DOI: 10.7860/IJARS/2016/20609:2157

Case Report

Surgery Section

Splenic Artery Aneurysms: Review of Pathogenesis, Diagnosis and Treatment and Presentation of Open Repaired Case

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ABSTRACT

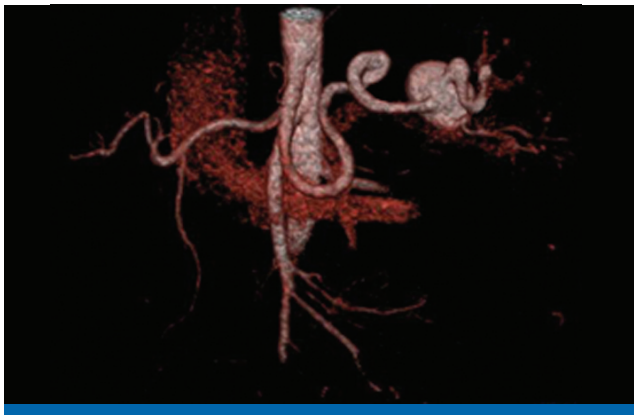
Splenic Artery Aneurysm (SAA) is the most common visceral artery aneurysm (60%). It remains asymptomatic in over 95% of patients. SAA occurs predominantly in women of child-bearing age. Multi-slice SC angiography can accurately and clearly display the location of the SAA. Different management strategies can be applied: open surgery, endovascular approach and laparoscopy.

We present the case of a 30-year-old female with a history of breast cancer T1cN0M0. Contrast-enhanced computed tomography scanning showed a 28mm true aneurysm of the splenic artery. Due to unfavourable anatomy for the endovascular intervention (elongated and tortuous splenic artery) the patient underwent open surgery. The aneurysm was excised and the splenic artery was reconstructed with end-to-end anastomosis. The patient was discharged from the hospital without any complication after 3 days.

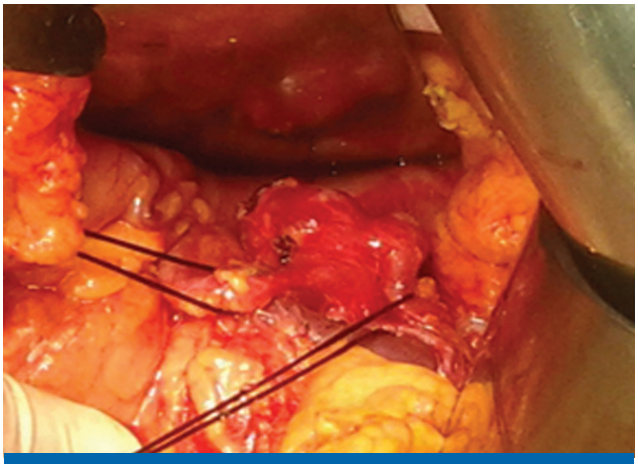
Keywords: Aneurysmectomy, CT scanning, Open surgery, Visceral artery

CASE REPORT

A 30-year-old female with no history of trauma was admitted to our hospital. She had a history of breast cancer T1cN0M0 and underwent breast tumor wide excision combined with sentinel lymph node biopsy 1 month earlier. This treatment was followed by routine CT scanning and CT angiography, which revealed the SAA. Contrast-enhanced computed tomography scanning showed an 28mm true aneurysm of the splenic artery [Table/Fig-1]. At presentation the patient was normotensive. The splenic artery was elongated and tortuous. Due to unfavourable anatomy for endovascular intervention the patient underwent open surgery. Through transverse laparotomy the peritoneal cavity was opened. The omental sac was revised and saccular SAA located at the artery bifurcation in distal third of splenic artery was exposed [Table/Fig-2]. Systemic anticoagulation was applied. The aneurysm was excised and the splenic artery was reconstructed with end-to-end anastomosis. Postoperatively

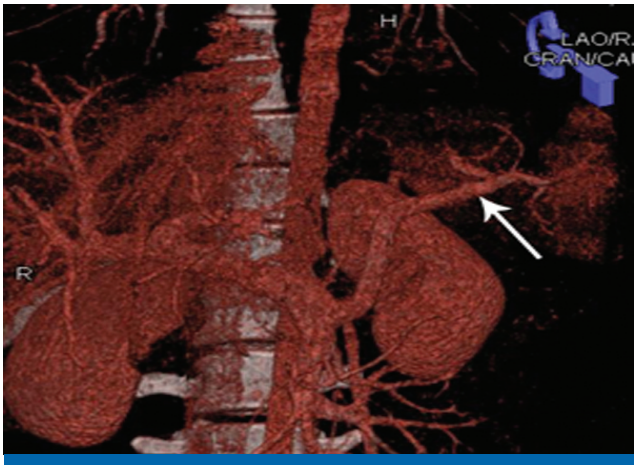


[Table/Fig-1]: Contrast-enhanced CT scanning with 3D reconstruction demonstrating the aneurysm of the tortuous splenic artery and the SAA.

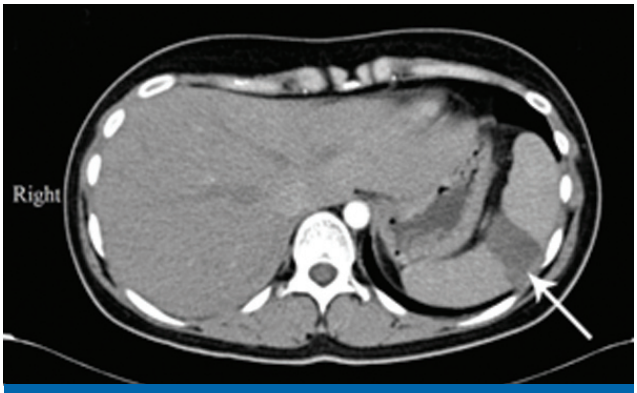


[Table/Fig-2]: Open exposure of the SAA.

the patient was monitored 24 hours in the intensive care unit. She was subsequently discharged from the hospital without any complication after 3 days. The CT scanning on the 6th postoperative day revealed patent splenic artery, without any stenosis. The SAA was relatively straight, due to its shortage following aneurysmectomy [Table/Fig-3]. Nevertheless the wedge-shaped spleen infarction was found [Table/Fig-4]. During 18 months following the SA repair repeated ultrasound examinations revealed shrinkage of infarcted area in the spleen. Long-term preservation of splenic function has been achieved.



[Table/Fig-3]: Contrast-enhanced CT scanning with 3D reconstruction on the 6th postoperative day revealing patent splenic artery (arrow).



[Table/Fig-4]: Contrast-enhanced CT scanning on the 6th postoperative day revealing the wedge-shaped spleen infarction (arrow).

DISCUSSION

Although rare, the SAA is the most common visceral artery aneurysm (60%), with 4:1 female-to-male predominance , commonly located in the distal third of the splenic artery (75% of cases) [1,2]. SAAs located in the middle third of the artery are described in 20% of cases. SAAs remain asymptomatic in over 95% of patients. SAAs occur predominantly in younger women (58%) of child-bearing age [3-5]. Multi-slice SC angiography can accurately and clearly display the location of the SAAs [6,7].

Our patient was a female in child-bearing age suffering from the asymptomatic SAA located in distal third of splenic artery. The artery was elongated with increased tortuosity [Table/Fig-1] as described in many cases in the literature [1]. Saccular shape of the aneurysm and location at the artery bifurcation are also typical [Table/Fig-1].

SAAs are associated with atherosclerosis, although a few cases of fibromuscular dysplasia were reported [7,8]. In our case microscopic examination of aneurysm wall didn't reveal fibromuscular dysplasia.

Patients with this type of aneurysm often present without symptoms and the SAAs are often found during investigation of other abdominal diseases [9]. In the presented case the SAA was revealed during routine CT scanning following breast cancer excision.

True SAAs are usually not greater than 3cm in diameter. Mural thrombus and calcifications frequently occurs. In our case the SAA was 28mm in diameter.

Because of the associated potentially fatal consequences, prompt management of SAA is of prime importance [4,10]. Different management strategies can be applied: open surgery, endovascular approach and laparoscopy.

Open surgical approaches include proximal and distal ligation of SAAs located in proximal and medial third of splenic artery. When SAA is located at distal third of splenic artery aneurysm excision and repair (primary anastomosis or patch closure) should be considered [1]. The other options are ligation without resection of the SAA located in proximal third of splenic artery [11] and splenectomy with aneurysm resection for the SAA in distal third of splenic artery [12].

Endovascular approach compared to open surgery, has a lower success rate (85%), but significantly reduced morbidity and mortality rates as well [1].

Although, in hemodynamically stable patients with not-ruptured SAA endovascular approach is usually recommended [1], the patient we present underwent open surgery due to unfavourable anatomy for the endovascular intervention with elongated and tortious splenic artery [Table/Fig-1]. During operation, the splenic artery and the SAA were exposed [Table/Fig-2], the splenic artery was cross-clamped, the aneurysm was excised and the artery was sutured end-to-end. The patient was subsequently discharged from the hospital without any complications after 3 days. The CT scanning on the 6th postoperative day revealed patent splenic artery [Table/Fig-3] and the wedge-shaped spleen infarction [Table/Fig-4].

The spleen infarction didn't require any additional treatment and was followed for 18 months with repeated ultrasound examinations.

CONCLUSION

The SAA is an uncommon pathology with a potential for rupture. If a rupture occurs, SAA became a life-threatening pathology. Rapid diagnosis and treatment is of prime importance.

Due to high mortality rate in case of aneurysm rupture, even asymptomatic SAAs should be treated. In case of unfavourable anatomy for the endovascular intervention, open repair is a safe procedure.

REFERENCES

[1] Mohan IV, Stephen MS. Peripheral arterial aneurysms: open or endovascular surgery? *Prog Cardio vasc Dis*. 2013;56(1):36-56.

[2] Manjunatha YC, Prasad KNV, Beeregowda YC, Bhaskaran A. Multiple splenic artery aneurysms secondary to extra hepatic portal vein obstruction. *J Clin Diagn Res*. 2013;7(2): 401–02

[3] Ha JF, Phillips M, Faulkner K. Splenic artery aneurysm rupture in pregnancy. *Eur J Obstet Gynecol Reprod Biol*. 2009;146(2):133-37.

[4] Sadat U, Dar O, Walsh S, Varty K. Splenic artery aneurysms in pregnancy-A systematic review. *Int J Surg*. 2008;6(3):261-65.

[5] Boumans D, Weerink LB, RheineckLeyssius AT, Swartbol P, Veneman TF. Splenic artery rupture during pregnancy concealed by a pancreatic lymphangioma: a rare co-occurrence. *Ann Vasc Surg.* 2013;27(1):112.e1-e4.

[6] Ming WD, Li XG, Xue HD, Jin ZY. Role of multi-slice computed tomography angiography in the diagnosis of visceral artery aneurysms. *Zhongguo Yi Xue Ke Xue Yuan Xue Bao*. 2014;36(3):296-99.

[7] Aroor AR, Rama Prakasha S, Raghuraj U, Attar NR. Multiple splenic artery aneurysms: a rare cause of extrahepatic portal hypertension and massive splenomegaly. *J Clin Diagn Res.* 2014; 8(9): MD01–02.

[8] Unlü C, van den Heuvel DA, Leeuwis JW, de Vries JP. Ruptured aneurysm of the splenic artery associated with fibromuscular dysplasia, *Ann Vasc Surg*. 2014;28(7):1799.e15-e8.

[9] GuillaumonI AT, Chaim EA. Splenic artery aneurysm associated with anatomic variations in origin. *J Vasc Bras*. 2009;8(2)177-81.

[10] Oakley E, Ho JD, Johnson V, Vancamp J, Melson T, Hick JL. Splenic artery aneurysm: an important cause of hemoperitoneum and shock. *J Emerg Med*. 2014;46(3):e65-67.

[11] Wei YH, Xu JW, Shen HP, Zhang GL, Ajoodhea H et al. Laparoscopic ligation of proximal splenic artery aneurysm with splenic function preservation. *World J Gastroenterol*. 2014;20(16):4835-38.

[12] Chen JS, Chuang SC, Wang SN, Chang WT et al. Natural course of splenic artery aneurysm with associated spontaneous splenorenal shunt in non-cirrhotic liver: An 18-year observational follow-up and review of literature. *Kaohsiung J Med Sci*. 2013;29(1):55-58.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Publishing: **Jul 01, 2016**