Diagn Interv Radiol DOI 10.5152/dir.2019.18057

© Turkish Society of Radiology 2019

INTERVENTIONAL RADIOLOGY

TECHNICAL NOTE

Endovascular treatment of a splenic vein aneurysm through a transhepatic approach

Laura Calsina Juscafresa
María Páramo Alfaro
Lukasz Grochowicz
Jose Ignacio Leal Lorenzo
Jose Ignacio Bilbao Jaureguízar

ABSTRACT

Aneurysms of the portal vein and its branches have been rarely described. Their natural history is unknown although large ones (>3cm in diameter) have been reported to cause rupture, thrombosis, duodenal or biliary obstruction, inferior vena cava compression and/or portal hypertension. We report the case of an incidentally diagnosed 4.5 cm splenic vein aneurysm repaired by endovascular treatment through a transhepatic route. The aneurysm was successfully excluded using a covered stent (Viabahn, Gore). The transhepatic route opens the possibility of offering a minimally invasive approach to vascular lesions of the portal vein system.

Splenic vein aneurysms were first reported in 1953 (1) and they are part of the extrahepatic portal vein aneurysm group (2). Their mechanism of development is not well understood. Etiology may include congenital causes (inherent weakness of the vessel wall) or acquired causes (trauma, inflammation such as pancreatitis, liver disease, or portal hypertension). However, portal aneurysms do not seem to be the result of an isolated portal hypertension since they are extremely rare even in patients with this condition (3).

The demographic characteristics of extrahepatic portal vein aneurysm include a female-to-male ratio of 2:1 and the median age of 52 years (range, 5–77 years). The size of the reported aneurysms ranges from 1.9 to 8 cm. The most common location of the aneurysm is in the main portal vein trunk, the junction of the superior mesenteric vein and the splenic vein, or at the hepatic hilus; intrahepatic venous aneurysms are rare (4, 5).

Here, for the first time, we report the successful endovascular treatment of a splenic vein aneurysm through transhepatic percutaneous approach using a Viabahn stent.

Technique

A 77-year-old female was referred after incidental finding of a splenic vein aneurysm (45 mm diameter) (Fig. 1) and congenital suprahepatic inferior vena cava short interruption with compensatory development of collateral venous circulation (Fig. 2) on computed tomography angiography (CTA). The aneurysm etiology was unclear (congenital versus inflammatory) since the patient had suffered acute cholecystitis complicated with pancreatitis two months before and no previous abdominal examination was available. At the time of referral she had been considered for a cholecystectomy. Except for this condition she had no significant medical history.

Despite being an asymptomatic patient, treatment of the splenic vein was considered because of the aneurysm diameter, with risk of thrombosis, rupture or compression of adjacent structures. A first-stage endovascular treatment was planned, and if technically not possible, surgical reparation (aneurysmorrhaphy) was considered. Treatment was attempted since, in this case, the presence of biliary disease could impede an objective clinical examination and mask the clinical follow-up of the patient if conservative treatment were to be chosen.

The transhepatic approach was considered the best option, with a lower risk of bleeding compared with the transsplenic access.

From the Departments of Vascular Surgery (L.C.J. ✉ *lauracalsina@gmail.com*, L.G., J.I.L.L.) and Interventional Radiology (M.P.A., J.I.B.J.), Clínica Universidad de Navarra, Pamplona, Spain.

Received 19 March 2018; revision requested 18 April 2018; last revision received 22 June 2018; accepted 19 July 2018.

Published online 1 February 2019.

DOI 10.5152/dir.2019.18057

You may cite this article as: Calsina Juscafresa L, Páramo Alfaro M, Grochowicz L, Leal Lorenzo JI, Bilbao Jaureguízar JI. Endovascular treatment of a splenic vein aneurysm through a transhepatic approach. Diagn Interv Radiol 2019; DOI 10.5152/dir.2019.18057.

Percutaneous transhepatic access was performed with ultrasound guidance (mapping a suitable intrahepatic portal vein). A 20-gauge 15 cm needle (Argon Medical Devices) was used to puncture right intrahepatic portal vein. After this, a 0.018-inch Cope guide wire (Cook Medical) was introduced across the liver tract into the portal vein bifurcation and Accu-Stick II introducter system (Boston Scientific) was advanced. A 0.018-inch guidewire was replaced with a 0.035-inch angled hydrophilic guidewire (Terumo) and 4 F catheter Cobra 4 (Cordis) to perform venography.

Through the splenic vein, the aneurysm was localized and catheterized. The Accu-Stick II system was exchanged by a 9 F sheath (Terumo) and the hydrophilic guide wire by an Amplatz stiff (Boston Scientific). According to CTA measurements, a 9 mm × 5 cm Viabahn stent (WL Gore and Associates) was deployed. Venography demonstrated residual filling of the aneurysm, because of this, a second 8 mm × 10 cm Viabahn stent was deployed distally. Final venography demonstrated splenic vein patency and aneurysm exclusion without leaks (Fig. 3). Withdrawal of the devices previous transhepatic tract plug with 4 MReye coils 5 mm × 5 mm (Cook Medical). During the procedure, heparinized saline serum (4000 UI/500 mL) was used.

After the procedure, antiplatelet therapy (aspirin 100 mg every 24 hours) was prescribed. The patient was discharged within 24 hours of the procedure.

Follow-up patency and aneurysm exclusion were assessed with duplex scan at one month, CTA at six months and duplex scan at one year post-procedure (Fig. 4). Patient has remained symptom-free at clinical examination.

Discussion

Most abdominal venous aneurysms are seen as incidental findings (3–6). The predominant accompanying symptom is mild abdominal pain, abdominal fullness, nausea or vomiting.

Main points

- Ultrasonography is an excellent tool for the diagnosis and follow-up of aneurysms of the portal vein system.
- Endovascular treatment of splenic vein aneurysms through transhepatic percutaneous approach is a feasible, safe, and effective technique.
- Endovascular treatment should be primarily considered in the treatment of traumatic portal vein injuries.

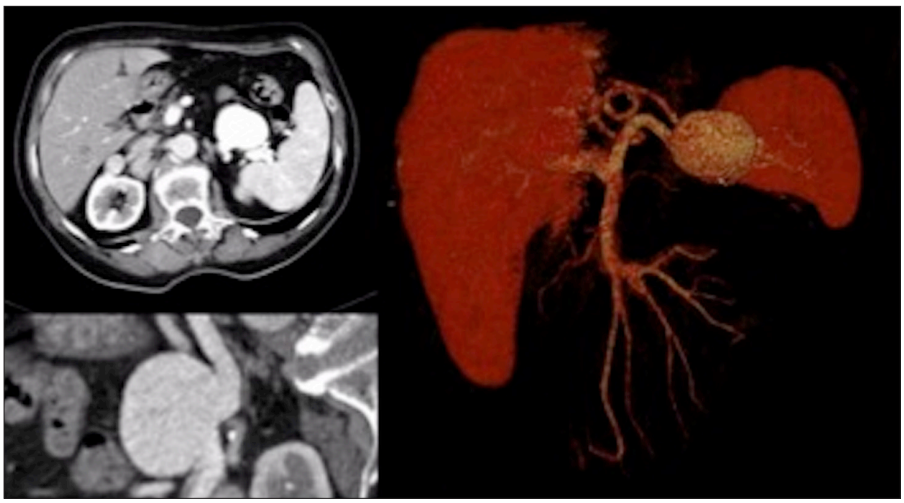

Figure 1. Axial view and 3D reconstruction of the venous splenic aneurysm.

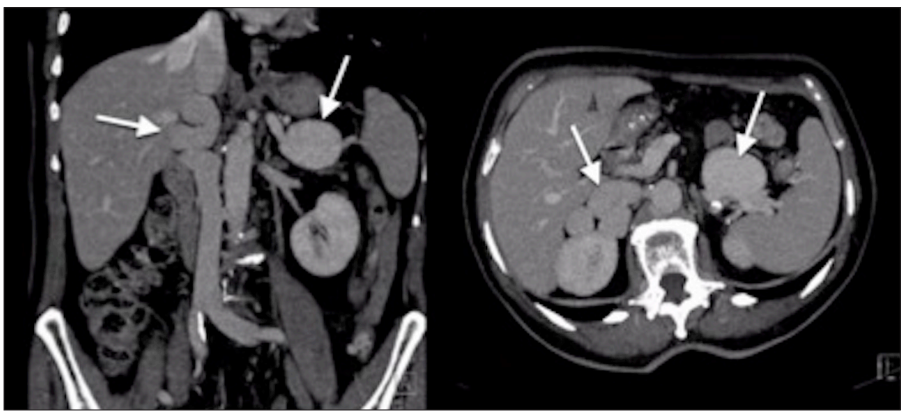

Figure 2. Inferior vena cava interruption in axial and sagittal CT slices show the inferior vena cava interruption and the splenic vein aneurysm *(arrows)*.

The clinical relevance of a portal vein aneurysms is related to its size. Small aneurysms are usually asymptomatic, while large ones (>3 cm in diameter) are described to be the cause of complications (seen in one-third of patients with extrahepatic portal aneurysms) including rupture with gastrointestinal or intraperitoneal hemorrhage (2.2%), thrombosis (13.6%), duodenal or biliary obstruction, inferior vena cava compression (compression of adjacent structures in 2.2%–9.8%) and/or portal hypertension (4, 5, 7).

Ultrasonography is an excellent tool for the diagnosis and follow-up of these cases. CT scan or magnetic resonance angiography are also useful and essential for planning surgical or endovascular interventions (2–4).

Most publications on portal vein aneurysms are case reports or small series and very few address the issue of indications and options for intervention. The natural course of splenic vein aneurysms is uncertain and because of this condition, the timing and type of treatment remain controversial (6). If a conservative management approach is chosen it is important to maintain a close follow-up with magnetic resonance angiography, CT scan or ultrasonography (controlling changes in aneurismal size and/or in luminal flow) (4, 6). Torres et al. (3) reported that prophylactic surgical intervention should be considered for abdominal venous aneurysms in low surgical risk patients; while in high-risk patients and in those with asymptomatic small aneurysm (<3 cm), observation and careful follow-up could be sufficient (2, 3, 7). Symptomatic aneurysms and presence of complications are sound indications for intervention (4, 5).

Surgery has been the standard treatment of portal aneurysms and includes aneurysmorrhaphy, aneurysmectomy, splenecto-

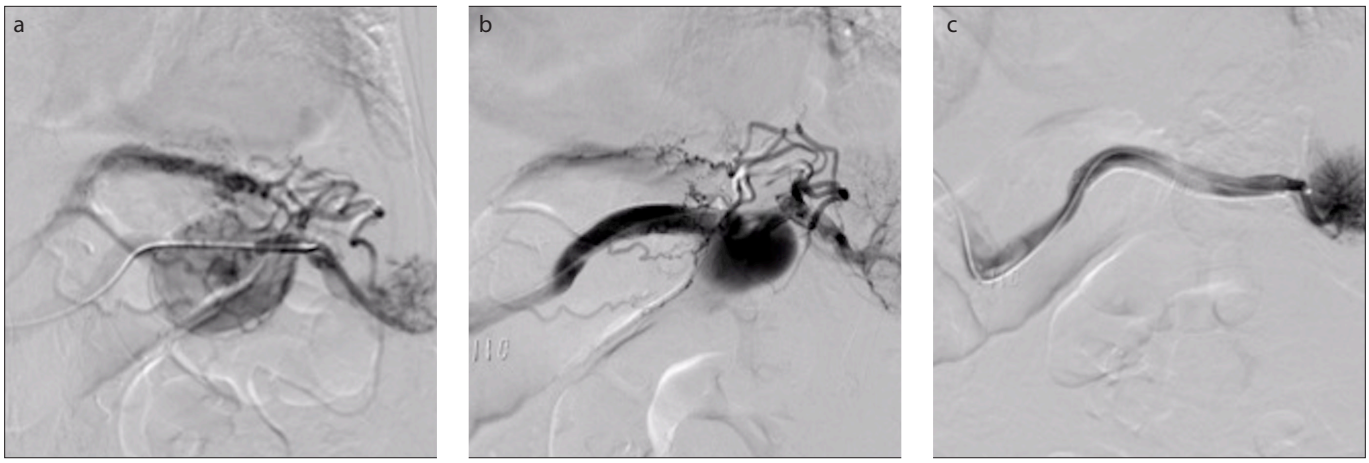

Figure 3. a–c. Image **(a)** shows diagnostic venography. Intraprocedural image **(b)** shows residual filling of the aneurysm after first Viabahn implantantion. Final venography image **(c)** shows aneurysm exclusion after second Viabahn implantation.

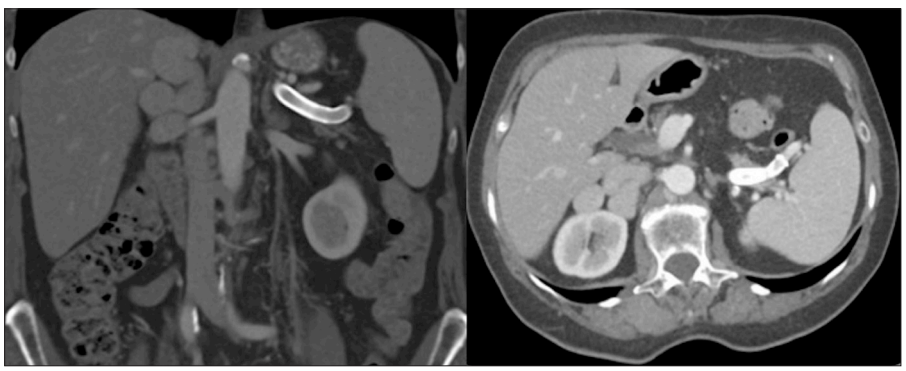

Figure 4. CT scan after six months shows inferior vena cava interruption and splenic vein stent graft patency with aneurysm resolution.

my, spleno-renal shunt, and distal pancreatectomy. In 2016, Kwon et al. (8) reported the first endovascular treatment in a traumatic splenic vein aneurysm through transsplenic approach using a Viabahn stent.

The transhepatic approach, constitutes a widely accepted access to the portal vein system. It is the common approach for the embolization of portosystemic collaterals, portal vein stenoses or thrombosis treatment and the creation of transjugular intrahepatic portosystemic shunts (TIPS) for the treatment of portal hypertension. It is a safer approach compared with the transsplenic access in terms of risk of bleeding because of the high vascularity of the spleen and the fragility of its vessels. The transhepatic access has only been described in a rare case of post-traumatic portal vein pseudoaneurysm endovascular treatment using an Excluder stent graft (9). The potential associated complications of this approach are transient pain at puncture site, vasovagal reactions, bleeding, hemobilia, pseudoaneurysms, and infection (10). Precisely, in order to prevent bleeding in the puncture site, it is recommended to puncture the intrahepatic portal vein system as peripherally as possible to avoid accidental punctures of larger caliber arteries and to embolize the puncture tract (10).

In conclusion, to our knowledge this is the first report of an endovascular treatment of a splenic vein aneurysm through transhepatic percutaneous approach. Considering the simplicity, safety, and the minimally invasive character of this approach compared with the surgical techniques described so far, the transhepatic endovascular treatment could be a turning point in the management of aneurysms and other portal injuries when anatomically feasible and not just an alternative technique.

Conflict of interest disclosure

The authors declared no conflicts of interest.

References

1. Lowenthal M, Jacob H. Aneurysm of splenic vein. Report of a case. Acta Med Orient (Tel Aviv) 1953; 12:170–174.
2. Calligaro KD, Ahmad S, Dadora R, et al. Venous aneurysms: Surgical indications and review of the literature. Surgery 1995; 117:1–6. [CrossRef]
3. Torres G, Hines GL, Monteleone F, et al. Splenic vein aneurysm: Is it a surgical indication? J Vasc Surg 1999; 29:719–721. [CrossRef]
4. Cho SW, Marsh JW, Fontes PA, et al. Extrahepatic portal vein aneurysm – report of six patients and review of the literature. J Gastrointest Surg 2008; 12:145–152. [CrossRef]
5. Sfyroeras GS, Antoniou GA, Drakou AA, et al. visceral venous aneurysms: clinical presentation, natural history and their management: a systematic review. Eur J Vasc Endovasc Surg 2009; 38:498–505. [CrossRef]
6. Cömert M, Erdem LO, Ozdolap S, et al. Splenic vein aneurysm demonstrated by magnetic resonance angiography. Dig Dis Sci 2005; 50:1344–1346. [CrossRef]
7. Moreno JA, Fleming MD, Farnell MB, et al. Extrahepatic portal vein aneurysm. J Vasc Surg 2011; 54:225–226. [CrossRef]
8. Kwon OS, Sul YH, Kim JS, et al. Endovascular stent graft for traumatic splenic vein aneurysm via percutaneous transsplenic access. Ann Surg Treat Res 2016; 91:56–58. [CrossRef]
9. Ierardi AM, Berselli M, Cuffari S, et al. Uncommon case of a post-traumatic portal vein pseudoaneurysm treated with percutaneous transhepatic stent grafting. Cardiovasc Intervent Radiol 2016; 39:1506–1509. [CrossRef]
10. Dollinger M, Goessmann H, Mueller-Wille R, et al. Percutaneous transhepatic and transsplenic portal vein access: embolization of the puncture tract using Amplatzer Vascular Plugs. Fortschr Röntgenstr 2014; 186:142–150.