Endovascular treatment of the superior mesenteric arteriovenous fistula complicated by gastrointestinal bleeding

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Dear Editor,

Superior mesenteric arteriovenous fistula (SMAVF) is an abnormal connection between the superior mesenteric artery (SMA) and superior mesenteric vein (SMV). SMAVF is rare, and it can be both congenital and acquired. The most common causes of acquired SMAVF are penetrating abdominal trauma and iatrogenic causes, such as abdominal surgery. The symptoms of SMAVF are the result of direct blood flow from the arterial to the venous system. Congestive heart failure, intestinal ischemia, and portal hypertension may occur with all its consequences. The latter leads to the development of esophageal and gastric varices and consequently gastrointestinal bleeding, which is the main cause of death in patients with SMAVF (1,2).

We present the case of endovascular treatment of SMAVF. A 51-year-old conscious patient with nausea and hematemesis was admitted to the hospital. He had multiple organ injury 19 years earlier and underwent splenectomy. Examination revealed abdominal guarding, mid-abdominal pain during palpation, and weak peristalsis. On the day of admission, a gastroscopy with the obliteration of the bleeding esophageal varices was performed, and two units of packed red blood cells were transfused. The patient produced five black tarry stools. Computed tomography angiography (angio-CT) examination revealed SMA dilatation to a diameter of 9 mm and SMV with a diameter of 30 mm, which was filled with contrast agent in the early arterial phase. The presence of an arteriovenous fistula was suspected (Figure 1).

Selective SMA angiography confirmed the diagnosis of SMAVF. Aneurysmal extension of the distal section of SMA and a short channel connecting artery directly to the SMV were revealed. In the mesenteric arcades, poor filling with the contrast agent was observed because of the stealing effect through the fistula (Figure 2a). It was decided to treat the patient with embolization. In the first stage of the treatment, a balloon catheter (diam-

Figure 1. Angio-CT of SMAVF

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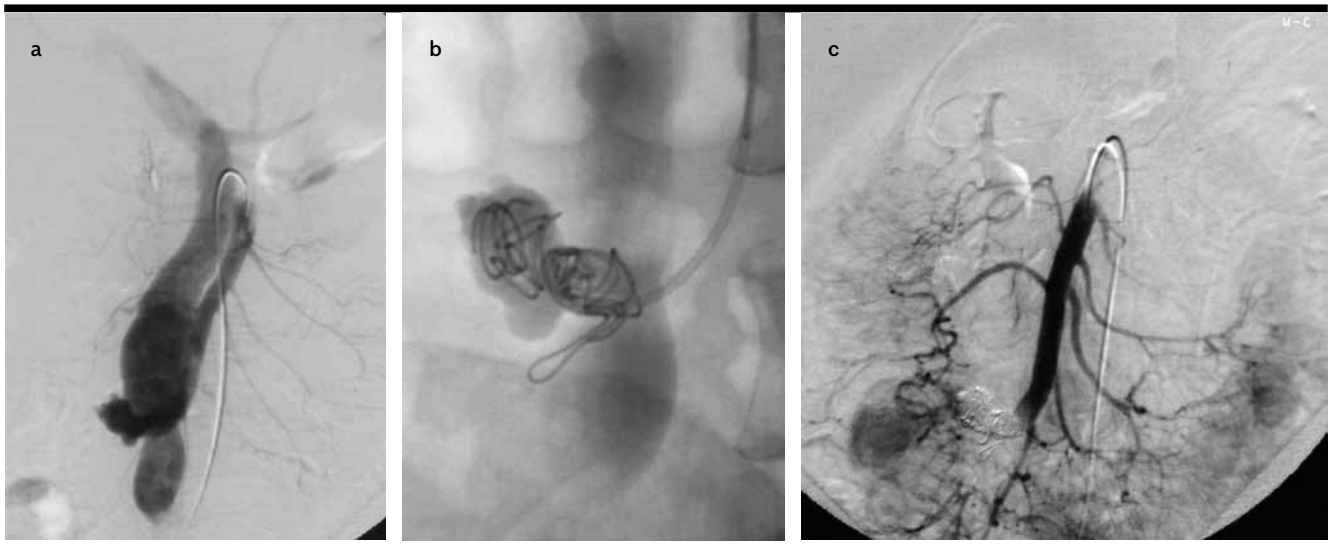

Figure 2. a-c. DSA of SMAVF. Poor filling of the mesenteric arcades with the contrast agent (a); coiling of SMAVF (b); effective closure of the fistula and sufficient filling of the mesenteric arcades with the contrast agent (c)

eter of the balloon 14 mm) was introduced into SMA, and it effectively stopped the blood flow in the artery. Through the catheter, three pushable coils (MWCE - Cook Inc.; Bloomington, IN, USA) with diameters of 15, 12, and 10 mm were introduced (Figure 2b). Control angiography revealed a significant reduction in blood flow through the fistula. Thereafter, seven more coils of different diameters (5-8 mm) were introduced into the fistula to produce a stable embolic plug. The final angiography presented an effective closure of the fistula and sufficient filling of the mesenteric arcades with the contrast agent. Images of proper intestinal blood flow and normal venous phase through SMV and further to the portal vein were obtained (Figure 2c). During the procedure, the patient did not report any complains. The clinical condition of the patient improved significantly after the treatment.

On day 3, Doppler ultrasound color imaging showed a significant reduction of SMV diameter to 15 mm and confirmed closure of the fistula. Evaluation of the flow in the portal vein was performed, and proper charts were obtained; the flow velocity in the main trunk of the portal vein was approximately 20 cm/s. The patient was discharged in good general condition 5 days after the procedure.

Before the advent of endovascular treatment, surgery was the only way for the treatment of SMAVF. Mortality in untreated SMAVF is estimated to be 25%, and while performing a surgery the estimation drops to 18% (3). In 1982, Uflacker and Saadi (4) described the first endovascular treatment attempted on a patient with SMAVF. Since then, the cases of ten patients with SMAVF complicated by gastrointestinal bleeding and treated with endovascular methods were described in literature (1-3,5).

The most widely used clinical examination confirming the diagnosis of SMAVF is angio-CT, performed both in the arterial and the venous phase (2). Most patients with SMAVF had a history of at least one abdominal surgery or trauma of the abdomen. For this reason, surgical treatment of SMAVF is difficult due to the high incidence of peritoneal adhesions and more difficult access to the lesion, which is not an obstacle in case of endovascular therapy. Surgery may also be an excessive burden for patients with comorbidities. Conversely, endovascular treatment can result in ischemic complications. To reduce the risk of coil migration into the portal system, accurate measurement of the feeding artery and SMA-SMV connecting channel was performed, and an occlusion balloon was used in the presented study. Thus, effective embolization of the fistula could be accomplished, avoiding relevant unfavorable hemodynamic deterioration in the affected vessels.

According to data from literature to the reported case, endovascular treatment can be a safe and effective treatment method for patients with SMAVF complicated by gastrointestinal bleeding.

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