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Case Report
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A Mycotic SMA Aneurysm Secondary to Aortic Valve Endocarditis Causing Ischemic Strictures and Ischemic Colitis

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Abstract

Visceral aneurysms of mycotic origin are uncommon, yet potentially lethal conditions that require rapid diagnosis and intervention to reduce serious complications such as ischemia, hemorrhage, and mortality. In this report, we present a case of mycotic Superior Mesenteric Artery (SMA) aneurysms secondary to infective endocarditis, complicated with colitis and stricturing of the ascending colon. Treatment with bowel resection, aneurysm resection, and a saphenous vein graft repair was performed. Based on our review of the literature urgent diagnosis and surgical intervention remain the mainstay in treatment for this rare condition.

Introduction

Superior Mesenteric Artery Aneurysms (SMAAs) are rare, especially those of mycotic origins. Most mycotic SMAAs are historically secondary to infective endocarditis and present with abdominal pain or a pulsatile, mobile tender mass [1,2]. The diagnostic modalities of choice are contrast CT scan and angiography [3]. SMAAs have high risks of complications including rupture, ischemic colitis, and mortality. Early diagnosis and management is crucial to prevent such devastating consequences from occurring. Surgery remains the treatment modality of choice. Only a small number of cases have been reported in the literature, which adds to the challenges of treatment. We report a case of open surgical therapy for mycotic SMAA in a young male.

Case Presentation

A 41-year-old male with a history of aortic valve endocarditis secondary to intravenous drug use was admitted to hospital for a gastrointestinal bleed. One month prior, the patient was diagnosed with bacterial endocarditis and subsequently developed congestive heart failure, renal failure and cerebrovascular incidents. The patient ultimately underwent an aortic valve replacement with a mechanical valve. Blood cultures at that time were negative for any organisms, though aortic valve samples were positive for *EnterococcusFaecalis*. He was then transferred to community hospital to complete recovery and continue IV antibiotics treatment with ampicillin and ceftriaxone.

A few days post transfer to the community hospital, the patient developed the initial GI bleed, with subsequent hemoglobin levels dropping to 63 g/L. The bleed occurred 15 days post aortic valve replacement. He was then transferred back to our tertiary hospital for further workup where gastroscopy, colonoscopy and CT scan were performed. CT demonstrated colitis and stricturing of the ascending colon (Figure 1), with biopsies indicating this was likely secondary to ischemia. The CT scan also revealed a 2.8 cm aneurysm involving the distal portion of the SMA and a 1.3 cm aneurysm involving a very distal branch of the SMA. A subsequent for malangio gram confirmed 2SMAAs arising approximately 1.4 cm from the origin of the SMA (Figure 2). With a new diagnosis of SMAAs and the risk of rupture associated, the patient was scheduled for surgical repair of the aneurysms. The initial operation was scheduled 16 days after the diagnosis of the aneurysms on CT. In the interim, the patient developed symptoms of abdominal pain, vomiting, and a tender abdominal exam consistent with a small bowel obstruction. A repeat CT scan showed thickened ascending colon, ileocecal junction, and signs of distal small bowel obstruction. Four distinct aneurysms of the SMA all relating to branches of the SMA, with the largest now having progressed to 4 cm were also detected (Figure 3),which were noticeably enlarged as compared to the previous CT and angiogram. The following day the patient was taken to the operating room for an emergentlaparotomy, right

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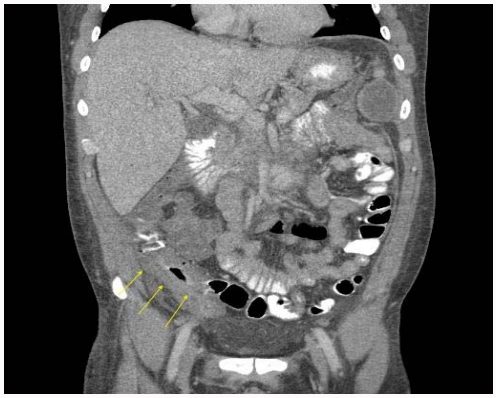

Figure 1: Computed tomography scan showing colitis and stricture of the ascending colon secondary to ischemia.

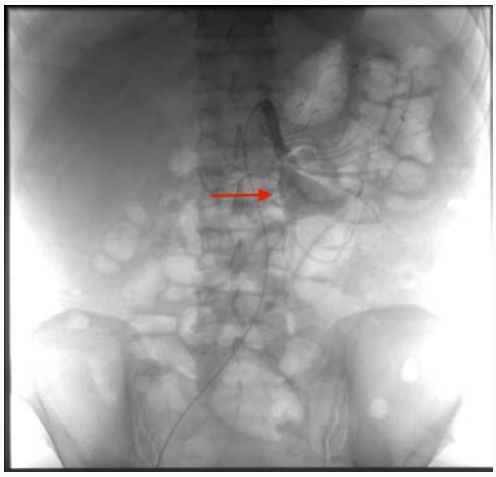

Figure 2: Abdominal angiogram performed on the 4th day of admission showing the main superior mesenteric artery aneurysm.

hemicolectomy, and resection of the four distinct SMA aneurysms. Intra operatively, the general surgery team resected the ischemic and thick end ascending colon. Although edematous, the remaining bowel appeared healthy. Simultaneously, the vascular team obtained a saphenous vein graft. The SMA was isolated at the root of the mesentery. Several branches coming off the aneurysmal segment could not be saved and controlled for re-implantation. This was due to severe fibrotic reaction of the mycotic aneurysm and had to be suture ligated from inside the aneurysm. However, the two major outflow branches beyond the largest and most central aneurysmal were isolated and preserved. The saphenous vein graft was used to create an end to end anastomosis with the two outflow tracts. Another distal jejunaland ileum mesenteric aneurysm which was identified on CT was then resected; no bowel ischemia resulted from this. Due to the extent of the aneurysmal disease and bowel edema, no anastomosis was performed. A negative pressure wound vacuum was applied and the patient was transferred to the ICU for a planned second look laparotomy in 24 hours.The patient suffered from mild hypotension post-op, which responded to fluid resuscitation. No vasopressors were administered.The second look revealed a diffusely ischemic small bowel with only 70-85 cm of proximal small bowel maintain ingviability. The saphenous vein graft was inspected and although patent, ithad a high Doppler resistance signal indicating that the arterial system in the periphery of the mesentery was not permitting

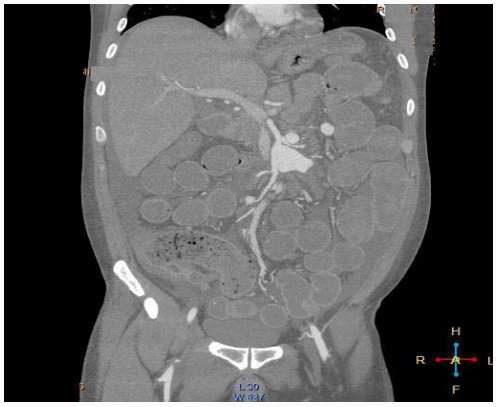

Figure 3: Computed tomography scan performed on the 6th day of admission showing a superior mesenteric artery aneurysm measuring 4.3 cm.

adequate bowel perfusion. Consequently, it was determined that the vast majority of small bowel was not viable and there were no further surgical options to save the patient.

Discussion

SUPERIOR MESENTERIC ARTERY (SMA) aneurysms are an uncommon entity and are the third most common splanchnic aneurysms, compromising 5.5% of splanchnic aneurysms. Mycotic origins account for more than 50% of these aneurysms, mainly secondary to infective endocarditis [1]. Mostly caused by a Staphylococcus or Streptococcus infection, though, in 25% of cases the blood cultures are negative [4]. The most frequent sites of mycotic aneurysm formation are cerebral arteries, abdominal aorta, SMA, brachial and iliac arteries [5]. Some cases of SMAAs are asymptomatic while others are mistaken for more common conditions such as gastric ulcers, appendicitis etc. Nonetheless, the most common presenting symptom is abdominal pain or discomfort which might progress to continuous epigastric pain [2]. A literature review performed by de Troia et al. which included 38 articles reporting 41 SMAAs and compared cases of non-mycotic SMAA with mycotic SMAA indicated that patients with non-mycotic SMAA usually present with pain, weight loss, nausea and vomiting, while fever is also present in patients with mycotic aneurysm [3]. It is suspected that the abdominal pain is related to direct expansion of the aneurysm or mesenteric ischemia. The investigation modality of choice to diagnose SMAAs is a CT angiogram followed by angiography, though, duplex scan US can be a quick and reliable tool for diagnosis [3]. Treatment of SMAAs is multifactorial starting with bactericidal antibiotics which should be started upon diagnosis of the mycotic aneurysm [5]. The mainstay treatment of SMAAs remains surgical and consists of aneurysm resection and revascularization using a graft, especially when the blood flow to the bowels is compromised [3,4]. The most commonly used graft is a saphenous vein graft. Though in some cases revascularization can be also be obtained using primary anastomosis [3]. Other treatment modalities include ligation without revascularization which could be accomplished due to the extensive collateral blood flow to the intestines [3]. In patients with no signs of intestinal ischemia or angina, a synthetic bypass can be considered [6]. New treatment modalities for SMA aneurysms involve embolization of a ruptured aneurysm with metallic coils [7]. A drawback to embolization with metallic coils is that they do not provide bowel perfusion, thus they do not improve any underlying ischemia [8]. Antibiotics are also administered post operatively [5]. It

is vital to identify and treat such aneurysms as soon as possible due to the high risk of rupture, intestinal ischemia, erosion to neighbouring bowel segments and mortality. The mortality rate of SMAAs is 30% [9]. It is approximated that the rate of rupture is around 50% with a resultant mortality rate up to 60% [9]. Moreover, it is estimated that patients with SMA mycotic aneurysms have a coinciding aneurysmal disease at other sites in 19% of cases [10]. Thus, stressing on the importance of comprehensive CT scans to identify any synchronous aneurysms or any underlying ischemia. We hope that this case provides some insightful discussion around SMA mycotic aneurysms and their management principles. In the case presented, we suspect bowel ischemia was due to a combination of factors including the need to ligate several distal branches of the SMA resulting from the severe aneurysmal fibrosis. Furthermore, multiple branches of the SMA could not be re-implanted to the saphenous vein graft as they were small and suffered a 'no-reflow' phenomenon. This could be attributed to micro vascular embolization at the time of the aneurysm repair, vasospasm of the arteries and pre-capillary arterioles, and/or low flow from systemic hypo perfusion. It is also possible that ischemia was secondary to a septic embolus. The final pathological report of the aneurysm confirmed an organizing intramural thrombus in the mesenteric artery. Due to the rapid progression of these mycotic aneurysms, early diagnosis and immediate intervention could lead to more optimal outcomes and prevent ischemic complications.In summary, mycotic SMAAs are a rare yet life-threatening condition and should be considered early in the diagnostic process. Both early detection and surgical management are essential to reduce mortality associated with catastrophic complications such as ischemia, rupture and death.

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