CASE REPORTS

Giant splenic artery aneurysms: Case report and review of the literature

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Although splenic artery aneurysms (SAAs) are the most common visceral aneurysms, giant SAAs >10 cm in diameter have rarely been reported. We present the case of a 67-year-old asymptomatic man who was diagnosed with a 15-cm SAA in the absence of a clear etiologic factor. The patient underwent open surgical repair. A medial visceral rotation was performed to gain good vascular control and subsequently the aneurysm was ligated from within. A systematic review was carried out, allowing us to analyze 12 cases of giant SAAs >10 cm published to date. The difference in terms of demographics, clinical presentation, and arterial location between the giant SAA group and usual SAAs may indicate a different underlying physiopathology that remains unclear at this time. (J Vasc Surg 2005;42:344-7.)

Splenic artery aneurysms (SAAs) are the most common of the visceral artery aneurysms, accounting for 60% to 71%.1,2 Moreover, they represent the third most common intra-abdominal aneurysms after aortic and iliac aneurysms. In the largest series published to date, Abbas et al1 and Trastek et al2 have found a mean diameter for SAAs of 2.2 cm and 2.1 cm, respectively. SAAs are rarely >3 cm in diameter.3 Thus, it is no surprise that there have been only few cases of giant SAAs >10 cm in diameter reported in the literature (Table).

CASE REPORT

A 67-year-old man was admitted to the surgical department of our hospital after his family physician had discovered a large pulsatile mass in the left upper quadrant of the abdomen. His past medical history included dormant multiple sclerosis. There was no history of hypertension, diabetes mellitus, coronary heart disease, smoking, trauma, or previous surgery. The patient was entirely asymptomatic.

A triple contrast helicoidal computed tomography (CT) scan of the abdomen revealed a 15-cm heterogeneous mass that took only a little of the intravenous contrast, which was consistent with an almost entirely thrombosed aneurysm of the splenic artery (Fig 1). The differential diagnosis included gastric neoplasia and a pancreatic pseudocyst. An abdominal aortography, including selective celiac and superior mesenteric angiography, confirmed the presence of a 15-cm aneurysm originating from the medial third of the splenic artery (Fig 2). Preoperative investigations were otherwise unremarkable. There were no concomitant thoracic or femoropopliteal aneurysms.

The patient was brought to the operating room electively for treatment of this lesion. From an anterior approach through a chevron incision, the opening of the lesser omental sac through the gastrocolic ligament revealed the 15-cm SAA that was compressing against the transverse mesocolon, the pancreas, and the stomach (Fig 3). As the celiac trunk was inaccessible from an anterior approach, retroperitoneal access was gained after medial visceral rotation. This allowed the surgeons to access the supraceliac aorta, which was then dissected down towards the origin of the celiac axis.

After careful dissection of the vascular structures, the normal proximal splenic artery was isolated for vascular control. After ligation of the proximal splenic artery, the aneurysm was incised longitudinally, and a large mural clot was removed en bloc. The proximal and the distal splenic artery were ligated from within the aneurysm. The spleen remained well vascularized, but it was removed because of a significant capsular tear. Only the anterior aspect of the aneurysmal wall was resected. The posteroinferior wall was left intact because it was adherent to the pancreas.

Pathologic analysis of the aneurysmal wall showed atherosclerotic changes, mural thrombus, and was consistent with a true aneurysm. The clot was examined, and a persistent arterial channel within the thrombus, slightly larger than a normal splenic artery, was the only residual lumen through which blood flowed towards the spleen. This explained the relatively small amount of contrast seen inside the lesion on the CT scan.

The patient’s postoperative recovery was uneventful. He was discharged on postoperative day 7 and continues to be well at the 6-month follow-up.

DISCUSSION

Splenic artery aneurysms are being diagnosed more commonly than in the past, mainly because of increased availability of CT and angiography.12 Their reported prevalence, however, varies considerably from 0.16% in an...
True giant splenic artery aneurysms >10 cm in diameter

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*Intraoperative rupture.

unselected autopsy series to 10.4% when SAAs were deliberately searched for in a population >60 years old. Moreover, most past reports did not distinguish between true and false aneurysms. We decided to selectively review true aneurysms to avoid confounding two potentially different pathologies with different natural histories. Only 12 true giant SAAs >10 cm have been reported to date (Table). These aneurysms appear different from common SAAs with respect to the gender in which they present, their location in the splenic artery, and their clinical presentation. Only 4 (33%) of the 12 reviewed giant SAAs were diagnosed in females. This is very different from the usual 4:1 female-to-male ratio seen in large SAA studies. In the Mayo Clinic series, 81% of patients were female, with a mean number of pregnancies of 3.8. Moreover, past reports have shown that 91% of females presenting with a SAA have been pregnant at least once. True SAAs occur primarily in association with multiparity, portal hypertension with splenomegaly, arterial fibroplasia, hypertension and possibly atherosclerosis. During pregnancy, alteration of the arterial wall as a consequence of hormonal level changes, as well as the increase in blood volume and cardiac output causing portal congestion, represent plausible mechanisms that may predispose to the formation of SAAs in pregnancy, especially in multiparous women. Surprisingly, among the identified giant SAAs, there is only one 27-year-old multiparous woman.

Our 67-year-old male patient presented with a giant aneurysm in the absence of a clear etiologic factor. Atherosclerotic changes had occurred on the aneurysmal wall, but whether this was a causative factor or a secondary phenomenon is unclear. Indeed, in one series, 99% of all resected aneurysms were shown to contain atheromatous plaques. Our observations concur with those made by Long et al. in suggesting that most of the giant SAAs we reviewed occurred in individuals who are typical of patients affected by other non splenic aneurysms. Most SAAs are solitary (87% of 317 patients), saccular, and located in the distal third of the splenic artery (80 of 100 patients), frequently at an arterial bifurcation point. As opposed to the usual aneurysms, 6 of the 7 giant SAAs for which this information is available were situated in the middle third of the artery and only one in the distal artery.

In the Mayo Clinic series, 90% of the patients were asymptomatic at the time of the initial diagnosis. Conversely, only 50% of the giant SAAs were asymptomatic. Interestingly, similar to our case, huge aneurysms of 15 cm and 18 cm were reported to be asymptomatic and were discovered incidentally during physical examination or upon abdominal imaging. On the other hand, two characteristics seem to be shared by common and giant SAAs. First, the mean age of presentation (60.6 years) of the 317 patients in the Mayo Clinic SAA series was similar to that of the reported giant SAAs (61.2 years). Second, 8% of patients (1 of 12) with giant SAAs presented with multiple SAAs, and this seems comparable to the reported 13% in patients with common SAAs.

The main complication of SAAs is rupture, and this has been reported in 2% to 10% of cases, although the true risk is probably closer to 2%. The smallest SAA known to have ruptured measured 2 cm. Reported mortality rates after rupture vary considerably but are estimated at 20% to 36%. Among the giant SAAs reviewed, three (25%) of 12 aneurysms ruptured, resulting in two deaths. At first glance, the prevalence of aneurysmal rupture at presentation seems consistent with a higher risk of rupture because of their large diameter; however, one may question how a single splenic aneurysm can reach such a size without rupturing. This data should be interpreted cautiously because of the lack of a good, long-term large patient series and a potential publication bias favoring the reporting of patients presenting before rupture.

Generally accepted indications for treatment include symptoms due to the aneurysm, documented enlargement, pregnancy or anticipation of pregnancy, portal hypertension presenting for liver transplant, and diameter >2 cm. Three treatment options are available: conven-
tional open surgery, endovascular treatment,21-25 and more recently, laparoscopic surgery.20,26

Until recently, open aneurysmectomy, with or without splenectomy was recognized to be the best treatment for aneurysms of the proximal or distal thirds of the splenic artery. Lesions of the medial third were often adherent to the pancreas; therefore, exclusion by proximal and distal ligation was a safer alternative. The spleen, which has a good collateral vascular supply via the short gastric arteries,7 was preserved when possible, preventing potential postsplenectomy sepsis.

The surgical approach for giant SAAs is challenging because the celiac trunk may be inaccessible anteriorly due to the size of the mass. Long et al3 have used a thoracoabdominal incision to gain retroperitoneal access to the aorta and the celiac axis. Once identified, the celiac trunk was controlled and all viscera were moved to the left upper quadrant to ensure access to the aneurysm through the gastrocolic ligament.5 A similar retroperitoneal approach was used for our patient with a chevron incision and medial visceral rotation. We believe our approach to be less invasive than that of Long et al,3 providing us with good vascular exposure and without the morbidity associated with a thoracotomy.

Recently, endovascular stent graft exclusion of SAAs preserving the blood flow through the artery have been realized.24,25 Moreover, during the last decade, endovascular embolization has become a viable alternative to surgery, as demonstrated by a 80% to 92% success rate.1,22,27,28 Potential complications of coil embolization include splenic infarction, abscess formation, and higher rates of recurrence.21,29

To our knowledge, embolization or stent graft exclusion have never been used in the treatment of true SAAs ≥4 cm in diameter. In the present case, stent graft exclusion was deemed inapplicable because the extreme tortuosity of both the splenic artery and the persistent arterial channel would have precluded stent graft deployment. Proximal and distal embolization would probably represent the ideal therapy of such aneurysms, allowing for an excellent treatment of the disease and a minimally invasive approach. However, although there is no literature on the subject, it was believed that, again, the length and tortuosity of the arterial channel would have increased the likelihood of failure of distal embolization.

CONCLUSION

Giant SAAs are a rare clinical entity. They differ from usual SAAs in the gender in which they usually present,
their location on the splenic artery, and their clinical presentation. Treatment of these large aneurysms is challenging, and although an open surgical approach has been the standard of care in the past, minimally invasive endovascular approaches should be further investigated.4,6,10,11

REFERENCES