Isolated mycotic hypogastric artery aneurysm

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ABSTRACT

Isolated iliac artery aneurysms are rare and commonly associated with aortic aneurysms. Hypogastric artery aneurysms (HAAs) are exceptionally rare. The general approach to HAAs has been exclusion and bypass, although when this is complicated by mycotic disease, endovascular techniques can provide unique approaches to management. We present the case of a patient with a mycotic HAA treated with endovascular coil and exclusion followed by aortic to external iliac artery bypass with cadaveric conduit. (J Vasc Surg Cases and Innovative Techniques 2019;5:22-5.)

Keywords: Aneurysm; Hypogastric artery aneurysm; Mycotic aneurysm

Iliac artery aneurysms are frequently found in conjunction with aortic aneurysms and isolated iliac aneurysms are uncommon. The incidence of hypogastric artery aneurysms (HAAs) is exceedingly low, occurring in <0.0001% of the population.[1,2] Mycotic HAAs have rarely been described in the literature.[3-5] The best treatment of this rare entity may be different from and more challenging than that of a mycotic aortoiliac aneurysm. We present the case of a patient with an infected HAA and discuss a unique approach to treatment of this unusual entity. The patient consented to publication of this case.

CASE REPORT

A 78-year-old man was handling and eating rattlesnakes near his home when several days later he developed profound myalgias and arthralgias. He was seen by a medical provider, diagnosed with polymyalgia rheumatica, and treated with steroids. He was transferred to our medical facility with persistently high fevers and left-sided hip and testicular pain. Blood cultures identified *Salmonella arizonae* bacteremia, and cross-sectional imaging revealed a 3.8-cm left HAA with surrounding inflammation (Fig 1).

Intravenous antibiotics were administered, and after clearance of bacteremia and systemic illness, he underwent an endovascular repair. After diagnostic aortography from a percutaneous bilateral common femoral artery approach, the patient was heparinized in the standard fashion. The left HAA was first embolized from a contralateral approach with two Amplatzer (Abbott, St. Paul, Minn) vascular plugs (7 × 10 mm, 9 × 12 mm). Next, from an ipsilateral common femoral artery approach, a covered stent was placed extending from the common iliac artery to external iliac artery (EIA) using an Excluder (W. L. Gore & Associates, Flagstaff, Ariz) limb placed in a reversed configuration (Fig 2).[6] There were no acute postoperative complications, and he was discharged home on intravenous ceftriaxone for 4 weeks. One-month computed tomography (CT) scan showed a patent stent with successful occlusion of the aneurysm and complete resolution of the associated inflammation (Fig 3). He was transitioned to trimethoprim-sulfamethoxazole for lifelong suppression. His antibiotic regimen was switched to azithromycin at 6 weeks because of gastrointestinal intolerance. Three months after the endovascular intervention, he presented with recurrence of fever, malaise, and left thigh and testicular pain. Blood cultures were negative, but erythrocyte sedimentation rate and C-reactive protein level were significantly elevated. A repeated CT scan demonstrated a dilated portion of the EIA where the graft was in place, with adjacent inflammatory changes noted throughout the psoas muscle and surrounding retroperitoneum. The patient's symptoms quickly resolved with intravenous antibiotics, and he was discharged with short-term follow-up.

A subsequent CT scan demonstrated aggressive dilation of the EIA to 2.6 cm (Fig 4). Because of the concern of an infected endovascular stent and aggressive aneurysmal dilation, the patient underwent an aorto-EIA bypass. This was performed through lower midline laparotomy with standard retroperitoneal exposure. Proximal control was obtained at the aorta and right common iliac artery and distal control at the EIA. Explantation of the stent graft and native iliac arteries with débridement of all inflamed retroperitoneal tissue was performed. All intraoperative cultures, including those taken of the covered stent, retroperitoneum, and native iliac vessels, were negative. Vascular reconstruction was performed using cryopreserved artery (CryoLife Inc, Kennesaw, Ga). The patient had an uneventful postoperative course. He remained on oral antibiotics for a period of 6 months after surgery and has had no long-term evidence of infection at 18 months.

DISCUSSION

Iliac artery aneurysms are rare. Autopsy studies demonstrate that 0.2% of the population have isolated iliac vessel aneurysms. However, common iliac artery

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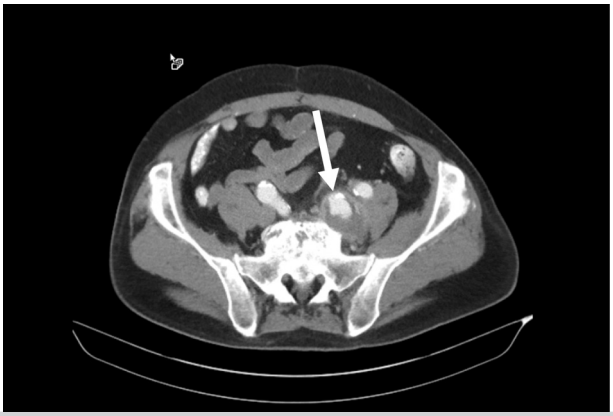

Fig 1. A 3.8-cm left hypogastric artery aneurysm (HAA) with surrounding inflammation, marked by the *white arrow*.

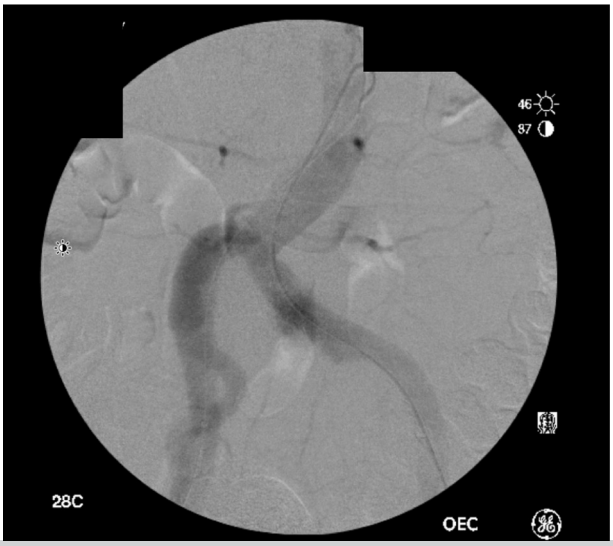

Fig 2. Covered stent placement with internal iliac exclusion.

aneurysms can occur in up to 20% of patients with concomitant abdominal aortic aneurysms.[7] Unlike abdominal aortic aneurysms, no screening criteria exist for these, which often are incidentally identified.

Isolated HAAs represent an even rarer pathologic process, accounting for <0.4% of the population. Because no imaging had previously been performed, we presume the HAA was mycotic rather than a pseudoaneurysm, which would be even less likely. Although there is a paucity of literature on HAAs, most available reports focus on management of acute rupture.[8-10] The traditional approach to treating HAAs is centered on exclusion and bypass with autogenous conduit in the setting of infection. Distal control has proved exceptionally difficult because of the vessels' retroperitoneal and pelvic location and adjacent venous structures. As endovascular techniques have become more prevalent, coil embolization and coverage of aneurysms are now commonly

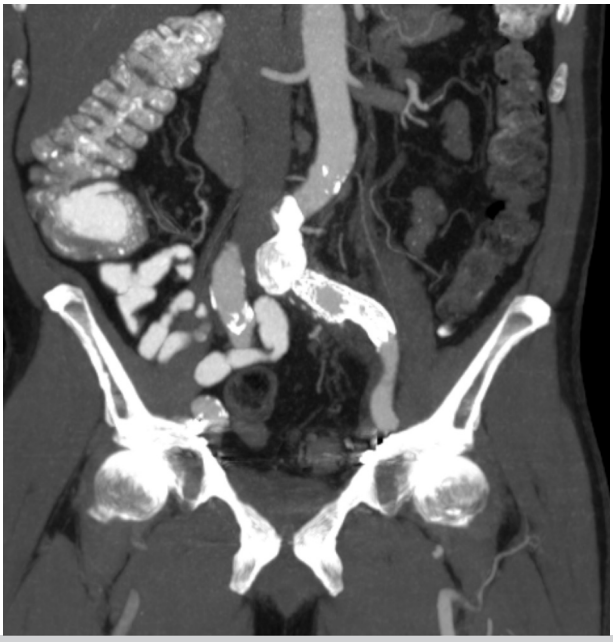

Fig 3. Computed tomography (CT) follow-up at 1 month demonstrating resolution of inflammation and patency of stent.

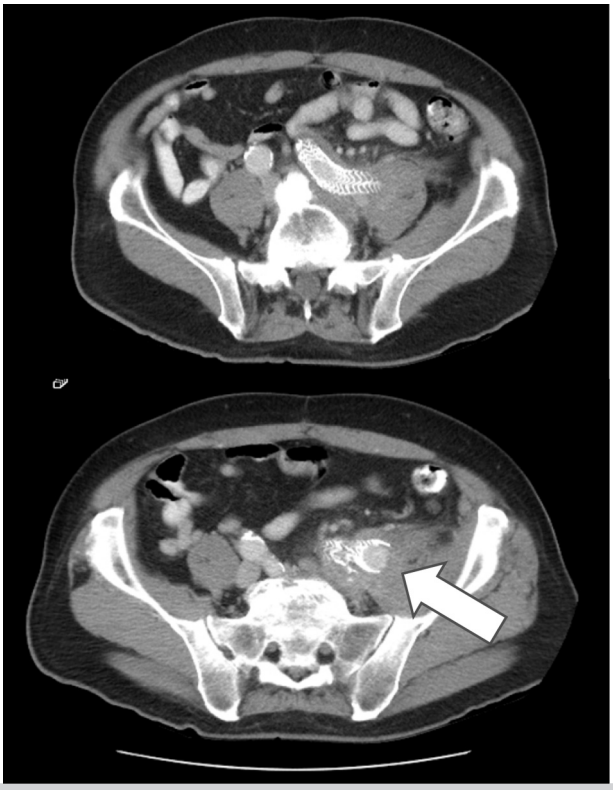

Fig 4. Axial images with inflammatory changes around dilated portion of external iliac artery (EIA), marked by the *white arrow*.

performed. Whereas buttock claudication has been noted in up to 30% of patients with unilateral hypogastric artery ligation, it usually resolves. Vascular impotence

and ischemic complications (colonic ischemia, buttock necrosis) are reported but uncommon in patients with a patent contralateral hypogastric artery.[11,12]

Mycotic aneurysms (MAs) represent <1% of all aneurysms. Historically associated with syphilis, they are now more commonly due to bacterial endocarditis. *Staphylococcus aureus* is a commonly identified pathogen, usually from septic emboli. *Salmonella*, the most common pathogen identified today, is thought to be related to dietary habits and transient bacteremia. This includes the handling and ingestion of rattlesnake meat.[13,14] MAs have been found to progress more rapidly than atherosclerotic aneurysms, possibly because of bacterial enzyme production (elastase, pancrease) and the lysosomal enzyme released by neutrophils as a part of the innate immune response.

The approach to MAs is both patient and case specific, with immediate repair indicated for rupture or symptomatic MAs. Repair can be performed by ligation and subsequent oversewing of outflow vessels or ligation with venous patch closure of the origin of the hypogastric artery. Extra-anatomic bypass or in-line reconstruction with autogenous vein, rifampin-soaked Dacron, or cadaveric tissue can be performed. An in-line bypass was chosen because of the higher patency rates compared with extra-anatomic bypass. In addition, a femoral-femoral crossover bypass adds incisions in the bilateral groins but could be reserved for the unlikely event of graft failure or development of aneurysm in the cadaveric tissue.[15,16] We contemplated using superficial femoral vein for this procedure but chose cadaveric artery. Although not prohibitive, his prior saphenous vein harvests made this option less attractive, as did the increased morbidity and extensive dissection.

Whereas open repair has historically been standard of care for treatment of nonmycotic aneurysmal disease, the endovascular approach has become an equally acceptable and more frequently chosen option.[17] It can be argued that graft placement in a ruptured MA contradicts general surgical principals. Yet one review of the literature found that an endovascular approach was successful in 76% of cases and that many of these patients did not require graft explantation after placement.[18] Lifelong antibiotics were required for all patients.

The treatment of mycotic aortoiliac aneurysms has been adequately reviewed. There is very little in the literature regarding treatment of mycotic HAAs.[5] As such, no true algorithm exists as to the best treatment plan. The treatment of a mycotic HAA presents several unique challenges. As previously stated, its location deep in the pelvis makes an initial open repair less appealing. As with all elective approaches, we were certain to ensure that the bacteremia was effectively treated and the patient had no clinical signs of infection. Our "coil and cover" approach was performed with two percutaneous access sites and minimal blood loss and ensured successful exclusion of the aneurysm. The patient initially responded well and appeared to have a successful outcome.

However, several months later, the patient returned with concerns of recurrent infection. Although he never had evidence of recurrent *Salmonella* bacteremia, despite many preoperative and intraoperative cultures, the concern was high, given his symptoms. The main impetus for returning to the operating room was the aggressive dilation of the EIA after graft placement. Whereas this can occur from aggressive graft oversizing (>20%), this was not the case in our patient. We believe this was more likely secondary to significant inflammation at initial presentation (Fig 4) and possible sequelae of subclinical infection. The subsequent inflammatory extension to the psoas muscle and surrounding tissues may have led to a weakening of the vessel walls and predisposed the patient to future dilation. Although studies have demonstrated successful outcomes of covered stents placed for MAs, caution should be exercised in placing stents for the treatment of more virulent organisms as definitive therapy. Furthermore, close follow-up with the patient must be maintained because of the concern for future problems and aneurysmal degeneration.

CONCLUSIONS

Our initial strategy of HAA exclusion and covered stent placement proved to be a bridge to open surgery. This approach allowed the aneurysm to thrombose, reduced immediate inflammation, and temporized disease progression in the setting of active infection, which likely assisted in the patient's overall outcome. Consideration should be given to this approach, especially in patients who are poor surgical candidates. Lifelong treatment with antibiotics should be considered, although it may not be necessary if a cadaveric bypass is used. The best treatment plan should be patient and pathogen guided.

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