Case Report

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A Case Report: Splenoaneurysmectomy by Using a Powered Vascular Staplerin A Giant Splenic Artery Aneurysm with Connective Tissue Disease

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ABSTRACT

Splenic artery aneurysms (SAAs) account for more than half of all visceral artery aneurysms. SAAs are the third most common intraabdominal aneurysm. Although SAAs is rare but are potentially life threatening [1]. It can cause complications, such as spontaneous intraperitoneal rupture, into the neighbouring hollow organs, and fistulisation into the pancreatic duct.

In a small SAAs (2 cm) are asymptomatic, and are diagnosed incidentally by radiological. Meanwhile giant SAAs (5 cm) present symptomatic and can result in complications. A 47 year old woman with underlying connective tissue disease presented with symptomatic abdominal pain and noted to have a giant splenic artery aneurysm. We proceeded with splenectomy and successfulaneurysmectomy of splenic artery with using Powered Vascular stapler gun. In our knowledge and literature review, a giant splenic artery aneurysmectomy by using a powered vascular stapler gun is not commonly practiced. Most importantly, as this is connective tissue disease patient, her safety requires technical experience and PVS is safe measure to be used even in a giant splenic artery aneurysm measuring up to 5 cm.

Keywords

Splenic artery aneurysms, Aneurysmectomy, Powered Vascular stapler gun, Connective tissue disease, Systemic lupus erythematous.

Introduction

Splenic artery aneurysms are the third most common intraabdominal aneurysm after the aorta and iliac arteries. However it is the most common site of visceral arteries accounts about 60% of cases. Splenic artery aneurysm was first described by Beaussier in 1770 and the second case was reported by Parker in 1844. Wagner in 1946 used aortography to diagnose splenic artery aneurysm. Since then conventional roentgenography were used to detect the calcified aneurysms. The mean size of splenic artery aneurysms is reported to be 2.1 cm. We would like to discuss about a 47 year old women with underlying systemic lupus erythematous presented with symptomatic abdominal pain and noted to have a giant splenic artery aneurysm. We would like to discuss regarding the management and operative approach in a connective tissue patient with a giant splenic artery aneurysm.

Case report

A 47 years old malay women with underlying of Systemic lupus erythematous diagnosed in year 2000 with antiphospolipid syndrome positive. Patient was under rheumatology follow up and was taking steroid medication. Patient initially presented with the complaint of menorrhagia, lethargy and lower abdominal pain. In the physical examination, there was a left lumbar mass. Laboratory investigation showed thrombocytopenia. Ultrasound showed a pancreatic tail lesion. Then we proceeded with Endoscopic Ultra Sound (EUS) which showed a round vascular lesion measuring 2.5 cm x 3.1 cm arising from splenic artery. After 3 months, we repeated EUS which showed the lesion was increasing to 2.9 cm x 3.1.Then the patient was referred for further management.

A CT Pancreatic protocol reviled a splenic artery aneurysm with portal hypertension with multiple periportal, splenic, stomach and distal oesophageal varices and splenomegaly (Figure 1). We proceeded with splenectomy and successful aneurysmectomy of splenic artery by using Powered Vascular stapler gun (PVS). Postoperatively patient was nursed in Postoperative Anaesthesia Care Unit (PACU). Patient had a speedy recovery and was discharge home on day 3.

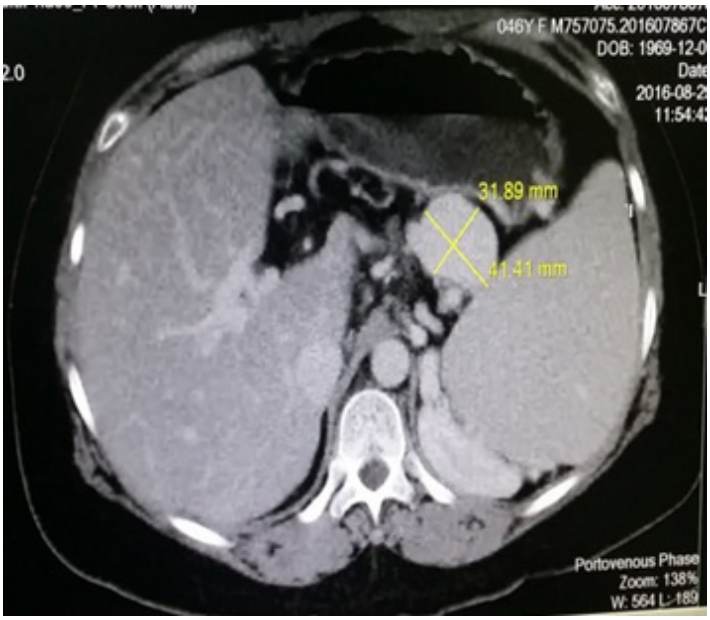

Figure 1: Preoperative CT contrast shows large saccular aneurysm of the distal portion of the splenic artery (maximal transverse diameter of 4.1 cm), encroaching upon the splenic hilum.

Discussion

Splenic artery aneurysms are the most common splanchnic artery aneurysms, representing 60% of such lesions [2]. They are also the third most common site of intra-abdominal aneurysms after the aorta and the iliac arteries [3,4]. The reported risk of rupture of splenic artery aneurysms varies from 3% to 9.6%. More significantly, 95% of splenic artery aneurysms discovered during pregnancy are ruptured, resulting in a disproportionately high maternal mortality rate of 70% and a fetal mortality rate 75% [5-8]. Most of these aneurysms are small and saccular and occur in isolation, usually at arterial bifurcations. Multiple lesions are seen in approximately 20% of patients [9]. More than 80% are located in the mid or distal splenic artery [10]. The reported incidence of splenic artery aneurysms at autopsy varies, rising from 0.01% to 0.2% in all age groups to 10.4% in the geriatric population, [11,12] the mean age of presentation being 52 years (range, 2 to 93 years) [12].

Giant SAAs are very rare and have several important differences compared with smaller SAAs. The high risk of rupture demands rapid intervention. Although treatment is challenging, they can be safely treated surgically by a carefully planned approach based on adequate exposure and proximal and distal arterial control. Advances in endovascular techniques have provided more therapeutic alternatives, especially for high-risk candidates and for aneurysms that are difficult to treat surgically [13].

Abbas et al. did a large case series of 217 patients over duration of 18 years and concluded that most SAAs are <2.5 cm in diameter and asymptomatic [14]. Meanwhile Trastek et al. did a large case series of 100 patients over duration of 20 years and found a mean diameter for SAAs of 2.2 cm and 2.1 cm, respectively [15]. Spittel et al. described that the average splenic artery aneurysms size is 2.1 cm and they rarely exceeded more than 3 cm.

Trastek et al. found that affected women had an average of 4.5 previous pregnancies at the time of diagnosis [1]. Portal hypertension was present in as many as 24% of patients with splenic artery aneurysm and they were noted in 7% to 20% of patients with cirrhosis and portal hypertension. The incidence in patients with chronic liver disease who undergo liver transplantation is 10%.

In our case the splenic artery was approximately 5 cm which would have about 2-10% of risk for spontaneous aneurysmal rupture. For this reason operative management is indicated in symptomatic aneurysms or those with rupture risk factors. SAA occur four times more frequent in women compared to man. This could be due to the hormonal effects during pregnancy. Majority of SAAs in pregnant women are diagnosed after rupture and which carries a 70% maternal and 95% fatal mortality rate. The summary of other possible causes for developing splenic artery aneurysm is shown in table 1.

TABLE 2. The Possible Causes Are Related to the Development of Splenic Artery Aneurysms

1	Multiple pregnancies
2	Portal hypertension
3	Cirrhosis
4	Acute pancreatitis
5	Chronic pancreatitis
6	Pancreatic pseudocysts
7	Mycotic
8	Pancreatic cancer
9	Fibromuscular dysplasia
10	Trauma
11	Medial degeneration
12	Posttraumatic pancreatitis
13	Cushing disease
14	Aortic coarctation
15	Mesenteric steal syndrome
16	Coagulopathy
17	Polycystic renal diseaee
18	Hepatoma
19	Cystic media necrosis
20	Gaucher disease
21	Lupus erythematosus
22	Inflammatory processes
23	Hypertension
24	Atherosclerosis

Table 1: The possible causes of developing Splenic artery Aneurysm.

Akbulut et al. did a comprehensive literature review on the giant splenic artery aneurysm in which they have reviewed 69 articles (62 full text, 6 abstract, 1 non-available). A total of 78 patients were taken in account in which 50 were males and 28 were females. They concluded treatment options for SAAs depend on age, sex, aneurysm dimension, location, complications, and severity of the clinical findings. Despite technical improvements, open abdominal surgery remains the gold standard for treatment. The mortality and morbidity of open abdominal surgical treatment are 1.3% and 9%, respectively. Table 2 is a summary of Meta analysis patient in which out of 78 patients no one had connective tissue disease [16].

TABLE 2. Demographic and Clinical Characteristics of 78 Patients With Giant SAAs

References	Year	Country	Article Language	Article Type	Type	Age	Sex	Size	Underling Causes	True/ Pseudo	Symptomatic/ Incidental
Hussain	2015	Pakistan	English	Letter	Fulltext	58	M	100	Idiopathic	True	Yes
Rodriguez-Caulo	2014	Spain	English	Letter	Fulltext	52	M	60*58	Hipertension+DM+Aortic Aneurysm	NS	Incidental
Uzunoglu	2014	Turkey	Turkish	Poster	Abstract	45	M	70	Idiopathic	NS	Yes
Ilkeli	2014	Turkey	Turkish	Case report	Fulltext	60	F	70*65	Hipertension+DM	NS	Yes
Ho	2013	China	English	Case report	Fulltext	65	M	81*72	Hipertension+AF	Pseudo	Yes
Ho	2013	China	English	Case report	Fulltext	58	M	70*66	Pancreatic surgery(Laparoscopic)	Pseudo	Incidental
Uyar	2013	Turkey	Turkish	Case report	Fulltext	63	M	230	Chronic pancreatitis	NS	Incidental
Tekola	2013	USA	English	Case report	Fulltext	48	M	78*51	Mycotic (S.Enteritidis)	Pseudo	Yes
Akkucuk	2013	Turkey	English	Case report	Fulltext	77	F	54*53	Hipertension+MI+DM	True	Yes
Tirpude	2013	India	English	Case report	Fulltext	40	M	100*80	Chronic pancreatitis	Pseudo	Yes
Miao	2013	China	English	Case series	Fulltext	51	M	56*49	Cirrhosis	NS	Yes
Mishra	2012	India	English	Case report	Fulltext	27	F	50*50	Portal Hipertension	True	Incidental
Mishra	2012	India	English	Case report	Fulltext	35	F	50*40	Portal Hipertension	NS	Incidental
Goes Junior	2012	Brazil	English	Case report	Fulltext	64	F	65	Hipertension+Childbirth?	NS	Yes
Yadav	2012	India	English	Case report	Fulltext	58	F	127*118	Idiopathic	True	Yes
Law	2012	China	English	Case report	Fulltext	49	M	72*55	Atherosclerosis	NS	Yes
Mastroro-berto	2012	Italy	English	Case report	Fulltext	60	M	90	Cirrhosis	NS	Yes
Gupta	2011	India	English	Case report+ Literature	Fulltext	47	M	70*40	Chronic pancreatitis+DM	Pseudo	Yes
Rathod	2011	India	English	Case report	Fulltext	40	M	50*38	Chronic pancreatitis	Pseudo	Yes
Goldberg	2011	USA	English	Clinical image+ literature	Fulltext	68	M	180	Iatrogenic+CAD+CABG	Pseudo	Yes
Orsitto	2011	Italy	English	Case report	Fulltext	63	F	90	Hipertension+AF	NS	Incidental
Aksoy	2011	Turkey	Turkish	Poster	Abstract	46	F	70	NS	NS	Yes
Ali	2011	India	English	Case report	Fulltext	35	F	100*80	Childbirth?	NS	Yes
Parikh	2011	USA	English	Clinical image	Fulltext	62	M	86	Chronic pancreatitis+Cirrosis	Pseudo	Yes
Mickovic	2011	Serbia	English	Case report	Fulltext	42	M	85*60	Acute pancreatitis+ Pseudocyst	Pseudo	Yes
Pappy	2010	USA	English	Case report	Fulltext	80	F	70	Pancreatitis+ Hypertension	NS	Yes
Yadav	2009	India	English	Case report	Fulltext	35	F	180*150	Idiopathic, Nulliparous woman	NS	Yes
Karsidag	2009	Turkey	English	Case report	Fulltext	47	F	79*72	Rheumatic fever	NS	Yes
Massani	2009	Italy	English	Case report+ literature	Fulltext	53	M	70	Chronic pancreatitis+Pseudocyst	True	Yes
Manian	2009	UK	English	Case report	Fulltext	63	M	62	Hypertension	NS	Yes
Aybar	2009	Turkey	Turkish	Case report	Fulltext	56	M	50*40	NS	NS	Yes
Mechchat	2008	Morocco	French	Case report	Abstract	62	M	100	NS	NS	Yes
Sun	2008	China	English	Original article	Fulltext	42	F	90	NS	NS	NS
Russo	2008	Italy	English	Case report	Fulltext	49	F	>100	Ulcerative colitis?	NS	Incidental
Vlychou	2008	Greece	English	Case report	Fulltext	80	M	120*80	Idiopathic	NS	Yes
Asad	2008	India	English	Case report	Fulltext	57	M	50	Acute pancreatitis+DM	Pseudo	Yes

Table 2: Summary of Meta analysis patient in which out of 78 patients no one had connective tissue disease.

Minimal-invasive percutaneous transcatheter embolizatin is an effective and safe treatment opting even for large and possibly mycoti SAAs. The risk of rupture is not solely correlated with the aneurysm size, which was also confimed by others [17]. The only clear consensus is that symptomatic SAAs should be treated immediately [18], since rupture can result or has already occurred, leading to a high mortality. SAAs can be treated surgically with a ligatin of the splenic artery, ligatin of the aneurysm or aneurysmectomy (sometimes including splenectomy) and with an open or laparoscopic operatin [19]. Interventional treatment has emerged as a treatment of choice and the effect and safety of this method has been demonstrated [20-22].

Elective operation is indicated in patients with SAA was more than 2 cm in diameter, in pregnant women or women of childbearing age with lesions >1 cm, and in symptomatic patients with a lesion of any size. This patient has fulfilled the above mentioned criteria for elective operative treatment. In our case there were different possibilities, such as laparoscopic surgery, endovascular embolisation, endovascular stenting or open surgery. The size of the aneurysm and arterial tortuosity are limiting factors for embolisation and stent placement. In these cases, open surgical management was chosen. Beside this the patient had underlying idiopathic thrombocytopenic purpura with primary antiphospolipid syndrome. Open surgical approaches can include splenectomy with excision of the aneurysm, proximal and distal ligature of the splenic artery with or without resection of the aneurysm, and endo-aneurysmorrhaphy. Partial splenectomy can be performed for distal aneurysms, preserving the unaffected splenic parenchyma. The mortality rate associated with open surgery is 1.3%, with a morbidity rate of 9%.

The decision of method of aneurysmectomy, depends on the

location of the aneurysm in the course of the splenic artery. It can be divided into three courses. Proximal third, medial third and distal third. Seventy-five percent of splenic aneurysms affect the distal third of the artery and 20% the middle third. They are generally solitary and saccular in nature. For proximal third an aneurysmectomy can be performed. If it is located in the medial third, aneurysmal exclusion is preferred. In our case where the aneurysm was located in the distal third, a splenoaneurysmectomy would be the choice of surgery.

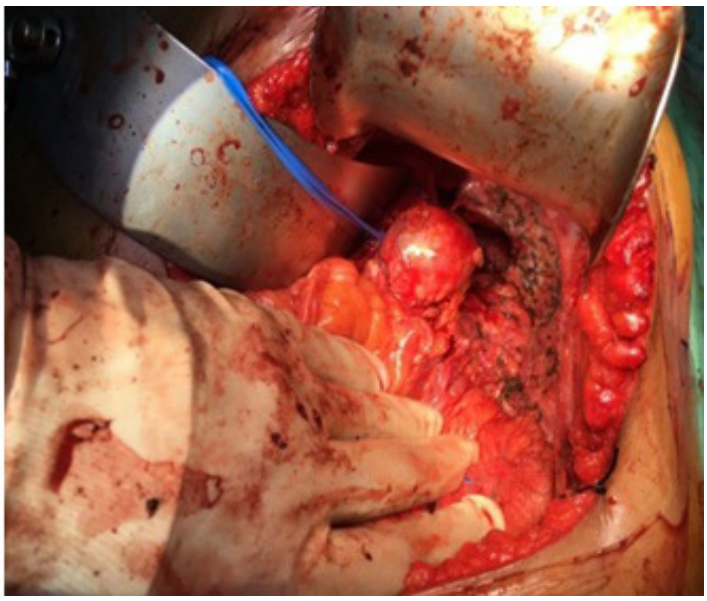

Figure 2: Intraoperative photograph: Lesser peritoneal sac approach used to identify the proximal splenic artery and large aneurysm of the distal splenic artery. Splenectomy was performed.

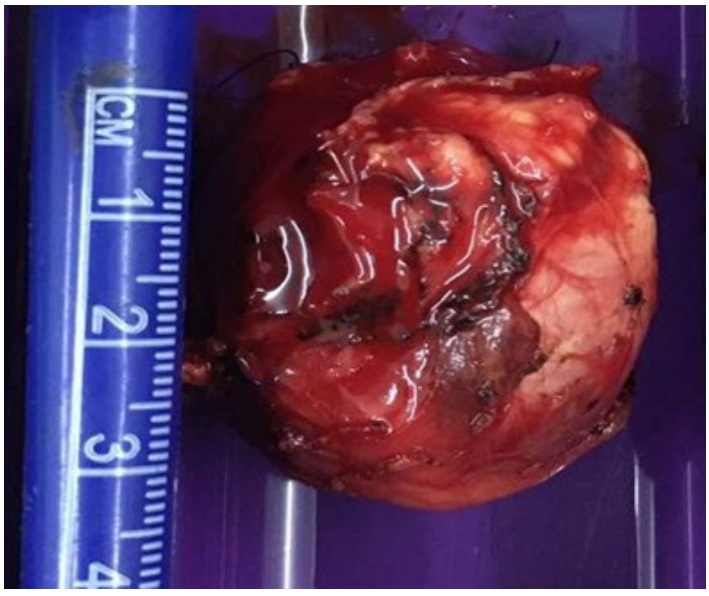

Figure 3: Postoperative photograph: Large aneurysm of the distal splenic artery measuring 5cm x 3cm.

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The aim of this study is to use a special device to conduct the aneurysmectomy. This device is called Powered Vascular Stapler by Ethicon which is safer and effective. In distal third splenic artery aneurysm a splenoaneurysmectomy was conducted. This procedure consists of dissection and resection of the spleen as it was enlarged measuring 20 cm x 16 cm followed by sealing the proximal part of aneurysm from its hilum by using PVS.

Current endoscopic devices are not optimized to meet the unique challenges posed by the task of pulmonary vessel division in difficult-to-access locations within the pleural cavity, for example, during major lung resection procedure. Decreasing the size of the transection device would make access to critical vascular structures in thoracic surgery easier by limiting the amount of vascular dissection required and potentially allowing for minimally invasive approaches in the management of more central tumours where only a limited dissection of the vessels is possible [23].

The PVS has a decreased shaft diameter of 9 mm, compared with a conventional endocutter with a 12 mm diameter, potentially allowing for easier insertion through the ribcage. This thinner shaft also permits a wider pivot between ribs and increased tip manoeuvrability which can minimize chest wall trauma that may be induced by a larger endocutter [24].

Conclusion

Anatomical features and patient selection would determine the treatment option which would result in the most successful and durable outcome. Until recently, open aneurysmectomy, with or without splenectomy, was recognized to be the best treatment for SAAs. In our knowledge and literature review, a giant splenic artery aneurysmectomy by using a powered vascular stapler gun is not commonly practised. We would like to conclude that PVS is safer to be used even in a giant splenic artery aslo.

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