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Case Report

Inferior epigastric artery injury after percutaneous imaging-guided peritoneal dialysis catheter placement[☆]

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ABSTRACT

Inferior epigastric artery (IEA) injury is a rare clinical entity that is usually associated with abdominal wall procedures and injuries though can also be spontaneous, particularly in individuals with coagulopathy. Of all described mechanisms of injury, percutaneous peritoneal dialysis (PD) catheter insertion is a rarely encountered, particularly in instances where insertion is performed under imaging guidance. While this injury is self-limited, it can be associated with hemodynamic instability and acute blood loss anemia, which can be fatal if left untreated. Computed tomographic (CT) angiography is the diagnostic method of choice. Transcatheter arterial embolization is an effective treatment modality with a high success rate. Here, we describe a 41-year-old female who underwent percutaneous PD catheter insertion that, despite intraprocedural imaging guidance, was complicated by large hemoperitoneum and clinical instability. Prompt identification of IEA injury followed by immediate intervention with coil embolization led to a successful outcome for this patient in the setting of a life-threatening uncommon complication of such procedure. The details of the diagnostic evaluation and management are outlined.

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Introduction

Inferior epigastric artery (IEA) injury is a rare entity that is often iatrogenic in nature following abdominal wall interventions, though occasionally spontaneous, seen more commonly among patients with underlying coagulopa-

thy [1–3]. Several mechanisms have been reported describing IEA injury including paracentesis, caesarean section, laparotomy, femoral artery catheterization, percutaneous drain placement, subcutaneous injection, stabbing, and blunt trauma [4,5]. However, IEA injury during percutaneous peritoneal dialysis (PD) catheter insertion is rarely encountered and can be associated with large hemorrhage

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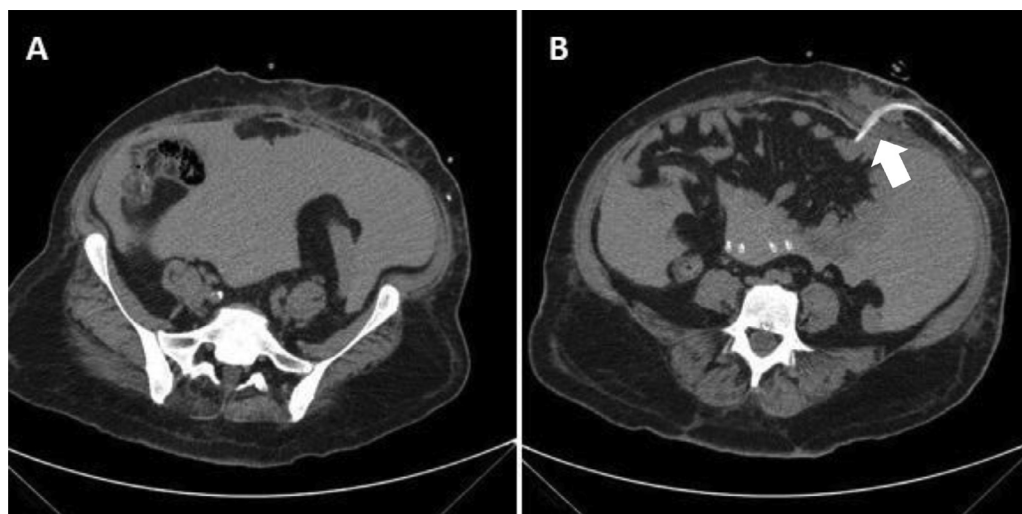


Fig. 1 – CT abdomen/pelvis revealing large hemoperitoneum (A, B). Presence of newly placed PD catheter (arrow) (B).

and hematoma formation within the rectus sheath [2]. Bleeding within the peritoneal cavity can lead to severe inflammatory reaction and consequent extensive adhesions that could compromise the function of the peritoneum during dialysis [6]. Although most of these injuries are self-limited, IEA injuries can be potentially life-threatening if not identified early and managed promptly [4].

Several modalities have been used for diagnosing IEA injury including Doppler ultrasound, CT angiography, and arterial angiography. CT angiography is the diagnostic method of choice if no contraindications exist [7]. Therapeutically, transcatheter embolization is an effective treatment modality, with an overall success rate reported to be around 90%. [1,4] Due to its life-threatening potential, it is imperative to recognize this risk after PD catheter placement and to treat it accordingly. Here, we describe a case of 41-year-old female who underwent PD catheter placement under fluoroscopy and ultrasound guidance in the setting of advanced chronic kidney disease (CKD) and volume overload. Postprocedurally, the clinical course was complicated by abdominal pain, hemodynamic instability, and acute blood loss anemia, and the patient was found to have IEA injury on selective arteriogram.

Case report

A 41-year-old female with long history of idiopathic pulmonary hypertension, systolic and diastolic heart failure, atrial flutter on chronic oral anticoagulation, and advanced CKD with baseline creatinine of 6.6 mg/dL presented with severe dyspnea, chest discomfort, and volume overload that was resistant to diuretic therapy. Right heart catheterization demonstrated elevated right sided pressures with a mean pulmonary wedge pressure of 26 mmHg. Baseline laboratory work up revealed: hemoglobin 9.2 g/dL, platelet 98,000 mm³, INR 1.16, and blood urea nitrogen 42 mg/dL. Due to diuretic resistance and worsening clinical symptoms, urgent renal replacement therapy was indicated, and the patient favored peritoneal dialysis over alternative dialysis modalities. In view

of her multiple comorbidities and the associated high risk of general anesthesia, the decision was to proceed with percutaneous PD catheter placement. Subsequently, a double-cuff 62.5 cm Tenckhoff PD catheter was inserted in the left paramedian position under fluoroscopy and ultrasound guidance. The deep cuff, which was approximately 5 cm lateral to midline and 3 cm below the umbilicus level, was buried through the rectus abdominus muscle using a peel-away sheath and introducer. The initial effluent was blood-tinged that was cleared with dialysate flush. Within 3 hours after PD catheter insertion, the patient developed acute onset abdominal pain, hypotension, and tachycardia associated with syncope. Physical exam showed moderate distress, distended abdomen with generalized tenderness, and tachycardia with irregular rhythm at 130 beats per minute. Further, repeat blood work up showed a sudden drop of hemoglobin level from 9.2 to 4.7 g/dL. Subsequently, the patient was resuscitated with intravenous fluids and required 4 units of packed red blood cells and 2 units of fresh frozen plasma. Noncontrast CT imaging of the abdomen was consistent with hemoperitoneum (Fig. 1).

Using the right femoral artery, a selective angiography of the left IEA revealed an active extravasation at the level of PD catheter entry site. After identification the source of bleeding, a transcatheter arterial coil embolization using microcoils and gel foam was performed, and no further extravasation was detected on the final angiography (Fig. 2). The patient remained hemodynamically stable and required no further intervention. Notably, during the initiation of the peritoneal dialysis therapy on the second day, a total of 4 liters of bloody fluid were drained before the PD fluids cleared of blood. The patient was discharged home a few days later in a stable condition tolerating PD therapy.

Discussion

IEA injury is commonly iatrogenic in nature, encountered mainly in abdominal wall interventions and especially among patients with end stage liver disease and those who are on

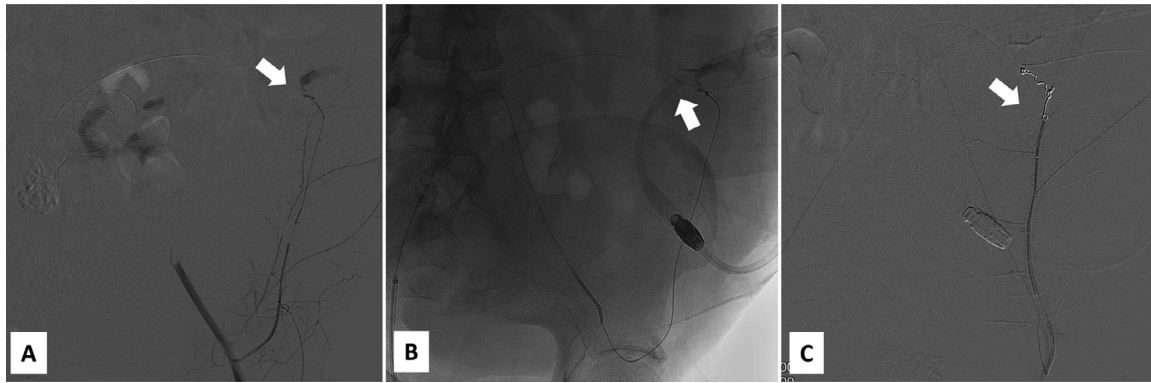


Fig. 2 – Selective arteriography revealing active extravasation of the left inferior epigastric artery (A) at the level of the peritoneal dialysis catheter insertion site (B). Coil embolization of the bleeding branch of the left inferior epigastric artery (C).

chronic anticoagulants [1,4]. This is supported by the data presented by Sobkin et al, in a case series of 20 patients with IEA injury in which the majority of these instances were iatrogenic in patients with coagulopathy [4].

The occurrence of IEA injury is rarely reported in the setting of PD catheter placement, especially when percutaneous fluoroscopic guided method is used. In fact, a moderate-size PD program in Michigan reported only 3 cases of IEA injury as a complication of 136 percutaneous PD catheter placement cases spanning 5 years [1]. Further, Allon et al reported two cases of peritoneal bleeding in a series of 154 percutaneously inserted PD catheters [8]. Importantly, in both studies, PD catheters were inserted blindly with no ultrasound guidance [1,8]. While the bleeding complication rate is low in percutaneous PD placement approach, this rate was approximately 2% in 263 patients who underwent surgical placement of PD catheter [5]. Most of the bleeding cases encountered in the surgically placed PD catheters were associated with coagulopathy or thrombocytopenia [5]. In comparison, the IEA was injured in our case despite the use of both ultrasound and fluoroscopy guidance. We speculate that one of the IEA branches was lacerated by the inserted PD catheter. This speculation is based on the observations that IEA is approximately 4.5 cm from the midline at the umbilicus level and has on average 3.3 branches arising from its lateral aspect [9]. In addition, our patient had advanced CKD that is usually associated with platelet dysfunction and subsequent increased risk for bleeding [10].

Contrast enhanced computed tomography remains the modality of choice for diagnosis. In patients with moderate CKD, Doppler ultrasound or noncontrast CT can be utilized [4,5,7]. Importantly, if CT and Doppler ultrasound are negative and the clinical suspicion is high, a selective arterial angiography is indicated to rule out IEA injury. [4] Transcatheter embolization using different agents is an effective therapy in controlling IEA bleeding with a high success rate [4,11].

In conclusion, IEA injury is a rare complication seen after percutaneous fluoroscopically guided PD placement. The diagnosis is usually made on clinical grounds and confirmed with imaging. This complication can be serious and potentially life-threatening, especially in coagulopathic conditions

and, therefore, requires a high index of suspicion to prevent unfavorable outcomes.

Informed consent

An informed consent was obtained from the patient for all procedures and images according to the institution policies and regulations.

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