

Acute massive bleeding from splenic artery aneurysm rupture: a case report

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SUMMARY: Acute massive bleeding from splenic artery aneurysm rupture: a case report.

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Splenic artery aneurysm (SAA) is the most common aneurysm of visceral vessels. Usually the rupture occurs into the free peritoneal

cavity and causes massive bleeding, much less frequently the rupture happens into the lumen of the gastrointestinal tract.

We describe the case of a 39-year-old male patient with a spontaneous rupture of a splenic artery aneurysm and an acute massive peritoneal bleeding.

The case described confirms the rupture of SAA is always a dramatic event and an emergency laparotomy is a life-saving procedure.

KEY WORDS: Splenic - Artery - Aneurysm - SAA - Rupture.

Introduction

Splenic artery aneurysm (SAA) is the most common visceral vessel aneurysm, and is the third most common abdominal cavity aneurysm (1-3), behind infra-renal aorta and iliac artery aneurysms (4-7). In recent years there has been a rise in the frequency of SAA (8), which may be connected with an increased availability of imaging examinations. Currently, SAA is estimated at 0.01% among young people, growing to 10.4% in elderly patients (9). Splenic artery aneurysm rupture is an even rarer event occurring in only 2 to 3% of all splenic artery aneurysms (6).

An aneurysm is a pathological widening of the lumen of the artery, developed usually as a result of pathological changes taking place in its wall. Most often the pathology concerns elastic fibres and smooth muscle cells of the middle part of the vessel. There are true, false and dissecting aneurysms. In a

true aneurysm the vessel wall thins and bulges as a result of the damage done to elastic and muscle elements, which are substituted with non-elastic connective tissue bulging under the pressure of blood. A false aneurysm is caused most often after a trauma, when the vessel is damaged, blood spills and new walls of the vessel create near artery structures, which are gradually walled-up with endothelium. A dissecting aneurysm is an intramural haematoma, developed as a result of bleeding into the middle layer of the artery, creating a multi-fissure intramural canal, which gradually lengthens under the blood pressure.

The rupture can occur as a sudden single stage or in two stages, with the later resulting from the initial rupture being contained in the lesser sac before it spreads into the greater sac (10). Two-stage rupture of splenic artery aneurysm occurs in 20 to 25% of all cases of splenic artery aneurysm rupture and usually presents as sudden abdominal pain followed by a period of clinical stability followed by sudden collapse.

In the initial stage, SAA is asymptomatic, as a result of which, in spite of significant development of imaging techniques (e.g., abdominal angiography,

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ultrasound, magnetic resonance or computed tomography) which has taken place in the past 25 years, splenic artery aneurysms are rarely diagnosed. Since their rupture leads to sudden deterioration of the patient's condition due to massive bleeding, fatal in most cases, a proper diagnosis is usually made in the course of post-mortem examination (11). Most often SAAs rupture to the free visceral cavity, but 30% of them perforate to the lumen of intra-abdominal visceral organs.

Case report

A 39-year-old male patient was admitted at our department in urgency transferred from another hospital with diffuse abdominal pain, anaemia and

haemoperitoneum at radiological investigation.

Physical examination on admission revealed abdominal tenderness mainly in the epigastric area with light peritoneal sign of rebound and guarding. Abdomen was also distended. The patient was pale, hypotensive and tachycardic.

The laboratory exams evince severe anaemia and leukocytosis.

CT-scan performed in our hospital shows the presence of free fluid in perihepatic and perisplenic space and hepatorenal fossa, along the right paracolic gutter, in the omental bag and in pelvis (Figure 1 A). The density of the fluid suggest and confirmed the presence of hemoperitoneum. The CT-scan shows also a pathological enlargement of the distal tract of the splenic artery (Figure 1 B, D, E) and the presence of a thrombus in the celiac artery (Figure 1 C).

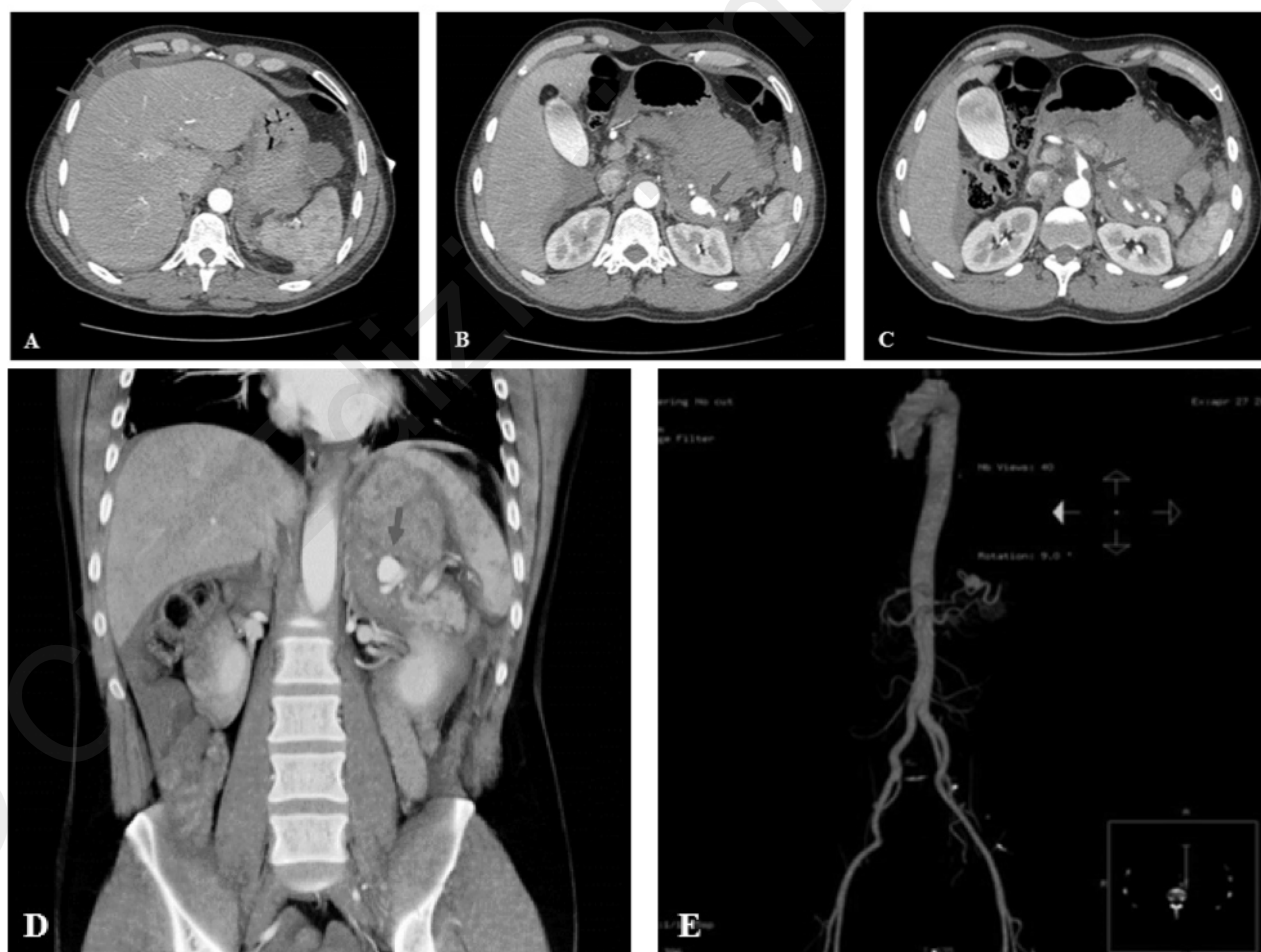


Figure 1 - CT-scan shows the presence of free fluid in perihepatic and perisplenic space and hepatorenal fossa, along the right paracolic gutter, in the omental bag and in pelvis (A). CT-scan shows also a pathological enlargement of the distal tract of the splenic artery (B, D, E) and the presence of a thrombus in the celiac artery (C).

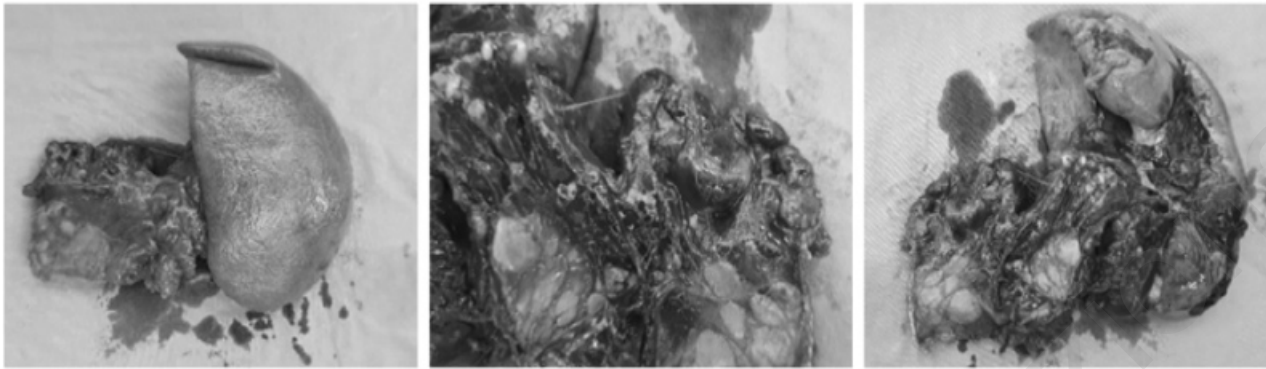


Figure 2 - Surgical specimen.

An emergency explorative laparotomy was performed and the exploration of the abdomen disclose the presence of blood in the peritoneal cavity due to the rupture of a splenic artery aneurysm with also haemorrhagic infarction of the pancreas. The patient underwent splenectomy and partial distal pancreatectomy (Figure 2). Four intra-abdominal drains were positioned: in the perisplenic and peripancreatic space, in the Morrison pouch and in pelvis.

The recovery was uneventful: normal bowel functions restored in 3rd p.o. day and oral feeding restarted in 2nd p.o. day. Drains were removed progressively in 4th, 6th and 7th p.o. day and no pancreatic leaks occur.

The patient was discharged in 20th p.o. day with the recommendation of performing an interventional radiology evaluation for the treat of the celiac artery thrombus. Histological examination confirmed the presence of an aneurysm of the distal tract of the splenic artery and also haemorrhagic infarction of the pancreas.

Discussion

The course of splenic artery aneurism (SAA) is usually asymptomatic until its rupture (12). It is most frequently diagnosed during routine exams for other reasons. A recommended therapeutic strategies are interventional radiology procedures, like percutaneous intravascular embolization, or laparoscopic ligation of the aneurism (2, 3, 8, 13-15). These methods give good therapeutic results, have a short convalescence period and beneficial cosmetic effect, as well as creating better operating conditions

for subsequent, elective 'open' surgery, should it be necessary. Possible risk factors for splenic artery aneurysm include portal hypertension, previous liver transplantation, trauma, pancreatitis, and pregnancy. Unfortunately, a complete understanding of the splenic artery aneurysm disease process is impeded by the rarity of the condition (16). Once splenic artery aneurysms develop, rapid growth of the aneurysm or diameter greater than 2 cm both increase the risks of rupture. Detection of splenic artery aneurysms is usually incidental, and the rarity of the event precludes any recommendations for routine screening. Most splenic artery aneurysms are asymptomatic, while others usually present with light symptoms such as nausea, vomiting, and abdominal pain. When splenic artery aneurysms are suspected, angiography is the gold standard for diagnosis (17). CT and MRI scans are useful for 3D evaluation of aneurysms, and even X-ray can detect splenic artery aneurysms with calcifications.

Management of splenic artery aneurysms depends on their size, location, and presenting symptoms.

Stable aneurysms in the middle third of the splenic artery can be managed with proximal and distal ligation, with the short gastric arteries usually providing enough circulation to preserve the spleen. Stable aneurysms in the distal third of the splenic artery require resection and splenectomy and possible pancreatectomy (5, 18-20).

Ruptured splenic artery aneurysms present with hypotension, loss of consciousness, and other signs of hemorrhagic shock (10). Due to the rarity of the condition, splenic artery aneurysms ruptures are often misdiagnosed.

Ruptured splenic artery aneurysms are first treated with resuscitative measures followed by laparotomy, resection of aneurysm, and splenectomy. If surgical management is delayed, crystalloid and blood transfusion products can be used in resuscitation efforts (6).

In case of non-ruptured SAA, laparotomic surgeries are rare and are performed only in exceptional situations, in case of inefficiency of low-invasive methods or their complications in the form of perforation of aneurysm or migration of embolization coils to the lumen of the gastrointestinal tract (21). In case of acute, sudden rupture of SAA, accompanied by a rapid deterioration of the general condition due to a very sudden hypovolemic shock in the course of massive bleeding to the peritoneal cavity or the gastrointestinal tract, the situation is quite different. In our opinion in such situation the only effective procedure, in view of the drastically deteriorating condition of the patient, leading to their death within minutes, is immediate laparotomy (22, 23). Surgery performed in such conditions has more complications than in elective surgery, among which the most frequent is iatrogenic pancreas leak. Laparotomy in a patient in bleeding shock caused by massive bleeding from the ruptured aneurysm is a life-saving procedure, the success of which depends mainly on the time to perform laparotomy, immedi-

ate readiness of the operating theatre and the experience of surgeons and anesthesiologists forming the therapeutic team. However, making a correct diagnosis in a short time is extremely difficult. The course of the disease is dynamic, and symptoms are few. Among them, hypovolemic shock is predominant (24, 25). In case of aneurysm perforation in the gastrointestinal tract is possible have fresh blood during rectal examination and frequently spilling from the anus or hematemesis (26, 27). Taking control of acute bleeding and stabilization of the patient's condition are a priority. It is extremely important to treat the patient on subsequent days, requiring proper intensive medical care, as well as further surgical interventions in the form of re-laparotomy, clot evacuation, washing out and drainage of the peritoneal cavity, and proper care of the post-surgical wound.

Conclusion

Splenic artery aneurysms (SAA) are very rare. They are unacknowledged until its rupture that cause a massive bleeding. When they are diagnosed before the rupture an interventional radiology procedure is recommended.

References

1. Wierzbicki T, Szmaja J, Borejsza-Wysocki M, Męczyński M, Smuszkiewicz P, Katulska K, Drews M. Massive bleeding from upper gastrointestinal tract as a symptom of rupture of splenic artery aneurysm to stomach. *Med Sci Monit.* 2012 Feb;18(2):CS8-11.
2. Illuminati G, LaMuraglia G, Nigri G. Surgical repair of an aberrant splenic artery aneurysm: report of a case. *Ann Vasc Surg.* 2007;21(2):216-18.
3. Pescarus R, Montreuli B, Bendavid Y. Giant splenic artery aneurysms: case report and review of the literature. *J Vasc Surg.* 2005;42(2):344-47.
4. Abhari P, Abhari S, Jackson A, Moustafa ASZ, Mercer L, Ashraf M. Splenic Artery Aneurysm Case Report. *Case Rep Obstet Gynecol.* 2019 Mar 19;2019:8347983. doi: 10.1155/2019/8347983. eCollection 2019.
5. Selo-Ojeme DO, Welch CC. Review: spontaneous rupture of splenic artery aneurysm in pregnancy. *European Journal of Obstetrics & Gynecology and Reproductive Biology.* 2003;109(2):124-127.
6. Garey ML, Greenberger S, Werman HA. Ruptured splenic artery aneurysm in pregnancy: A case series. *Air Medical Journal.* 2014;33(5):214-217.
7. Arepally A, Dagli M, Hofmann LV, Kim HS, Cooper M, Klein A. Treatment of Splenic Artery Aneurysm with Use of a Stent-Graft. *Journal of Vascular and Interventional Radiology.* 2002;13(6):631-633.
8. Nincheri Kunz M, Pantalone D, Borri A. Management of true splenic artery aneurysms. Two case reports and review of the literature. *Minerva Chir.* 2003;58(2):247-56.
9. Rao S, Sivina M, Willis I. Massive lower gastrointestinal tract bleeding due to splenic artery aneurysm: a case report. *Ann Vasc Surg.* 2007;21(3):388-91.
10. Sadat U, Dar O, Walsh S, Varty K. Splenic artery aneurysms in pregnancy - a systematic review. *International Journal of Surgery.* 2007;6(3):261-265.
11. Hunsaker DM, Turner S, Hunsaker JC. Sudden and unexpected death resulting from splenic artery aneurysm rupture: two case reports of pregnancy-related fatal rupture of splenic artery aneurysm. *Am J Forensic Med Pathol.* 2002;23(4):338-41.
12. Kenningham R, Hershman MJ, McWilliams RG. Incidental splenic artery aneurysm. *J R Soc Med.* 2002;95(9):460-61.
13. Jeyamandi R, Shyamkumar NK, Narayanan K. Giant splenic artery mycotic aneurysm presenting with massive hematemesis.

- Indian J Gastroenterol. 2003;22(4):147-48.
14. Ohmoto K, Yamamoto S. Treatment of multiple splenic aneurysms by coil embolization. *AJR*. 2005;185:556-57.
15. Sandford RM, Lloyd DM, Ross Naylor A. Laparoscopic ligation of splenic artery aneurysm. *Surg Laparosc Endosc Percutan Tech*. 2006;16(2):102-3.
16. Nanez L, Knowles M, Modrall JG, Valentine RJ. Ruptured splenic artery aneurysms are exceedingly rare in pregnant women. *Journal of Vascular Surgery*. 2014;60(6):1520-1523.
17. Jacobson J, Gorbalkin C, Good S, Sullivan S. Splenic artery aneurysm rupture in pregnancy. *The American Journal of Emergency Medicine*. 2017;35(6):935-935.e8.
18. Zampieri F, Gentile V, Lippolis PV. Giant aneurysm of the splenic artery in an elderly man short report and review of the literature. *Ann Ital Chir*. 2005;76(3):275-79.
19. Kayacetin E, Yol S, Kayacetin S. Giant aneurysm of the splenic artery adherent to the pancreas with splenic infarct: report of a case. *Acta Chir Belg*. 2006;106(3):348-50.
20. Kadoya M, Kondo S, Hirano S. Surgical treatment of celiac-splenic aneurysms without arterial reconstruction. *Hepato-gastroenterology*. 2007;54(76):1259-61.
21. Shah NA, Akingboye A, Haldipur N. Embolization coils migrating and being passed per rectum after embolization of a splenic artery pseudoaneurysm, "the migrating coil": a case report. *Cardiovasc Intervent Radiol*. 2007;30(6):1259-62.
22. Kinoshita H, Kubota A, Kasuda S. An autopsy case of rupture of an aneurysm of the splenic artery. *Soud Lek*. 2008;53(4):44-45.
23. Thierauf A, Preuss J, Dettmeyer R. Fatal rupture of an undiagnosed aneurysm of the splenic artery-Medico-legal implications. *Forensic Sci Int*. 2007;171(1):33-36.
24. Koch R, Graziadei I, Zoller H. Posttraumatic splenic artery aneurysm presenting as occult gastrointestinal bleeding. *Wien Klin Wochenschr*. 2003;115(17-18):668-71.
25. Moawad M, Ray S, Joseph JV. Massive upper gastrointestinal haemorrhage due to intragastric rupture of a splenic artery aneurysm. *Int J Clin Pract*. 2002;56(6):482-83.
26. Pinarbasi B, Poturoglu S, Yanar H. A rare case of hemosuccus pancreaticus: Primary splenic artery aneurysm ruptured into pancreatic serous cystadenoma. *Turk J Gastroenterol*. 2008;19(1):57-63.
27. Massani M, Brida A, Caratozzolo E. Hemosuccus pancreaticus due to primary splenic artery aneurysm: A diagnostic and therapeutic challenge. *JOP J Pancreas*. 2009;10(1):48-52.