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Ruptured spontaneous splenic artery aneurysm: A case report and review of the literature

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ABSTRACT

INTRODUCTION: Splenic artery aneurysm is a rare condition, however, potentially fatal. The importance of splenic artery aneurysm lies in the risk for rupture and life threatening hemorrhage.
PRESENTATION OF CASE: This is a case of a ruptured splenic artery aneurysm in a 58-year-old lady. She presented with hypovolemic shock and intra-peritoneal bleeding. Diagnosis was confirmed by CT angiography and she was managed by operative ligation of the aneurysm with splenectomy and distal pancreatectomy.
DISCUSSION: The literature pointed the presence of some risk factors correlating to the development of splenic artery aneurysm. In this article we discuss a rare case of spontaneous (idiopathic) splenic artery aneurysm and review the literature of this challenging surgical condition.
CONCLUSION: Splenic artery aneurysm needs prompt diagnosis and management to achieve a favorable outcome, high index of suspicion is needed to make the diagnosis in the absence of known risk factors.

1. Introduction

Splenic artery aneurysm is a rare condition with a prevalence of 1%.[1] It accounts for about 60% of all splanchnic arterial aneurysms. It only follows aortic and iliac arteries aneurysms as the third most common intra-abdominal aneurysm.[1] The significance of splenic artery aneurysm lies in the potential risk for rupture and life threatening hemorrhage which occurs in 10% of cases with a mortality rate of 10–25% in non-pregnant patient and up to 70% during pregnancy.[2]

A true aneurysm is different from pseudoaneurysms. In a true aneurysms, all the layers of the vessel are intact with a thinned and dilated wall. On the other hand, a pseudoaneurysms or false aneurysms result from a tear in the vessel wall with subsequent formation of a peri-arterial hematoma and is usually secondary to a local inflammatory process such as pancreatitis.[3]

To date the literature pointed the presence of some risk factors correlating to the development of splenic artery aneurysm such as fibromuscular dysplasia, collagen vascular diseases, female gender, history of multiple pregnancies and portal hypertension.[4] We describe a case of spontaneous (idiopathic) splenic artery aneurysm whom presented uniquely without any previously known risk factor.

2. Presentation of case

58-year-old female, presented to ER compiling of epigasteric abdominal pain and nausea for one day. There were no associated symptoms nor there was a history of previous similar episodes. Her past medical history includes cavernous sinus venous thrombosis for which she was on lifelong warfarin anticoagulation and she did not have any previous surgeries. Initial physical examination was unremarkable. Her initial lab test showed a hemoglobin of 13.6 g/dl and INR of 6.6 IU. Abdominal ultrasound did not show any obvious abnormality. The patient was admitted for a possible upper GI endoscopy if symptoms did not resolve after correction of the coagulopathy. Twelve hours following admission the patient complained that her pain suddenly became severe. On examination her heart rate became 110/min and the blood pressure dropped to 90/50 mmHg. Her abdomen became distended with mild general tenderness and her repeated hemoglobin was 6.9 g/dl. Patient was resuscitated and stabilized then shifted to radiology suit. CT angiogram showed large amount of free intra peritoneal fluid and a splenic artery aneurysm with intravenous contrast extravasation consisting of intra peritoneal hemorrhage (Figs. 1 and 2).

The patient was appropriately resuscitated with blood and plasma transfusions and booked for an emergency exploration.

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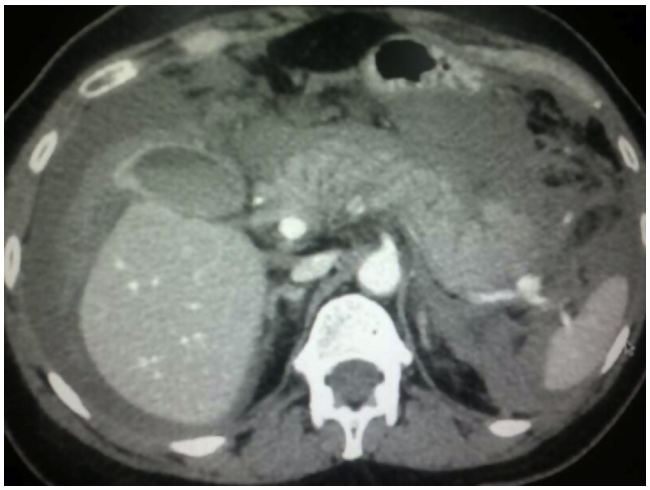

Fig. 1. CT abdomen showing intra peritoneal hematoma.

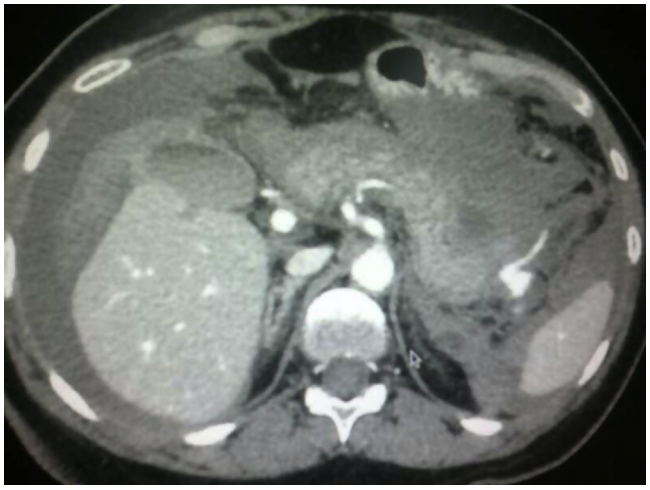

Fig. 2. CT abdomen showing splenic artery aneurysm and contrast extravasation.

In the operating room a midline laparotomy incision was performed. Upon entering the peritoneal cavity a moderate amount of blood and clots were encountered. After proper exposure, a large hematoma was seen in the lesser sac bulging through the gastro-colic omentum. The supra-celiac aorta was identified by dissecting through the gastro-hepatic ligament to assure the availability of vascular control. Exploration of the lesser sac hematoma revealed a ruptured aneurysm involving the distal part of the splenic artery close to the hilum of the spleen, with a total amount of evacuated blood of 3 L. The splenic artery was ligated proximally, followed by a splenectomy with distal pancreatectomy to excise the aneurysm that was inseparable from the pancreatic tail (Fig. 3). As the patient was in hypovolemic shock a damage control approach was taken to expedite the transfer of the patient to the ICU for hemodynamic management and overall support. We believed that a splenectomy was the procedure of choice to accomplish the control of the bleeding in this patient, rather than a splenic tissue preserving procedure. The patient had uneventful postoperative coarse and discharged home on the 7th postoperative day. The histopathology report confirmed the diagnosis of a true splenic artery aneurysm.

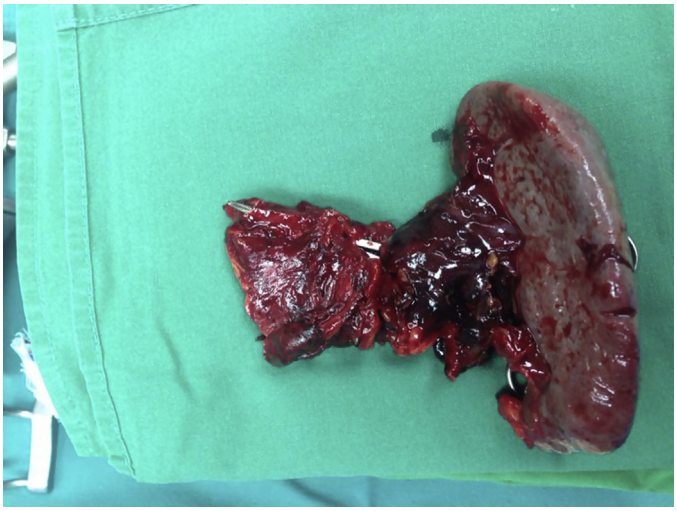

Fig. 3. Excised specimen showing the splenic artery (artery clamp through) and the site of the aneurysm rupturing into the pancreas close to the hilum.

3. Discussion

Splenic artery aneurysm was first described by Beaussier in 1770.[5] The incidence of splenic artery aneurysm in large autopsy series found to be between 0.01% and 0.2%. The incidence

Table 1
Summary of all reported cases of spontaneous (idiopathic) splenic artery aneurysm.

Year	Author	Age (years)	Sex	Presentation	Method of diagnosis	Procedure	Outcome
1990	Lie et al.[16]	71	M	Abdominal pain/UGIB	Angiography	Distal pancreatectomy	Survived
1994	Willis et al.[17]	86	F	UGIB	Not reported	Ligation of the aneurysm	Survived
2000	Deshpand et al.[18]	62	F	Abdominal pain	Intra-operative	Distal pancreatectomy	Survived
		27	M	Shock	Intra-operative	Splenectomy	Died
2001	Jamsheer et al.[19]	30	M	Shock	CT scan	Splenectomy	Survived
2005	Tsokos et al.[20]	33	M	Shock	Autopsy	Not done	Died
2006	Afridi et al.[21]	18	F	Abdominal pain/shock	Intra-operative	Splenectomy	Survived
2007	Mattick[22]	47	M	Abdominal pain/shock	Intra-operative	Splenectomy	Survived
2009	Betal et al.[23]	58	M	Epigasteric pain/shock	CT scan	Splenectomy	Survived
2009	Zubaidi[24]	42	F	LUQ pain/hematemsis	CT scan	Splenectomy/embolization of proximal aneurysm	Survived
2009	Sezgin et al.[11]	22	F	LUQ pain	Intra-operative	splenectomy	Survived
2009	Ousadden et al.[14]	36	F	hematemsis	Intra-operative	Splenectomy	Survived
2013	Katirci et al.[25]	46	F	LUQ pain	CT scan	Splenectomy	Survived
2014	Oakley et al.[26]	33	M	Generalized body pain/shock	Intra-operative	Splenectomy	Survived
		48	M	Abdominal pain/shock	Intra-operative	Splenectomy	Survived

increases to 10% in patients who are older than 60 years and in patients with portal hypertension.[6] Splenic artery aneurysm is more common in females, with a female-to-male ratio of 4:1.[7] Although the pathogenesis is still not clear, many contributing factors have been described, which were found to play a role in the development of splenic artery aneurysm including medial fibrodysplasia, pregnancy, portal hypertension, spleenomegaly, liver cirrhosis, orthotropic liver transplantation, degenerative atherosclerosis, pancreatic pseudocyst, polyarteritis nodosa, vasculitis and congenital anomalies affecting the arteries of the foregut.[8–10] None of these factors was identified in our case with only 15 similar cases of spontaneous (idiopathic) splenic artery aneurysm were reported in the literature over the last 30 years (Table 1).

Patients with splenic artery aneurysm are usually asymptomatic, only 20% of them have symptoms such as abdominal pain, chest pain and most are diagnosed incidentally.[11]

Splenic artery aneurysm can be complicated by rupture resulting in hypovolemic shock, which could be fatal if not treated properly. It can rupture freely in the peritoneal cavity, in the gastrointestinal tract causing GI hemorrhage or eroding into surrounding structures such as, the splenic vein resulting in splenic arteriovenous fistula.[12] A high blood flow through the splenic arteriovenous fistula can rarely lead to mesenteric steal syndrome, which can result in non-transmural small bowel ischemia.[13]

The diagnosis of splenic artery aneurysm can be made by Ultrasound, pulsed Doppler, CT, MRI and abdominal aortic arteriography, which is the gold standard.[14] It is reported that up to 74–87% of the aneurysms are located in the distal third of the splenic artery, 22% in the middle third and the remaining in the proximal third.[15] Indications of treatment include symptoms, aneurysms >2 cm, pregnancy and patients having major upper abdominal surgery.[3]

The therapeutic options are either surgical or endovascular treatment.

Surgical options includes; excision, ligation or revascularization, with or without splenectomy. This could be achieved by either an open or a minimally invasive approach depending on the expertise.[8] The endovascular treatment is usually considered for those who are not candidate for surgery and those in elective settings. It includes different techniques such as coil embolization, placement of covered stents, plug deployment, gluing, and injection of endoluminal thrombin, polyvinyl alcohol, particles, or gelfoam.[3] However, surgical intervention is considered the conventional option of treatment in most centers especially in case of rupture.

4. Conclusion

Splenic artery aneurysm is a challenging diagnosis that needs to be considered in patients presenting with abdominal pain and signs of hypovolemia regardless the presence of an identifiable risk factors. Prompt treatment is detrimental to patient survival.

Conflict of interest

None.

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None.

Ethical approval

The authors confirm that a written informed consent was obtained from the patient for publication of this case report and accompanying images.

Author contribution

Aisha Abdulrahman (senior surgical resident): literature review and summarized all previous similar cases, wrote part of introduction and discussion, photography. Alaa Shabkah (surgical intern): wrote the case details and clinical coarse, improved the introduction and managed the reference list. Mazen Hassanain (assistant professor and consultant HPB and transplant surgeon): reviewed the whole manuscript, offered critiques and improved the discussion. Murad M. Aljiffry (assistant professor and consultant HPB and transplant surgeon): surgeon who performed the operation, reviewed the case, wrote part of discussion and introduction and submission process.

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