

Percutaneous Embolization of a Portal Venous Pseudoaneurysm

Background

Portal vein pseudoaneurysms (PSA) are rare occurrences, with few cases described in the literature. Causes of described cases include iatrogenic post-ERCP [1], blunt trauma [2], or as a complication of pregnancy [3]. Typically, a portal vein PSA erodes into the biliary system, causing hemobilia [1-3]. Treatment includes surgical ligation [2,3] or via trans-hepatic embolization [1].

Direct erosion of a portal vein PSA into the duodenum is an exceedingly rare occurrence, with only one case described in the literature [4]. In the case described, the PSA is a post-operative complication after pancreaticoduodenectomy, and was treated surgically with vein patch, in conjunction with endovascular angiography.

Endoscopic, surgical, and endovascular management of a portal vein PSA may be extremely difficult. Endoscopic methods of PSA treatment are limited by patient anatomy and vessel accessibility via endoscopy. Endovascular techniques may similarly be limited, as access to the portal venous system may be complicated by post-surgical anatomy or diminutive vein size. Open surgery may be complicated by peri-operative risk. In these cases, a direct percutaneous approach to PSA embolization may be considered. Here we describe a case where a percutaneous approach was utilized to help control persistent UGI bleed in a patient with portal venous PSA eroding into the duodenum.

Case

A 65 year old male with admitted for GI bleed was found to have a bleeding duodenal ulcer. Endoscopic clipping failed to control the bleed. A CTA demonstrated a chronic Proper hepatic artery occlusion with no evidence of bleeding from either the superior mesenteric artery or collaterals. Repeat CT suggested portal vein erosion into the duodenum. Exploratory laparotomy with ligation of the liver hilum and a Gortex jump graft from the superior mesenteric vein (SMV) to portal vein was performed. Due to persistent melena with anemia, a repeat CTA was performed, identifying a pseudoaneurysm at the ligated portal vein site (Fig 1). Interventional radiology was consulted for management of portal vein pseudoaneurysm.

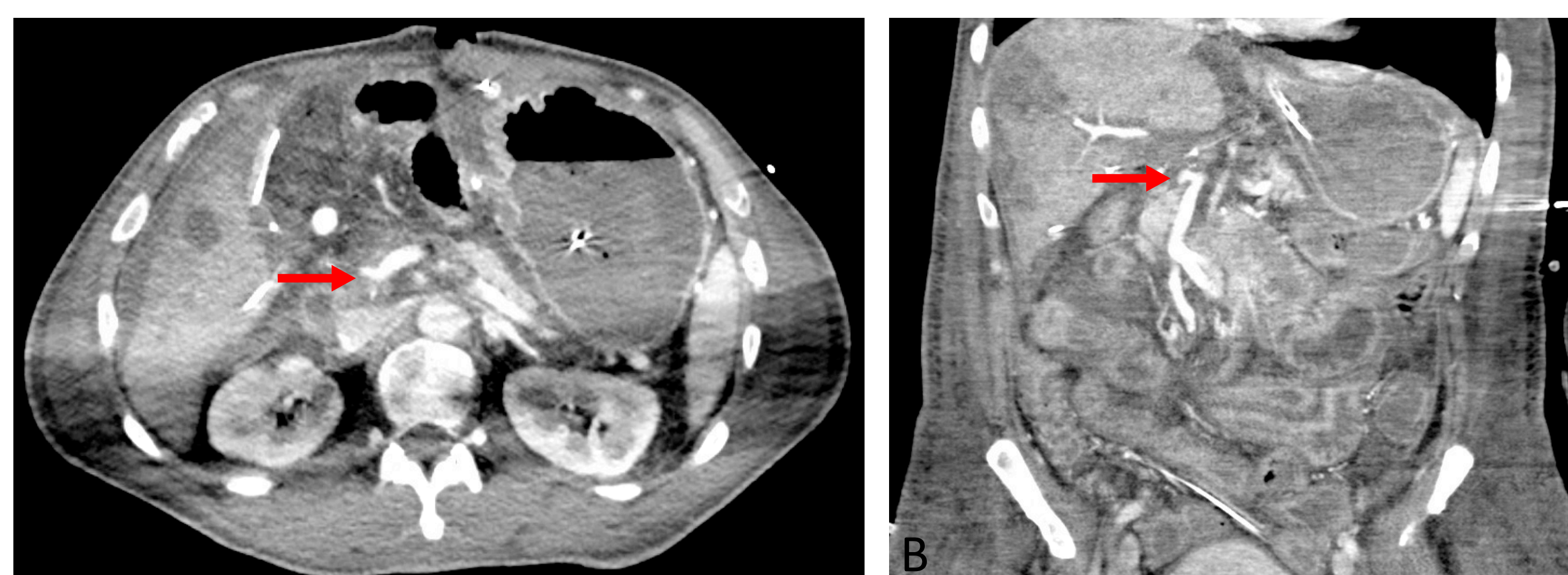


Fig 1: CT Angiogram of the abdomen pelvis in axial (A) and coronal (B) views demonstrate a round hyperenhancing focus adjacent to the ligated SMV measuring 7 mm in greatest dimension, consistent with pseudoaneurysm

Intervention

Mesenteric angiography was performed to exclude additional sources of bleeding. Selective catheterization of the splenic artery with a 2.7-Fr Progreat (Terumo, Tokyo, Japan) microcatheter demonstrated flow into the splenic vein, inferior mesenteric vein (IMV) and SMV, with flow noted through the Gortex jump graft (Fig 2A).

Transsplenic access into the portal system was ruled out, as the spleen was atrophic. Direct percutaneous access was obtained into the SMV with a 21G Chiba needle, with the use of intravascular ultrasound introduced via the IVC to aid needle guidance into the SMV (Fig 2B). A 2.6-Fr CXI catheter (Cook Medical, Bloomington, IN) was advanced into the distal SMV, and an Azure coil 8 mm x 26 cm (Terumo, Tokyo, Japan) was used to embolize the distal SMV (Fig 2C).

A venogram was then performed, which demonstrated residual flow within the pseudoaneurysm. A second direct percutaneous access into the pseudoaneurysm was then obtained with a 21G Chiba needle via fluoroscopic guidance, using the previously placed coil as a fiducial. Once placement of the Chiba needle within the pseudoaneurysm was confirmed with contrast (Fig 2C) no significant filling was noted. Repeat venogram demonstrated no residual filling of the pseudoaneurysm (Fig 2D).

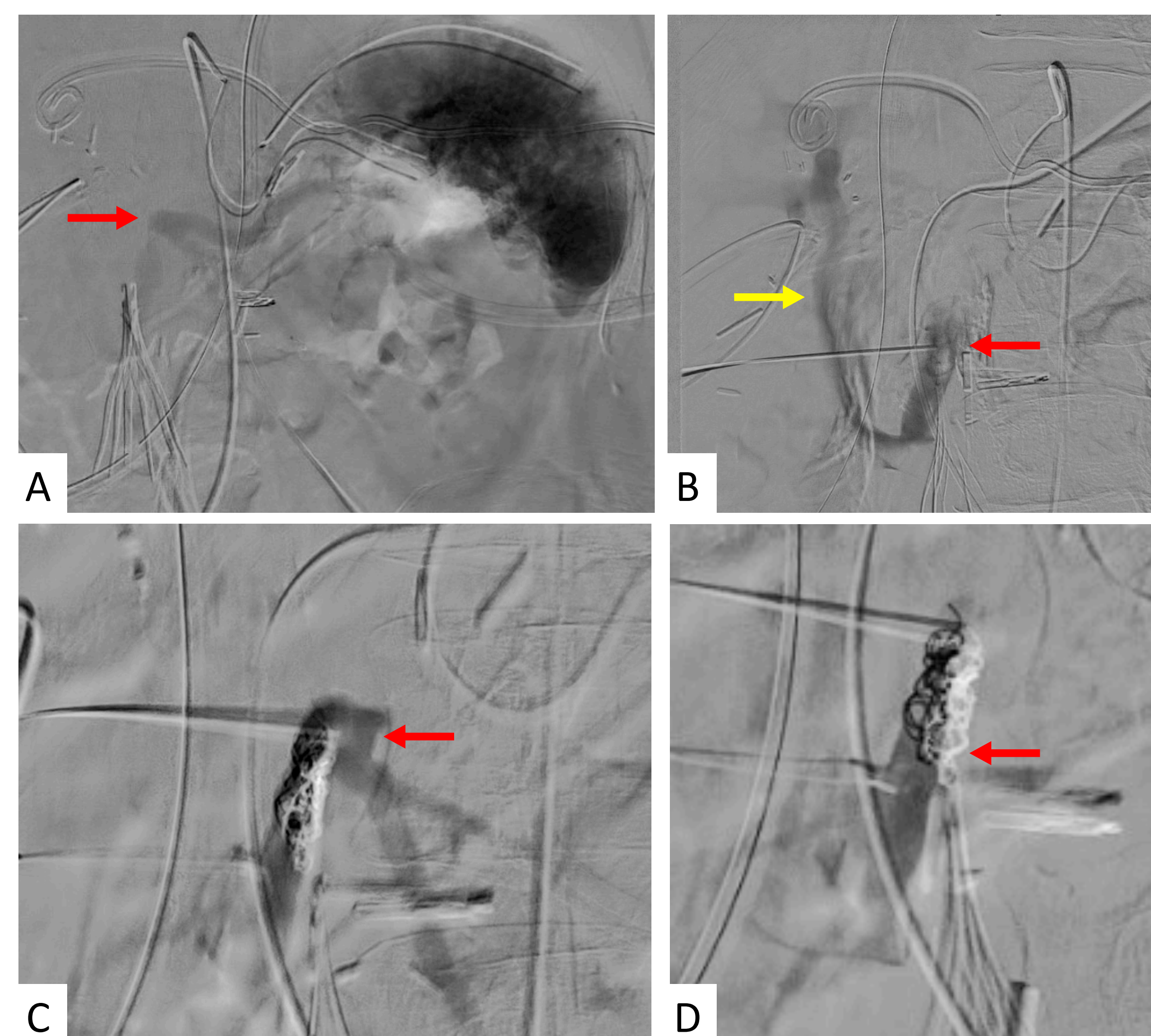


Fig 2: (A) Portal venous phase delayed images of celiac artery angiogram demonstrating splenic vein and SMV at the ligated SMV site (red arrow). (B) 21G Chiba needle introduced percutaneously into the SMV with contrast opacifying the ligated SMV site (red arrow) and portal vein graft (yellow arrow). (C) Contrast injected via a second 21G Chiba needle superior to the SMV coil mass demonstrates filling of the PSA and SMV/splenic vein confluence. (D) Contrast injected via the initial Chiba needle demonstrates non-filling of the PSA proximal to the coil mass.

Intervention

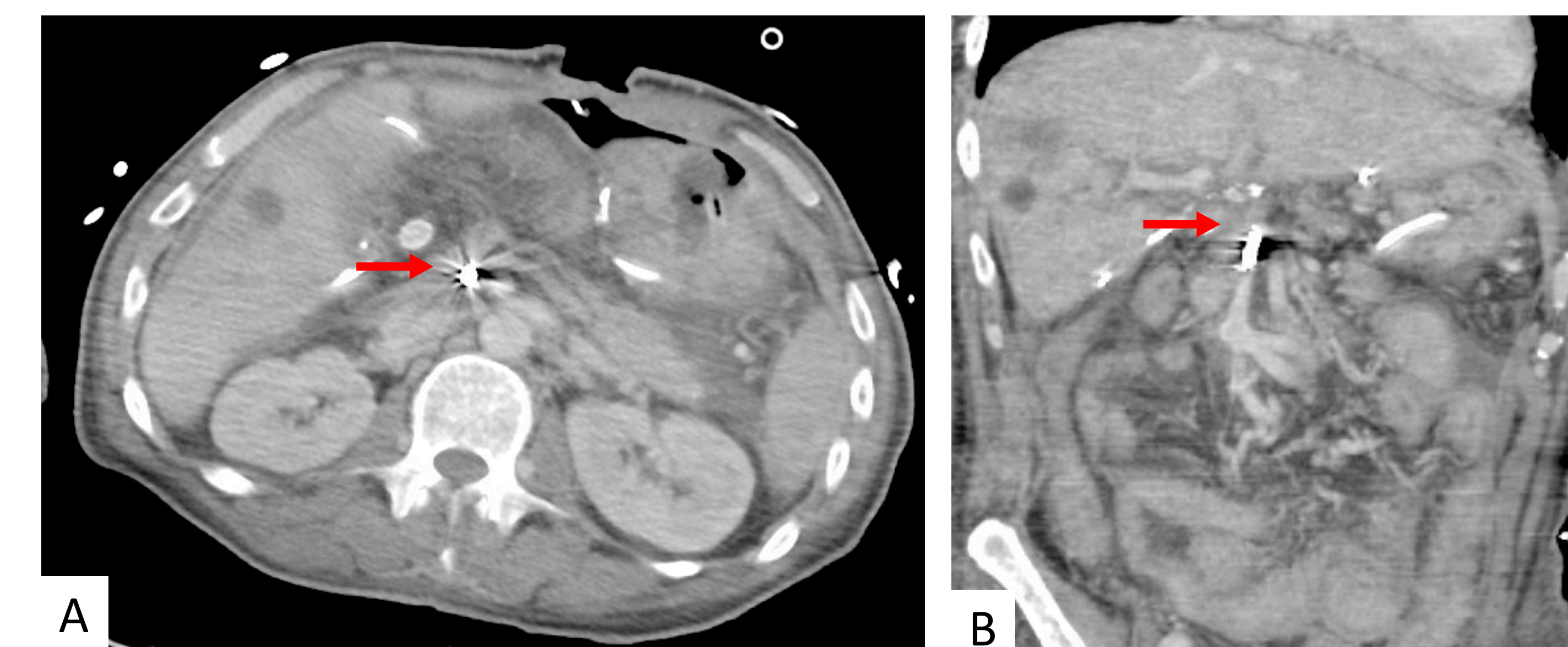


Fig 3: CT of the abdomen and pelvis in axial (A) and coronal (B) views on post-op day 7 demonstrates coil mass in the distal SMV, with non-visualization of the previously noted portal vein pseudoaneurysm

Discussion

Several endovascular methods are available to access the portal venous system, however in this case only direct percutaneous access proved to be a viable approach. Given the surgical ligation of the portal vein, access to the SMV would not be possible through a TIPS approach or percutaneous trans-hepatic access. Consideration could be given for trans-splenic portal venous access, however this patient's atrophic spleen and diminutive splenic vein preclude viable trans-splenic access. Thus percutaneous access provided the most feasible means of accessing the ligated distal SMV.

To our knowledge, this is the first reported case of direct percutaneous access to a portal vein PSA. While this patient's anatomy made direct access the most attractive option, direct percutaneous access of a portal vein pseudoaneurysm may be considered in other scenarios either in conjunction with or as an alternative to endovascular approach. Cases potentially amenable to percutaneous embolization include cases with PSAs with a narrow neck, large PSAs, or PSAs which may be visualized on ultrasound or CT and it is felt that angiography may be deferred [5].

Conclusion

Percutaneous embolization of a portal venous pseudoaneurysm may be suitable instead of, or in conjunction with, an endovascular approach, when there is complex or post-surgical vascular anatomy.

References

- Walton H, Yu D, Imber C, Webster G. Portal vein pseudoaneurysm secondary to pancreatic lymphoma and biliary stent insertion: a rare cause of haemobilia. *CVIR Endovasc*. 2018;1(1):5. doi:10.1186/s42155-018-0011-7
- Wallis A, Rogers T, Pope I, Callaway M. Blunt abdominal trauma - An important cause of portal venous pseudoaneurysm. *J Radiol Case Rep*. 2010;4(5):27-31. doi:10.3941/jrcr.v4i5.368
- Javadrasheed R, Mozafarpour S, Sadramani S, Jalili J, Sepelri B. Pseudoaneurysm of the portal vein as a rare source of gastrointestinal bleeding in pregnancy: a case report. *Gastroenterol Hepatol Bed Bench*. 2012;5(4):213-216.
- Burke CT, Park J. Portal vein pseudoaneurysm with portoenteric fistula: an unusual cause for massive gastrointestinal hemorrhage. *Semin Intervent Radiol*. 2007;24(3):341-345. doi:10.1055/s-2007-985748
- Madhusudhan KS, Venkatesh HA, Gamanagatti S, Garg P, Srivastava DN. Interventional Radiology in the Management of Visceral Artery Pseudoaneurysms: A Review of Techniques and Embolic Materials. *Korean J Radiol*. 2016;17(3):351-363. doi:10.3348/kjr.2016.17.3.351