A Real Dilemma: Management of Multiple Mycotic Visceral Aneurysms Revealing Severe Endocarditis

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Abstract

We present a case of endocarditis, which manifested as an acute-onset of abdominal pain, due to multiple mycotic visceral aneurysms in a 31-year-old man. We initially thought that the pain had a surgical visceral aetiology. However, following a computed tomography scan of the abdomen, he was subsequently found, to have multiple mycotic visceral aneurysms including: two aneurysms in two branches of the superior mesenteric artery; two mycotic aneurysms in the left renal artery associated with bilateral renal and splenic infarcts. Further investigations confirmed that the symptoms were related to mutilated mitral and aortic valves with a high risk of embolization. Our case highlights the surgical priority between repairing the life-threatening multiple aneurysms and the mitral and aortic valves that caused an endocarditis. First, we repaired the mycotic aneurysms by ligation and/or excision. This was then followed by replacement of the aortic and mitral valves. The patient recovered remarkably well.

Keywords: Acute abdomen, bacterial, embolism, endocarditis, mycotic visceral aneurysms

Introduction

Acute abdominal pain is a common condition in the emergency department, however it remains a very rare complication of endocarditis. Mycotic aneurysms result from direct bacterial invasion, embolic occlusion, and immune complex deposition within the blood vessels. Infected aneurysms of the visceral arteries are life threatening, with the potential for rupture and organ ischemia. Managing aneurysms of the visceral arteries, which are subsequent to severe endocarditis is a great challenge.

Case Report

A 31-year-old male, with no known medical history of significance, was admitted to the Emergency Department following complaints of intense abdominal pain in the left hypochondria which had started one week prior to presentation. The pain became generalized and involved the whole abdomen. It was also associated with fever, nausea and fatigue. During physical examination, the patient was found to be conscious and febrile (38°C), with a blood pressure of 95/50 mmHg and a heart rate of 116 beats/min. The abdomen was tense and exquisitely tender with a parambulical pulsating mass. Examination of the respiratory system revealed no abnormalities. The cardiologic examination found a holosystolic murmur grade 3/6 at the cardiac apex. His laboratory tests revealed a hyperleukocytosis (white cell count: 18.860 x 10^9/L - neutrophil: 85.8%) and a high C-reactive protein (190.7 mg/dL). A Computed Tomography Angiography (CTA) scan of the abdomen revealed an aneurysm of the superior mesenteric artery (SMA) branch [Figure 1], a splenic infarct, and a left renal infarct with two aneurysms of the left renal artery [Figure 2]. The transthoracic echocardiography showed severe mitral and aortic valve regurgitation with multiple vegetations on both valves. Three separate blood cultures were negative. The patient was prescribed two antibiotics which were administered intravenously: ceftriaxone 2 g/day and gentamicin 3 mg/kg/24 h for a duration of one week.

Following the medical treatment, the clinical signs of sepsis persisted. The intense abdominal pain reappeared and became associated with symptoms of hypovolemia. Thus, a second abdominal CTA was performed. It revealed a neoformed...
parietal thrombosis in a small branch of SMA [Figure 3] and a new right renal infarction [Figure 4]. It also showed increase in the sizes of both the left renal aneurysm from 15 to 21 mm as well as the mesenteric artery. Thus, the intervention on the aneurysms became a surgical priority.

Accordingly, the patient underwent surgical resection of the first mycotic aneurysm in the SMA branch [Figure 5]. The second SMA branch aneurysm and renal artery aneurysm were excluded by proximal and distal ligation. Then, we performed a combined aortic and mitral valve replacement using a 33 mm prosthesis. The direct culture examination of the valves did not reveal any bacterial colonization. The pathology of the aneurysm showed severe infiltration of inflammatory cells and a proliferation of granulation tissue in the arterial wall.

Following the surgery, and after a 4-week course of intravenous antibiotic treatment, the patient had a satisfying postoperative recovery and was discharged without complications.

**Discussion**

An acute abdomen due to multiple visceral aneurysms of mycotic origin is very uncommon. The mycotic aneurysms represent one of the rarest extracardiac complications of septic endocarditis, compared to the more frequent involvement of the central nervous system, lungs, spleen, kidneys, and musculoskeletal system. High-risk factors include patients with cardiac valvular abnormalities or prosthetic valves and history of intravenous drug use and immunosuppressive conditions, such as the human immunodeficiency virus infection.\(^1\)

Systemic embolization can occur in 22%–50% of cases of infective endocarditis (IE). According to pooled data and meta-analyses, systemic embolization has increased among patients with vegetations >10 mm, young patients, and those with mitral valve involvement, as was the case in this patient.\(^2\)

Mycotic aneurysms can result from direct bacterial invasion, embolic occlusion, and immune complex deposition within the blood vessels; this is most usually due to *Staphylococcus aureus*.\(^3,4\)

In our case, blood cultures were negative.

Common sites for abdominal complications of IE include the spleen and the kidneys, frequently due to septic emboli,
leading to infarction. Rarely, the formation of abscesses can occur following infarction. Renal failure is also sometimes seen. Liver and bowel complications are uncommon.[2]

In patients with sepsis, even if it is clinically unsuspected, mycotic aneurysms may sometimes cause abdominal pain or be detected as pulsatile masses, like in this case.

We describe the purpose of imaging in diagnosis, monitoring the extent of the complications and the difficulty of management.

The imaging characteristics of a mycotic aneurysm are: a focal artery dilatation, usually sacciform (90%), with lobulated contours; a fast size increase, which is the opposite of the atheromatous aneurysm that has a slow evolution.[5] The mycotic aneurysm has less parietal calcifications than atheromatous aneurysms. Mesenteric fat infiltration, liquid mass, or abscess is regarded as the infectious nature of aneurysm.[5,6] However, thrombotic murals are unusual characteristics of mycotic aneurysms.[7]

Sometimes, incidentally detected mycotic aneurysms may require open surgery, endovascular stent placement or angiographic embolization, medical treatment, or a combination of these. Small, nonruptured aneurysms are managed with intravenous antibiotics for 4–6 weeks, with imaging surveillance, best performed with repeated CT studies. Alternatively, a colour Doppler ultrasound allows a non-invasive follow-up, although with limited reproducibility.[11] Despite advanced antibiotic therapies, these lesions are associated with significant morbidity and a 50% mortality rate, resulting from both disseminated sepsis and a propensity to rupture (as demonstrated by this case). Therefore, prompt detection is imperative.[3]

The mycotic aneurysms with a high risk of rupture associated with multiple threatening vegetation and regurgitation of the mitral and aortic valves represent a difficult issue in the surgical management: whether to start with the intervention on the aneurysms or on the valves, since no case has been reported in the literature. In our case, we judged the necessity to begin with the mesenteric and renal aneurysms, and then we replaced the mitral and aortic valves. The outcome was favourable.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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