Unruptured splenic artery aneurysm presenting as epigastric pain

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We present the case of a patient who presented to the surgical department with a symptomatic unruptured splenic artery aneurysm.

Case report

A 77-year-old multiparous Caucasian woman presented with a three-month history of intermittent generalized abdominal pain with associated vomiting and weight loss. The patient had no previous medical history and her past surgical history included a hysterectomy for fibroids 25 years previously. She was found to be hypertensive (blood pressure 202/78 mmHg) with a pulse rate of 94 bpm. On examination the abdomen was tender in the epigastrium with no guarding or rebound tenderness. No pulsatile mass was palpable. Systemic examination was unremarkable.

The patient's blood results revealed a neutrophilia (neutrophils 8.36×10^9/L, normal range 2.00–7.50×10^9/L), a raised amylase (158 u/L, normal <110) and an elevated γ-glutamyl transferase (151 u/L, normal range 12–43). Abdominal and erect chest radiographs were both unremarkable.

Computerized tomography (CT) of the abdomen revealed several low attenuation lesions within the liver (the largest being in the right lobe). It also showed a focus of calcification in the splenic artery surrounded by a low attenuation lesion closely related to the body of the pancreas (Figure 1). At this stage it was not clear what either the liver or pancreatic lesions represented and so an ultrasound scan of the abdomen was performed.

Ultrasound revealed that the lesion related to the pancreas seen on CT represented a splenic artery aneurysm (SAA) measuring 2.2 cm in diameter (Figure 2). The lesions in the liver were hyperechoic, the largest being an irregular 6.9 cm lesion in the right lobe. Radiological biopsy of the hepatic lesions was not advocated and so instead magnetic resonance imaging (MRI) of the liver was performed.

MRI of the liver revealed some focal areas of particularly high *T2* signal especially in the right lobe lesion. Appearances were not entirely typical of haemangiomas but this was deemed the most likely possibility. Oesophagogastroduodenoscopy (OGD) was also performed to rule out upper gastrointestinal malignancy and was unremarkable.

After multidisciplinary team discussion it was felt that the best course of action was to perform an exploratory laparotomy to biopsy the hepatic lesions and tie off the splenic artery.

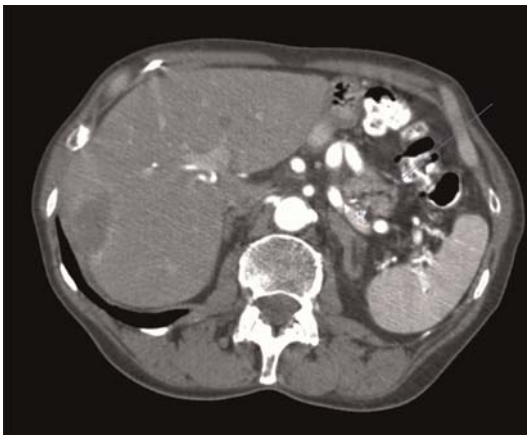
Surgical exploration of the abdomen revealed several white coloured lesions in the liver and a biopsy of the right lobe lesion was taken. The lesser omental sac was opened and the splenic artery was ligated both proximal and distal to the aneurysm. The pancreas appeared slightly oedematous in the region of the aneurysm. The spleen and stomach were normal. Histopathological analysis of the hepatic lesion revealed benign cavernous haemangioma.

The patient was discharged 7 days post-surgery and was commenced on anti-hypertensive therapy for persistently raised blood pressures. She was reviewed in the outpatient department and remains well with no recurrence of her abdominal pain indicating that the cause of her pain had been the symptomatic SAA.

Discussion

SAAs are rare but are increasingly being diagnosed as incidental findings.[1] They account for around 60% of visceral artery aneurysms[2] and

Figure 1
CT appearance of the splenic artery and the lesion related to the body of the pancreas

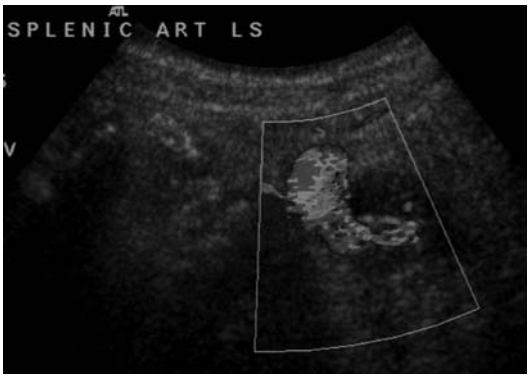


are the third most common intra-abdominal aneurysms after aortic and iliac aneurysms.[3]

The true incidence of SAA is difficult to determine as the majority of cases are asymptomatic. Incidence rates in cadaver studies range from 0.01–10.4%.[4] It is clear, however, that SAAs are being found more frequently and identified earlier due to the availability of advanced imaging techniques.[5]

SAAs have a female:male ratio of 4:1 and have been found to be associated with multiparity, portal hypertension, arterial fibrodysplasia, hypertension and possibly atherosclerosis. It has been hypothesized that during pregnancy the change in hormonal levels alter the arterial wall while increases in circulating volume and cardiac output cause portal hypertension.[3] Portal hypertension causing portosystemic shunting leads to a rise in portal blood inflow volume which is believed to increase the aneurysmal propensity of the splenic artery.[6]

Figure 2
The splenic artery aneurysm as seen on ultrasound scan



In a large Mayo Clinic study, Abbas *et al.* found a mean diameter for SAAs of 2.2 cm with a mean age of presentation of 60.6 years.[7] SAAs >3 cm in diameter are rarely seen and growth is infrequent.[7] The main complication of SAAs is rupture with reported incidence of rupture ranging from 3.0–9.6%[8] with the highest incidence of rupture in young pregnant women.[2] Reported mortality rates after rupture are estimated at 20–36%.[3] This figure increases disproportionately to a mortality rate of 75% among pregnant women with a fetal mortality of 95% after rupture.[9] Abbas *et al.* recommend considering intervention for symptomatic SAAs, SAAs 2 cm in size, or for any SAA in a woman of childbearing age.[7]

The majority of SAAs are located in the distal and middle parts of the splenic artery and in this location differentiating a SAA from a pancreatic mass on contrast-enhanced CT can be difficult as was shown in this case. Colour Doppler ultrasound is a safe and simple imaging technique which can visualize the aneurysm lumen and measure arterial flow through it. Spiral CT is, however, considered the gold standard imaging technique for the diagnosis of SAA.[1]

Reports recommend that SAAs located in the distal part of the splenic artery should be treated by aneurysmectomy with splenectomy, while if the aneurysm is located in the proximal or middle portion of the splenic artery, excision of the aneurysm with or without reconstruction of the splenic artery, or simple ligation of the splenic artery proximal and distal to the aneurysm should be performed.[2] The SAA in our report was located in the middle portion of the splenic artery and was treated with simple ligation and preservation of the spleen.

Recently, successful endovascular stent graft occlusion of SAAs preserving blood flow through the splenic artery has been documented[3] while over the last decade endovascular embolization has presented itself as a viable alternative to

surgery with an 80–92% success rate.[3] The recommended technique for transcatheter embolization is to place coil emboli both proximal and distal to the aneurysm.[10] Alternatives include placement of large coils within the aneurysm or percutaneous thrombin injections.[10] However, embolization is associated with complications such as splenic infarction, abscess formation, higher rates of recurrence and endovascular treatment is generally not advocated for larger aneurysms (though successful treatment has been reported).[3]

Successful laporoscopic resection of a SAA via the anterior approach has been documented and offers good intraoperative exposure, quick postoperative recovery and preservation of splenic function.[8] Successful laparoscopic exclusion of a SAA using a lateral approach has also been reported.[8]

The definitive management of SAA, however, remains controversial because although endovascular and laparoscopic treatments have been shown to be successful traditional open repair often still draws favour because of the lower rate of complications and recurrence.

Conclusion

SAA is a rare clinical condition which is usually asymptomatic but is increasingly being diagnosed due to the availability of advanced imaging techniques. SAAs are associated with multiparity and are at risk of rupture especially in pregnant women. A number of management forms have been reported but conventional open surgery is often favoured and was used in this case.

References

1 Casadei R, Antonacci N, Calculli L, *et al.* Thrombosed splenic artery aneurysm simulating a pancreatic body mass: can two entities be distinguished preoperatively thus avoiding diagnostic and therapeutic mistakes *JOP* 2007;**8**:235–9

2 Tochii M, Ogino H, Sasaki H, *et al.* Successful surgical treatment for aneurysm of splenic artery with anomalous origin. *Ann Thorac Cardiovasc Surg* 2005;**11**:346–9

3 Pescarus R, Montreuil B, Bendavid Y. Giant splenic artery aneurysms: case report and review of the literature. *J Vas Surg* 2005;**42**:344–7

4 Deshpande AA, Kulkarni VM, Rege S, Dalvi AN, Hardikar JV. Ruptured true aneurysm of the splenic artery: an unusual cause of haemoperitoneum. *J Postgrad Med* 2000;**46**:191–2

5 Kokkalera U, Bhende S, Ghellai A. Laparoscopic management of splenic artery aneurysms. *J Laparoendosc Adv Surg Tech A* 2006;**16**:604–8

6 Kenningham R, Hershman MJ, McWilliams RG, *et al.* Incidental splenic artery aneurysm. *J R Soc Med* 2002;**95**:460–1

7 Abbas MA, Stone WM, Fowl RJ, *et al.* Splenic artery aneurysms: two decades experience at Mayo Clinic. *Ann Vasc Surg* 2002;**16**:442–9

8 Lee SY, Florica O. Laparoscopic resection of splenic artery aneurysm with preservation of splenic function. *Singapore Med J* 2008;**49**:e303–e304

9 Sadat U, Dar O, Walsh S, *et al.* Splenic artery aneurysms in pregnancy – a systematic review. *Int J Surg* 2008;**6**:261–5

10 Herskowitz MM, Safriel Y, Gillego V. Successful treatment of a giant splenic artery aneurysm solely by proximal coil embolisation. *EJVES Extra* 2002;**3**:52–3