

Visceral Artery Aneurysms: Our Experience at Oujda University Hospital

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ARTICLE INFO

Article history:

Received: 13 July 2018;

Received in revised form:

10 August 2018;

Accepted: 21 August 2018;

Keywords

 Visceral arteries,
 Aneurysms,
 Atherosclerosis.

ABSTRACT

The aneurysms of the digestive visceral arteries constitute a rare vascular pathology, since they represent only 5% of all the aneurysms. The rupture remains the most formidable complication. The treatment is essentially based on conventional or endovascular surgery. This is a report of 4 cases presenting an aneurysm of different visceral arteries managed in the department of vascular surgery of the Mohammed VI-Oujda CHU. The mean age was 41 years, (30-57 years mean with SD), sex ratio is at 1, and two patients had a specific aneurysm related symptomatology with pulsatile abdominal mass and systolic murmur. The location of the aneurysms was variable with two cases of the splenic artery, one of the superior mesenteric artery and one of the cystic artery. The diagnosis was made in three patients by the abdominal ultrasound, supplemented by the CT-scann, and once by the abdominal CT- scann immediately. Three patients were treated surgically with resection of the aneurysm without restoration of continuity. The goal of DAA treatment is to prevent risk of rupture associated to a high mortality. The risk of rupture depends on the location, type, and etiology of the aneurysm. Atherosclerosis has the main etiology of digestive aneurysms, followed by mycotic and post-traumatic aneurysms. Fibromuscular dysplasia remains a rare and poorly understood entity. Surgical treatment is the therapy of choice. Endovascular techniques have developed and are being used successfully. They have indications more and more wide in the treatment of aneurysms of the digestive arteries. The advent of endovascular treatment has significantly increased the percentage of patients treated for aneurysm of the digestive arteries, thus reducing morbidity and mortality in patients at high surgical risk.

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Introduction

The arterial aneurysm is defined by a permanent localized dilation of the artery with an increase in diameter of at least 50% compared to the normal diameter of the considered artery.

Aneurysms of the visceral arteries (VAA) are a rare vascular disease, since they represent only 5% of all aneurysms. The risk of rupture is significant. Indeed, the rate of patients presenting with an inaugural aneurysmal rupture varies, according to the studies, from 22 to 61% [1].

They occur commonly in the splenic (60%), hepatic (20%), superior mesenteric (5.5%), coeliac (4%) or stomachic coronary (4%) arteries. [2]

Advances in technology and the wider use of doppler ultrasound, CT scan, and arteriography have led to the diagnosis of asymptomatic and increasingly smaller lesions.

Therapeutically, endovascular techniques have been developed over the past 30 years and have been successfully used [1, 3].

Patients and methods

Our work is a retrospective study at the vascular surgery department of the Mohamed VI University Hospital in Oujda, Morocco.

It aims to describe the epidemiological and clinical profiles as well as the management of aneurysms of the digestive visceral arteries.

Case 1:

A 30 years old male, with history of chronic cigarette smoking and recurring amygdalitis, received recent dental care and was admitted for abdominal pain and prolonged fever. Clinical examination revealed abdominal tenderness, an expansive peri-umbilical pulsatile mass with systolic murmur, in a context of fever and deterioration of general state.

Investigations revealed predominantly neutrophils leukocytosis with elevation of inflammatory markers (C Reactive Protein (CRP) level of 23.8 and a sedimentation rate (ESR) of 38mm).



Figure 1. Abdominal CT scan showing superior mesenteric artery aneurysm (arrowed).

Trans-thoracic echocardiography revealed a large left intra-auricular vegetation of the mitral valve. The abdominal Doppler ultrasound revealed a 3cm aneurysmal lesion at the level of the superior mesenteric artery (SMA). Abdominal and pelvic CT scan showed a probably large mycotic aneurysm of the distal segment of the SMA measuring 3cm, associated with parietal thickening and infiltration of peripheral fat as well as splenic and renal infarction (Figure 1).

Cerebral CT showed a mycotic aneurysm of a terminal branch of the right Sylvian artery with adjacent parietal hypodensity suggestive of area of ischemia (Figure 2).



Figure 2. Brain CT scan showing an aneurysm of the terminal branch of the right Sylvian artery.

The size of the aneurysm of the SMA was an indication for emergent surgery. The patient had a resection with arterial ligation of upstream and downstream, associated with a double antibio-therapy. The evolution was favorable clinically, biologically and radiologically. the control scanner does not objectify any visceral aneurysm.

Case 2:

A 34-year-old woman, with a history of splenomegaly and portal hypertension cause since the age of 22 years, was admitted with abdominal pain. The clinical examination found epigastric and left hypochondrium tenderness, an expansive pulsatile mass with systolic murmur in the left hypochondrium, splenomegaly and a cutaneous collateral venous circulation.

The laboratory evaluation revealed pancytopenia. Doppler ultrasound has revealed a 6cm aneurysm of the splenic artery with a 16mm dilatation of the portal vein. The abdominal CT scan confirmed the aneurysm of 7 cm, with wall calcification and a homogeneous splenomegaly (Figure 3).

The patient underwent splenectomy with resection of the aneurysm and ligation of the splenic artery (Figure 4-a; 4-b) with good clinical evolution.

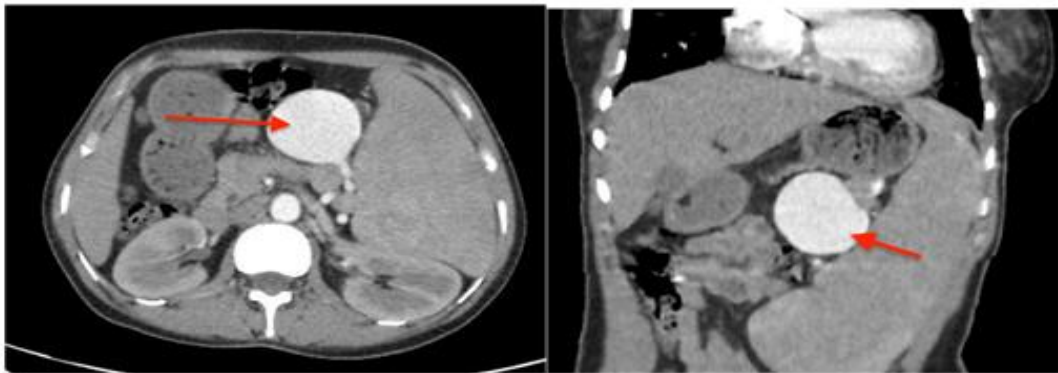


Figure 3. Preoperative abdominal CT scan showing the aneurysm of the splenic artery.

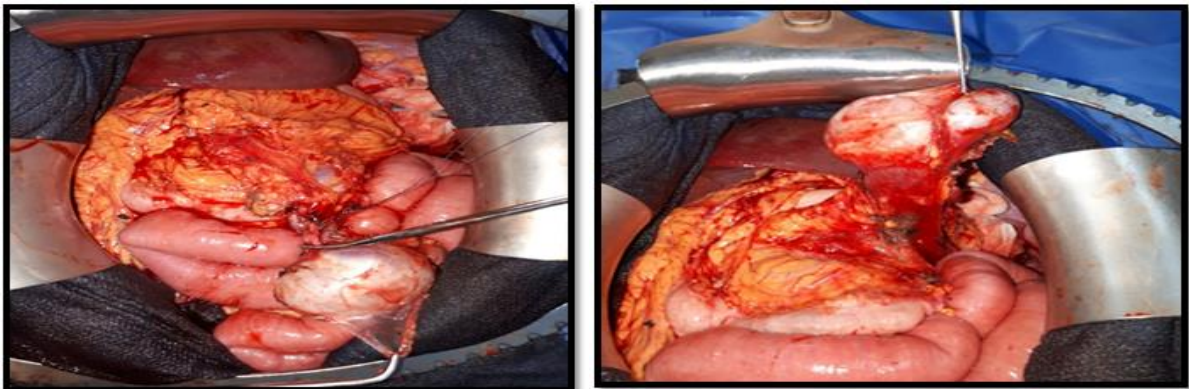


Figure 4.(a)Operative view showing aneurysm of the splenic artery.

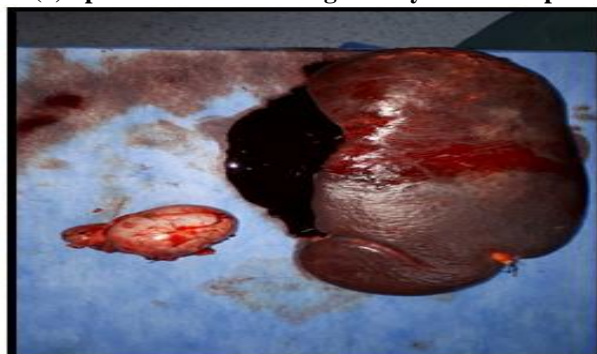


Figure 4.(b) Splenectomy specimen and Splenic Artery Aneurysm.

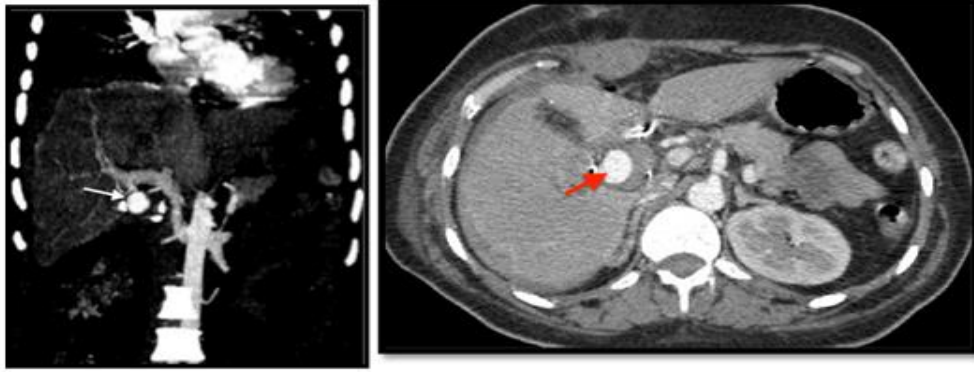


Figure 5.(a) Reconstruction CT scan showing a false aneurysm of the right hepatic artery.



Figure 5.(b) Operative specimen of a false aneurysm of the right hepatic artery.

Case 3:

A 45-year-old woman, with a history of cholecystectomy 20 days before admission, was admitted with biliary colic, bilious vomiting and jaundice. The clinical examination found a tenderness of the right hypochondrium without a palpable mass.

Biological laboratory evaluation revealed a normochromic anemia, a leukocytosis with predominance of neutrophils, a hepatic cytolysis and a cholestasis with total bilirubin of 35, direct bilirubin of 24, and alkaline phosphatase of 329 and GGT of 210. Doppler-coupled abdominal ultrasonography revealed a 2 cm diameter paravesicular formation in favor of an arterial pseudo-aneurysm of the cystic artery. This diagnosis was confirmed by the abdominal CT scan, and its association to an abundant hemoperitoneum (Figure 5). The patient underwent a resection of the aneurysm where with gap repair without reconstruction, and had a good clinical evolution.

Case 4:

A 56-years-old woman, with a mechanical prosthetic mitral valve, under oral anticoagulation, also followed for epilepsy since 2 years ago, under valproic acid, and for dyslipemia under statin therapy, was admitted for prolonged fever.

The clinical examination found no abdominal tenderness, without a palpable mass. The laboratory evaluation revealed a CRP of 92.55 mg/l, and an erythrocyte sedimentation rate of 38 mm/h. Transoesophageal echocardiography showed a mobile vegetation measuring 4 mm in diameter on the coronary valve what is a coronary valve. The abdominal CT scan showed an aneurysm of the splenic artery hilum, measuring 14x8 mm without signs of complications (Figure 6). The aneurysm was only monitored

because of its small size and the patient received medical treatment with triple antibiotic therapy. The patient underwent a trans-esophageal echocardiography of control made 1 month after the beginning of treatment showing the absence of any vegetation on the coronary valve.

The patients were not followed in the long run because they are gone from view

Discussion

The arterial aneurysm is defined by a diameter increase of at least 50% compared to the theoretical normal diameter of the considered artery. The aneurysm may be cupuliform, saccular or fusiform.

Visceral Arterial Aneurysms (VAA) can be located on the arteries from the aorta to the intra-abdominal viscera. They constitute a rare vascular disease, since they represent only 5% of all aneurysms. However their risk of rupture is significant, since about 22% of all reported splanchnic aneurysms occur in the emergency setting with a mortality rate of 8.5% [3].

They are preferentially developed in the splenic (60%), hepatic (20%), superior mesenteric (5.5%), celiac trunk (4%) or stomachic coronary arteries, as demonstrated by an earlier study of Stanley and Coll (4%) [4]. However, in recent years, there has been an increase in the incidence of SMA aneurysms. Indeed, the study of 7 series published during the last decade shows an incidence of 13% [5]. The average age of discovery of aneurysms of the visceral arteries is generally between 40 and 60 years old, except for SMA aneurysms, that occurs before the age of 50, as well as peri-gastric aneurysms and those of the peri-pancreatic arterial ring, which occur between the sixth and seventh decades of life.

The main etiologies are represented by atherosclerosis, fibromuscular dysplasia, infection, trauma, inflammatory causes, elastopathies and collagen vascular disease.

- **Atherosclerosis:** At present, it is the most frequent cause of visceral artery aneurysms because of the aging of the population and the decrease in the number of infectious causes. Atherosclerosis is the main etiology of aneurysms of the duodenopancreatic arches with a rate of 60% of cases, of true extrahepatic aneurysms (33%), of those of the gastroduodenal artery and more recently those of the celiac trunk with a rate of 42% of cases [6, 7 and 8].

- **Fibromuscular dysplasia [9, 10]:** Fibromuscular dysplasia represents a polymorphic disease of the arterial wall,

affecting more often the young, white woman. Dysplastic aneurysms account for up to 90% of cases of renal aneurysms and 40% of cases of splenic aneurysms [10] and respectively 24%, 17%, 13%, and 6% of extrahepatic, celiac trunk, inferior and superior mesenteric arteries aneurisms [11,12 and 13].

• **Infection:** Primary infectious aneurysms are more common. They complicate pre-existing arterial lesions in 75% to 95% of cases. Mycotic aneurysms are secondary to cardiac emboli migration and complicate 5% of endocarditis. Their preferential localization, after the aorta, is the SMA where the embolus is located between the duodenopancreatic artery and the middle colonic artery in 82% of cases [10]. In our series 2 out of 4 patients had a mycotic aneurysm secondary to infective endocarditis.

• **Traumatic causes:** The most frequent traumas of the digestive arteries are iatrogenic. And as was the case for our third patient, Bilio-pancreatic surgery is responsible for false aneurysms of the gastroduodenal artery and those of the duodeno-pancreatic arches. [10,14].

• **Inflammatory causes:** An adjacent inflammatory and especially necrotizing lesion is sometimes involved. This is particularly the case of pancreatitis, which may be responsible for false aneurysms of the digestive arteries secondary to autodigestion of the arterial wall due to the release of pancreatic enzymes. This concerns the pseudoaneurysms of the duodenopancreatic arches in 30% of cases. 10% of patients who had acute pancreatitis have a splenic pseudoaneurysm.

Other causes of digestive aneurysms include acute necrotizing vasculitis, elastic tissue abnormalities, VON RECKLINGHAUSEN neurofibromatosis, dissecting aneurysms, and pregnancy. Often asymptomatic, DVAAAs are frequently discovered during a complication such as rupture, the presentation depends on the stage of the fissure [15] and on the site of rupture [16].

Advances in technology and the wider use of doppler-coupled ultrasound, CT scan and arteriography have led to the diagnosis of asymptomatic and increasingly smaller lesions. CT angiography is the preferred diagnostic modality for VAAs [17]. It makes it possible to specify the vascular origin of the lesion, visualizes the aneurysm as a liquid mass of spontaneously high density, sometimes calcified at the periphery, enhancing after injection of the contrast product, specifies the fusiform or saccular character, the exact location and the visceral relations of the aneurysm as well as the state of the downstream parenchyma and the existence or not of a collateral circulation.

Until recently, surgical treatment was the therapy of choice. Endovascular techniques have developed over the last 30 years and have been successfully used [1]. They are likely to play an increasingly important role in the future. Endovascular treatment has increasingly broad indications in the treatment of visceral Artery aneurysms. The technique used varies according to the localization, whether there is or not a thrombosis of the aneurysm, the permeability of the afferent and efferent vessels, and the substitution by the collateral network. Embolization offers several advantages over the operative alternative of ligation of the artery especially in case of rupture, it allows a precise localization of the seat of the bleeding, and is done without general anesthesia and can be followed by a control angiography. Covered stents are the second major alternative offered by the endovascular technique. They allow, in a single gesture, the exclusion of the aneurysmal sac and the restoration of the

arterial continuity, without direct approach of the aneurysm, and without morbidity related to surgical incisions [1, 15].

Conclusion

Aneurysms of the digestive arteries are rare vascular lesions. They represent 5% of all aneurysms. Splenic localization is the most common.

Its etiopathogenesis incriminates the intrication of several factors such as fibromuscular dysplasia, portal hypertension and pregnancy. Current diagnostic methods, such as CT scan with spatial reconstructions, have led to the discovery of asymptomatic and especially small aneurysms. The advent of endovascular treatment, has significantly increased the percentage of treated patients, and therefore reducing mortality and especially morbidity in patients at high surgical risk.

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