TECHNICAL NOTE / Interventional imaging

Percutaneous treatment of parastomal varices: Direct or transhepatic approach?

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Ectopic parastomal varices can occur in up to 5% of patients with stoma, more frequently in cases of ileostomy and in up to 50% of patients with portal hypertension [1]. The risk of bleeding is hardly predictable but the bleeding is usually not severe and resolves spontaneously. The bleeding can sometimes become more severe and/or recurrent, affecting the quality of life of the patient due to repeated hospital stays for transfusions, and may even be life-threatening [1,2]. Management of parastomal bleeding is not standardized, in particular in case of recurrent or severe bleeding. Manual compression or local injection of sclerotic or vasoconstricting agents is often only temporarily effective [2]. Although surgery can be an option with ligation and/or complete revision of the stoma, these interventions are often complex, sometimes worsen the patient condition and are potentially risky in those with multiple abdominal co-morbidities [3]. In such situations, two types of vascular percutaneous treatments can be proposed. One is a transjugular intrahepatic portosystemic shunt (TIPS), which is considered to be the reference treatment for some authors [2]. The other is embolization of parastomal varices, which is a less invasive option [1,4]. In the latter option, an indirect transhepatic approach is used to access deep, intra-abdominal varices [5,6], and a direct percutaneous approach for superficial and subcutaneous varices [7–10].
The goal of this technical note was to discuss the two possible approaches for percutaneous embolization of parastomal varices and highlight the role of computed tomography (CT) to best decide on the most appropriate approach.

Transhepatic approach

A 67-year-old man presented with iron-deficiency anemia due to recurrent bleeding of his colostomy that required repeated transfusions. The colostomy had been performed 2 years before because of a perforated adenocarcinoma of the left colon and peritonitis. The patient had also severe alcohol-related cirrhosis and a hepatocellular carcinoma in segment I that was treated by arterial chemoembolization.

CT was obtained following intravenous administration of 100 mL of iodinated contrast agent (lomeron 400®, Bracco Imaging, Milan, Italy) during the arterial and portal phases. CT showed a deep network of parastomal varices that were mainly fed by an enlarged, 8 mm left colic vein (Fig. 1).

Under general anesthesia, the right portal vein was accessed under ultrasound guidance using a transhepatic approach after confirming that the needle track was free of tumor. Direct portography was performed under fluoroscopic control using a 5-Fr vertebral catheter that was pushed further into the colic vein. Then, the distal tip of a 2.4-Fr microcatheter (Progreat®, Terumo Medical Corporation, Tokyo, Japan) was placed as close as possible to the parastomal varices. Three vials of Onyx® (Micro Therapeutics, Irvine, CA, USA) were first injected through the microcatheter. A mixture of 1 mL of Lipiodol® (Laboratoire Guerbet, Roissy, France) and 1 mL of n-butyl-2-cyanoacrylate (Histoacryl®, B. Braun Dexon, Spangenberg, Germany) was then injected through the 5-Fr catheter (Fig. 1) to achieve complete embolization of the colic vein. During the removal of the 5-Fr catheter, a subcapsular hepatic hematoma occurred. The patient was hemodynamically stable so that neither transfusion nor embolization was needed.

The parastomal bleeding stopped for 3 months, then recurred due to new, deep parastomal varices that were fed by enlarged, 8 mm ileal branches originating from the superior mesenteric vein. A second session of embolization was performed using the same procedure, with no recurrence of bleeding at 6 months.

Direct percutaneous approach

A 70-year-old man presented to the emergency unit for severe bleeding in his stoma pouch. Stoma had been performed 5 years before because of occlusion revealing a rectal adenocarcinoma with synchronous pulmonary and hepatic metastases. CT revealed large parastomal varices under the surface of the skin fed by an enlarged, 9 mm left colic vein (Fig. 2). Endoscopy through the stoma confirmed the presence of varices and the absence of associated parietal or intraluminal lesions. Injection of Aetoxicreral® (Kreussler & Co, Reichstett, Germany) at the end of the endoscopic procedure resulted in short-term hemostasis but recurrent bleeding occurred 24 hours later. After a multidisciplinary discussion, direct percutaneous embolization of parastomal varices was decided.

Under general anesthesia, direct ultrasound-guided puncture of the varices immediately below the skin was performed. This approach was made easier owing to CT that helped identify target veins (Fig. 2). The variceal network

Figure 1. A 67-year-old man with iron-deficiency anemia due to recurrent bleeding from colostomy. a: portal venous phase CT image in the transverse plane shows parastomal varices (arrowhead) in a deep location, under the abdominal wall; b: three-dimensional volume rendering reconstruction of the portal circulation in the coronal plane shows the venous route to follow after a transhepatic approach, from the right hepatic portal branch to the feeding left colic vein (arrow) to reach the parastomal collateral vessels (arrowhead); c: direct portography image shows embolization of the collateral circulation (arrowhead) and the feeding vein (arrow) with Glubran®.
was opacified up to the left colic vein by reflux. Embolization was performed using 2 cm³ of n-butyl-2-cyanoacrylate (Histoacryl®) mixed with 2 cm³ of Lipiodol®. The injection was stopped halfway into the left colic vein to avoid diffusion into surrounding collateral vessels. The patient did not develop any recurrent bleeding. Twelve months later, CT performed showed persistent obliteration of the venous collateral network (Fig. 2).

**Discussion**

Our two cases illustrate the two possible approaches for embolization of parastomal varices depending on the main location of collateral vessels. CT obtained during the portal phase is the key test to obtain a detailed map of the collateral circulation and best determine management strategy and approach. CT helps determine the accessibility of the parastomal varices, demonstrates the feeding vessels that should be embolized, whether a direct or retrograde approach should be undertaken and the site(s) to be punctured, and helps select the most appropriate material for embolization. Magnetic resonance imaging can also be used to study venous drainage and can be an option in case of contraindication to the administration of an iotrinated contrast agent [11].

Whatever the approach, the goal is to precisely target the variceal network as well as the feeding vessels. Although transhepatic puncture often provides rapid and easy access to feeding vessels, access to intra-abdominal parastomal variceal network can be more challenging [5,6]. Subcutaneous varices can be easily localized with ultrasound, however, their puncture can be difficult because they can collapse under the pressure of the needle and that of the ultrasound probe [7–10]. If the parastomal territory is easy to treat, retrograde embolization of all the feeding vessels is more difficult and requires good control of the liquid embolic agent to prevent diffusion in collateral non-feeding vessels. A third retrograde approach has been described, based on the experience acquired in obliteration of gastric varices using the femoral vein then the systemic efferent veins (i.e., balloon retrograde transfemoral obliteration) [12].

There are very few complications with these different percutaneous techniques, which are limited to parastomal skin ulcers [12]. There have been no reports of embolization of incorrect target veins or stomal necrosis, probably because embolization is controlled, targeted and limited. Embolization by biological liquid agents (Glubran® and Onyx®) can be painful and may require neuroleptic sedation or general anesthesia.

The main limitation to these procedures is long-term recurrence due to failure to embo1ize all feeding vessels in a single session, or due to the rapid development of new feeding vessels like in our first patient. Parastomal varices develop at the mucocutaneous junction by the occurrence of spontaneous anastomoses due to the high-pressure portal circulation of the gastrointestinal tract and the low-pressure systemic veins of the abdominal wall [1]. To prevent recurrence, it is important to target the different afferent veins as well as to get as close as possible to the parastomal variceal network, upstream of which portosystemic anastomoses develop, to avoid early re-opening of shunts. The basis of treatment is the same as that for arteriovenous malformations, which must be treated as closely as possible to the nidus. The choice of the embolic agent differs depending on the team, but it usually associates a distal embolic agent to get as close as possible to shunts (liquid or sclerotic agent) and more proximal embolic material for the feeding veins (liquid agent, coils, or plugs) [5–10].

TIPS placement, whose goal is to normalize the portosystemic gradient, which causes varices, is the only etiological treatment [13–15]. For Penick et al., it is the most effective management strategy and should be the first line treatment because it reduces the risk of recurrence by 78.5%, compared to 50% following percutaneous embolization [2]. However, this technique is contraindicated when there is tumoral invasion, which was the case in our two patients. Moreover, Gaba et al. reported complications in up to...
20% of patients, including hemorrhage, biliary, hepatocellular insufficiency, and malposition or stent occlusion [4]. Depending on the patient co-morbidities and the context, in particular in the presence of malignancies, TIPS should only be considered as second line therapy when percutaneous embolization has failed.

In conclusion percutaneous embolization of parastomal varices using CT to determine whether a direct or transhepatic approach should be selected is a simple and effective technique, with a low rate of complications. Despite the risk of recurrence, this technique should be considered as an alternate option to other treatment strategies.

Disclosure of interest

The authors declare that they have no competing interest.

References