

Superior mesenteric artery aneurysm due to fibromuscular dysplasia: diagnosis and surgical treatment

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Case report

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Abstract

Objectives. Improvement of diagnosis and surgical treatment of superior mesenteric artery aneurysms. **Material and methods.** The peculiarities of the clinical course, diagnosis and surgical treatment of superior mesenteric artery aneurysm were analyzed in 64-year-old patient. **Results.** In our observation, in a 64-year-old patient, by clinical examination, laboratory and diagnostic imaging the diagnosis of superior mesenteric artery branch aneurysm was confirmed, that has become a direct indication for surgical intervention - resection of aneurysm. Pathomorphologically fibromuscular dysplasia was detected. **Follow-up:** 3, 6 months after surgical treatment the patient has no complaints, at the control ultrasound examination magistral blood flow through superior mesenteric artery is detected, aneurysmatic expansions are not visualized. Due to the rarity of pathology, the results of surgical treatment of superior mesenteric artery aneurysms in literature are limited to a small number of observations. Most of them indicate on an infectious etiology of the disease – mycotic aneurysms. According to the U.S. registry for fibromuscular dysplasia, celiac and mesenteric arteries were involved in 37.5% of all cases, in the form of stenosis, dissection or visceral artery aneurysm. When the diagnosis of superior mesenteric artery aneurysm is confirmed there is no alternative to timely surgical treatment. Open surgical intervention traditionally remains a «gold» standard for superior mesenteric artery aneurysm repair and includes a resection of aneurysm or resection in combination with revascularization. **Conclusions.** Superior mesenteric artery aneurysm is a rare clinical condition that may be complicated by rupture with fatal bleeding and mesenteric ischaemia. This clinical case demonstrates that timely diagnosis and adequate surgical treatment of superior mesenteric artery aneurysm allow to prevent the occurrence of life-threatening complications and achieve complete recovery of the patient.

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Introduction.

Superior mesenteric artery aneurysm (SMAA) is a rare clinical pathology, with a 5,5% rate due to visceral artery aneurysms [1]. SMAAs are divided into: true aneurysms (saccular or fusiform), pseudoaneurysms, dissecting aneurysms. Unlike other visceral aneurysms, the most common etiology of SMAAs is the infection, associated with bacterial endocarditis. Other causes of SMAAs include: atherosclerosis, fibromuscular dysplasia, hypertension, cystic medianecrosis, collagenosis, posttraumatic etiology et al [1-3]. Clinical course of the disease is often asymptomatic, manifesting rupture or mesenteric ischemia [1,4]. With active introduction of diagnostic imaging – computed tomography angiography (CTA) / magnetic resonance imaging (MRI), when the diagnosis of SMAA is confirmed, there is no alternative to timely surgical treatment [5].

Objectives.

Improvement of diagnosis and surgical treatment of SMAAs.

Material and methods (Case presentation).

We consider expedient to share the following clinical case-report because of the rarity of this pathology, peculiarities of the clinical course, diagnosis, and surgical treatment. The 64-year-old woman 01.02.2021 was admitted to the Vascular surgery department of Lviv Regional Clinical Hospital presenting of SMAA, periodic increase of blood pressure up to 150/90 mm Hg. From anamnesis: the disease is diagnosed incidentally when ultrasound examination of the abdominal cavity was performed. Objectively: the patient's status is good. Vital signs are stable and within normal limits. The pulsation of the main arteries is determined. The ultrasound examination of abdominal aorta and visceral vessels: superior mesenteric artery (SMA) – 7,5 mm in diameter, magistral blood flow through SMA is determined, peak systolic velocity – 80 cm/s. Above SMA by 3,0 cm distal from its origin – saccular aneurysmatic expansion is visualised, within 16,0 mm in diameter, without thrombotic masses inside (probably branch of SMA). US-signs of SMA branch aneurysm (Figure 1).

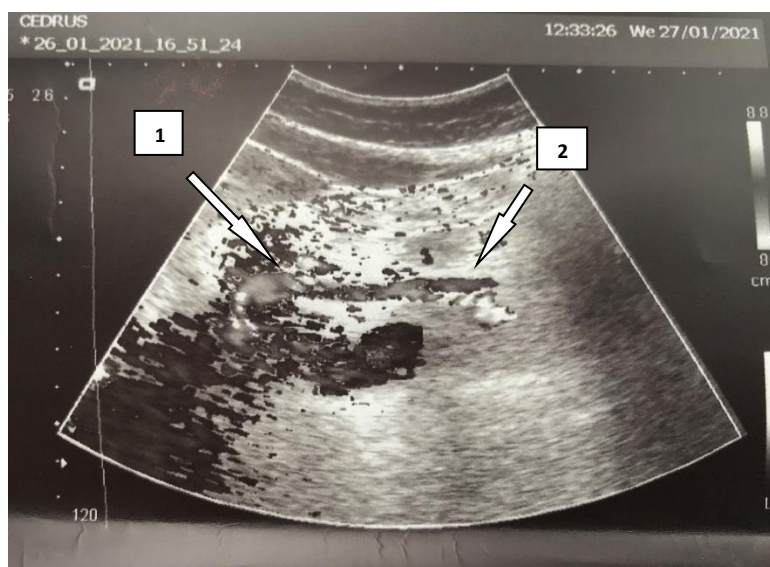


Figure 1. Ultrasonography of visceral arteries: 1 – Superior mesenteric artery aneurysm; 2 – Superior mesenteric artery.

The abdominal CTA revealed: at the distance of 68,0 mm from SMA origin – aneurysmal expansion on a thin stalk 9.0 mm in length, 18,0x12,0 mm in diameter (Figure 2). Transthoracic echocardiography didn't reveal any valvular lesions or vegetations.

So, the diagnosis of SMA branch aneurysm, 18,0x12,0 mm in diameter, has become a direct indication for surgical intervention – resection of aneurysm. 02.02.2021p. 11⁰⁰ – 14¹⁰ Surgical operation - under general anesthesia the resection of SMA branch aneurysm was performed.



Figure 2. Computed tomography angiography of the abdomen: A, B – branch aneurysm of the superior mesenteric artery.

«Mercedes» laparotomy. T-shaped incision of the posterior leaf of the peritoneum. Novocaine blockade of the mesentery root. At the root of the mesentery, the SMA is mobilized on 3,0 cm distal from it's origin of the aorta, within 7,0 cm in length. A pulsating aneurysm of the SMA branch, 20,0x15,0 mm in diameter, was detected. Systemic heparinization. By the lateral clamping of the SMA the aneurysm was mobilized from inflammatory surrounding

tissues. The aneurysm was resected and sent for pathomorphological examination. The blood flow through SMA is restored. Intestines – without visual signs of ischemia, with active peristalsis. Hemostasis. Suturing of laparotomy wound. Aseptic bandage. (Figure 3). Pathomorphological results: fibromuscular dysplasia (FMD) (Figure 4).

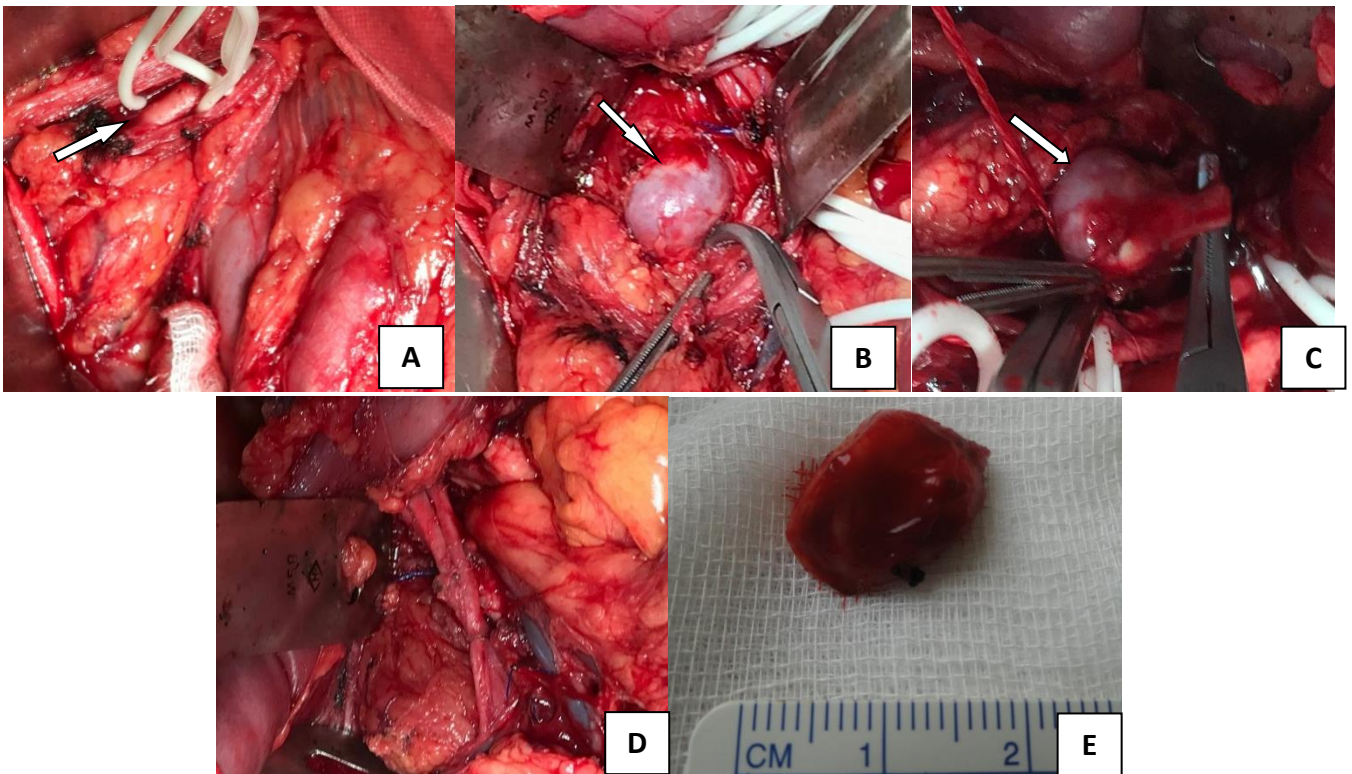


Figure 3. Intraoperative photos: A – mobilized superior mesenteric artery; B,C – branch aneurysm of the superior mesenteric artery; D – the blood flow through superior mesenteric artery is restored; E – resected aneurysm.

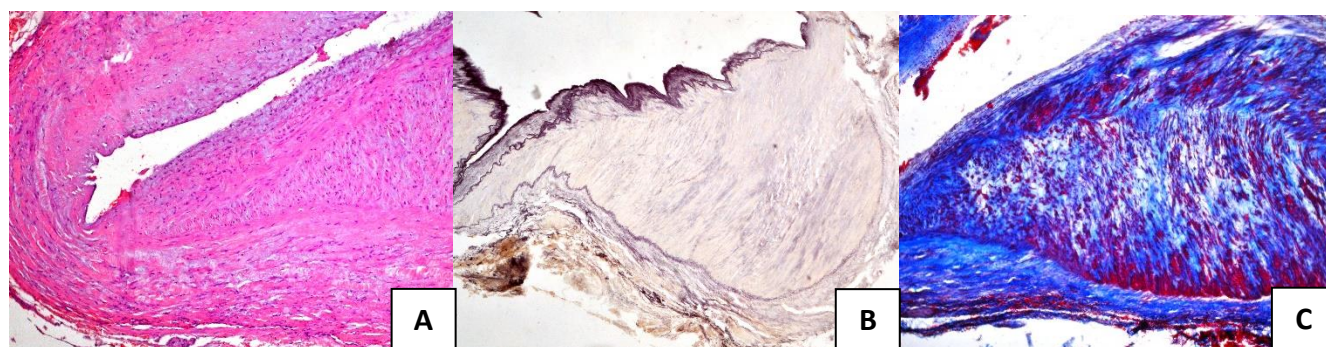


Figure 4. Histologic sections – FMD of SMA: A – the wall of the artery is thickened with the formation of fibro-muscular plaque. H&E stain, x100; B – expressed subintimal hyperplasia of arterial wall. Hart's stain for elastic fibers, x100; C – expressed hyperplasia of smooth muscle cells and connecting tissue cells of the arterial wall. Masson's trichrome stain, x100.

In the postoperative period signs of ileus, edematous pancreatitis were observed. The patient was consulted by a general surgeon with relevant recommendations, received adequate infusion-transfusion corrective therapy, anticoagulants, antibiotic therapy, prokinetics. Against the background of the conservative therapy, the patient's status – with positive dynamics.

Results and case discussion.

In our observation, in a 64-year-old patient, by clinical examination, laboratory and diagnostic imaging the diagnosis of SMA branch aneurysm was confirmed, that has become a direct indication for surgical intervention – resection of aneurysm. Pathomorphologically FMD was detected. Due to the rarity of this pathology, the results of surgical treatment of SMAAs in the literature are limited to a small number of observations. Most of them indicate on an infectious etiology of the disease – mycotic aneurysms, that account for 60% of all SMAAs [1,6,7]. Predisposing factor in the formation of SMAAs also is FMD – nonatherosclerotic, non-inflammatory disease, unknown etiology, in which microscopically segmental development of fibrosis and hyperplasia of the media cells were observed [8-10]. According to the U.S. registry for FMD, celiac and mesenteric arteries were involved in 37.5% of all cases, in the form of stenosis, dissection, or visceral artery aneurysm [8]. Furthermore, SMAAs, also found predominantly in women, but less frequently associated with other dysplasias and were generally sacciform [11]. Abdominal ultrasound, CT, MRI-angiography are all feasible methods for the diagnosis of SMAAs, but CTA is the «gold» standard and provide the best diagnostic information as regards location, evidence of rupture, presence of collateral flow, that are important for choice of surgical treatment [1,5]. In this clinical case the disease is diagnosed incidentally during ultrasonography of

Postoperative wound healed by primary tension. Patient was discharged 18.02.2021 in a good status with recommendations of a general surgeon observation. Follow-up: 3, 6 months after surgical treatment the patient has no complaints, at the control ultrasound examination magistral blood flow through SMA is detected, aneurysmatic expansions are not visualized.

abdominal cavity. Further before surgery the CTA was performed to determine the accurate diagnostic information regards relationship between the aneurysm and related blood vessels. Manifestations of SMAAs differ, often with asymptomatic course. Abdominal pain is the most common symptom of SMAAs that may indicate on increase in the size and risk of rupture of the aneurysm [1,4,6]. Therefore the Society for Vascular surgery clinical practice guidelines on the management of visceral aneurysms recommends repair of all true SMAAs and pseudoaneurysms as soon as the diagnosis is made regardless of size [5]. Open surgical intervention traditionally remains a «gold» standard for SMAAs repair and includes a resection of aneurysm or resection in combination with revascularization. Direct revascularization of the SMA is recommended at aneurysm of the SMA trunk or its bifurcation and involves performing primary anastomosis, saphenous vein interposition or aortomesenteric bypass grafting [1,6,7,12,13]. With the active development of endovascular treatment, successful cases of SMAAs stenting and embolization have been reported in the literature [1, 2, 4, 6]. However, according to some authors, endovascular surgery has certain disadvantages due to the complex anatomy of SMAAs, including technical difficulties of catheterization of the aneurysmal «neck», intraoperative migration of stents, stratification or rupture of aneurysms, embolization [1, 6]. Moreover, a recent meta-analysis discovered that the endovascular approach was associated with shorter hospital

days and lower rates of cardiovascular complications, but higher rates of reintervention for visceral artery aneurysm were also reported [14].

Conclusions.

Superior mesenteric artery aneurysm is a rare clinical condition that may be complicated by rupture with fatal bleeding and mesenteric ischaemia. This clinical case demonstrates that timely diagnosis and adequate surgical treatment of superior mesenteric artery aneurysm allow to prevent the occurrence of life-threatening complications and achieve complete recovery of the patient.

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Thus, the performed surgical treatment – SMA branch aneurysm resection saved the patient's life and prevented the development of fatal complications.

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