dL, platelets 83,000 / mm3, INR (international normalized ratio) 1,86; Na + 135 mEq / L; K + 4.4mEq / L; aspartate aminotransferase 69 IU / L; total bilirubin 9.6 mg / dL; direct bilirubin 3.6 mg / dL; albumin 2.5 g / dL; urea 30 mg / dl. A physician performed a left lower quadrant therapeutic paracentesis with an 18 gauge needle without image guidance. Manual compression was applied to the puncture site. After paracentesis, the patient complains of worsening abdominal pain and left wall hematoma associated with hypotension and worsening tachycardia. Contrast-enhanced abdominopelvic computed tomography scan was carried and revealed extravasation of the contrast from the IEA. (Fig. 1: A and B) Patient referred to the interventional radiology unit and angiography was performed by puncturing the common right femoral artery. Pelvic arteriography was performed and bleeding was identified from the left lower epigastric artery. For microcatheterization of the lower epigastric artery was used catheter Progreat 2.8 (Terumo) and embolization was performed with PVA 100–300 μm. (Fig. 2: A and B) The endpoints of the embolization was considered complete when no further extravastion of contrast after embolization of the IEA. (Fig. 3) A successful procedural outcome was defined by the return

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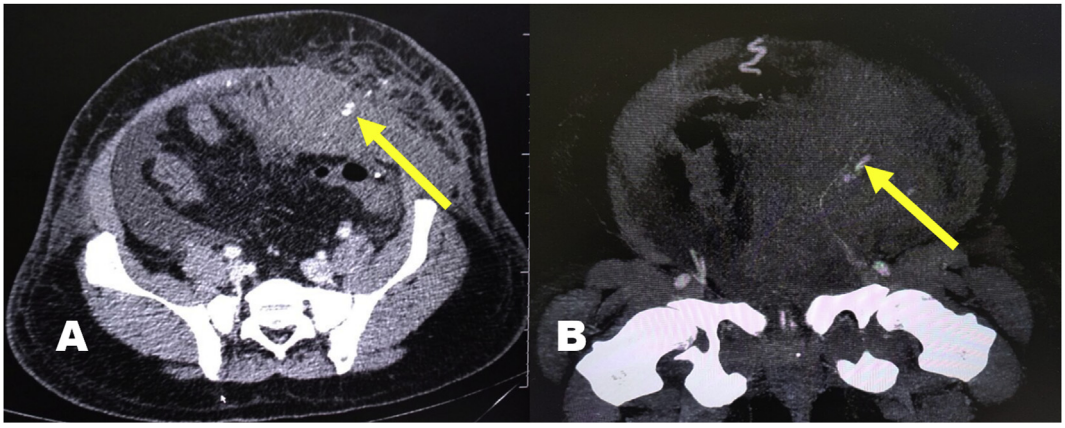

Fig. 1. A: Contrast-enhanced abdominal CT scan obtained after paracentese reveals ascites and focus of extravasation of the contrast medium in the left lower. (yellow arrow) B: Reconstruction of abdominal computed tomography angiography with a focus on extravasation of the contrast medium in the lower left. (yellow arrow).

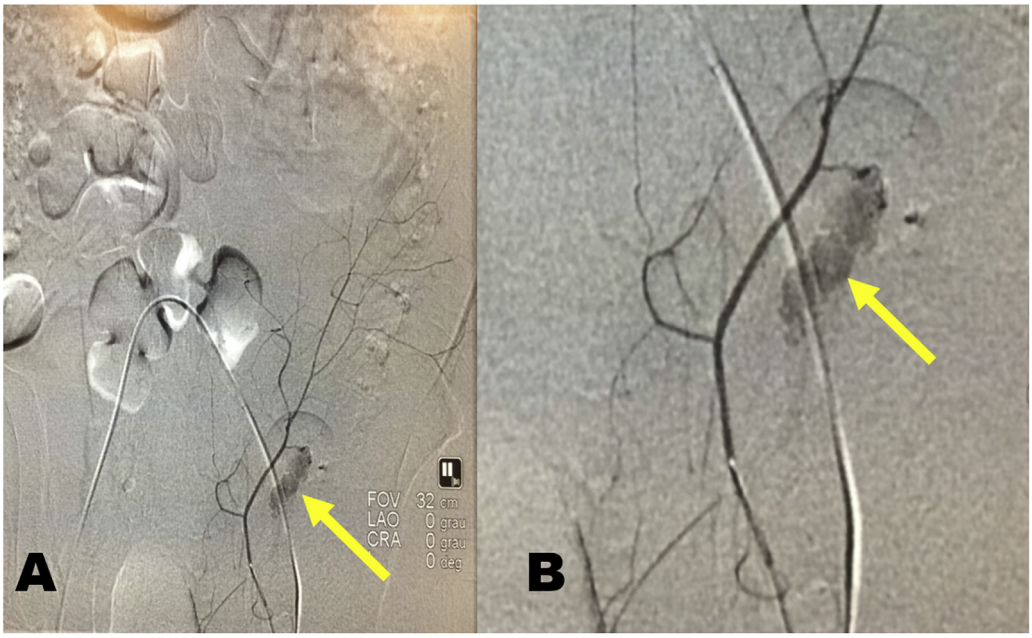

Fig. 2. A: Angiography carried out after selective catheterization with a microcatheter of the left inferior epigastric artery shows active hemorrhage with extravasation of contrast. (yellow arrow) B: Angiography carried out after super selective catheterization with a microcatheter of the left inferior epigastric artery with active hemorrhage. (yellow arrow).

of hemodynamic stability and the stabilization of hematocrit. The work was reported according to the Consensus Surgical CAse REport (SCARE) Guidelines, International Journal of Surgery 2018 [4].

3. Discussion

The treatment of ascites in liver disease is clinical with diuretics and salt restriction. Paracentesis is a treatment option in advanced stage of cirrhosis, in general is a safe, minimally invasive, especially when performed using sonographic guidance. The lower left quadrant of the abdomen, 4–5 cm medial to the upper anterior iliac spine, is the most common site for the procedure [5]. As a result of its anatomy, the IEA may potentially be traumatized during percutaneous procedures in until 40 %.

Besides, there are others etilogies of injury to the IEA, including inadvertent puncture during common femoral artery catheterization, placement of peritoneal dialysis catheters, surgical trauma including the use of sutures in the abdominal wall (15 %), blunt trauma (10 %), subcutaneous injection (5%), stabbing (5%) [6,7].

Patients with a normal coagulogram rarely experience complications such as bleeding and when the endovascular technique occurs it can be a treatment option. The use of ultrasound is able to reduce adverse events during paracentesis, for example, (1.4 % vs 4.7 %, $p < 0.0004$), post-paracentesis infection (0.41 % vs 2.44 %, $p < 0.001$), hematoma (0.0 % vs 0.87 %, $p < 0.01$), and seroma (0.14 % vs 1.05 %, $p < 0.03$) [8]. Lesion of the lower epigastric artery usually appears as a hematoma in the abdominal wall, abdominal pain and a drop in hematimetry.

Diagnosis can be based on the combination of patient history, physical examination, ultrasonography, and contrast-enhanced computed tomography Computed tomography (CT) with contrast has been reported to be an accurate, noninvasive technique for identifying arterial hemorrhage in patients with blunt abdominal or pelvic trauma with sensitivity and specificity of the 70 % and 100 %, respectively [9]. Angiotomography may be useful to lateralize a suspected IEA before angiography. The presence of the extravasation of contrast material on contrast-enhanced CT can suggest the presence of arterial injury that will require treatment. For patients

Fig. 3. Angiogram shows complete occlusion of the left inferior epigastric artery after embolization with PVA 100-300 μm without extravasation of contrast. (red arrow).

with chronic renal failure with high levels of creatinine or who are allergic to contrast, Doppler ultrasound may be an alternative in the diagnosis of active bleeding.

There are various options of treatment of injury IEA such as surgery, transcatheter embolization, ultrasound-guided thrombin injection and ultrasound-guided compression [5].

Lesions of the lower epigastric artery, endovascular techniques are preferable, especially in patients with portal hypertension, liver failure and coagulopathy. Our option was to perform embolization with PVA, as this technique has less morbidity and mortality and it would be possible to perform it with local anesthesia.

There are various endovascular therapeutic options including embolization with polyvinyl alcohol (PVA), gelfoam, coils, autologous coagulum, and n-butyl cyanoacrylate, Onix or associated combinations [10]. Our interventional radiology department has no standard protocol for embolization of active hemorrhages of IEA. The use of embolization materials at our department is still solely based on the interventional radiologist personal experience and individual case decision.

In conclusion, hemoperitoneum is a rare complication in paracentesis, which can be severe in patients with advanced liver cirrhosis. The use of ultrasound has been shown to reduce complications inherent to parecentesis. The endovascular approach with superselective embolization is a safe, effective and definitive procedure in lesions of the lower epigastric artery, especially in cirrhotic patients.

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request

Declaration of Competing Interest

The author declare no conflict of interest in preparing this article.

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Ethical approval

Case reports are not required to be approved by the institution's ethics committee.

Consent

The document is attached.

Author contribution

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