VDM Vascular Disease Management

CASE REPORT WITH REVIEW

Campylobacter Fetus-Associated Infrarenal Abdominal Aortic Aneurysm

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Keywords
Abdominal
Aortic
Aneurysm
Campylobacter
Fetus
Complications
Allograft

February 2023
ISSN 2152-4343

VASCULAR DISEASE MANAGEMENT 2023;20(2):E28-E35

Abstract

Infected abdominal aortic aneurysms are usually associated with poor outcomes. The management of this rare entity is demanding and requires a devoted joint multidisciplinary team. The aim of this article is to discuss diagnosis and management features of abdominal aortic aneurysms due to *Campylobacter fetus* bacteremia.

Introduction

It has been demonstrated that *Campylobacter fetus* bacteria has an affinity for vascular endothelium.[1] Although rare, different vascular pathologies related to *C. fetus* include thrombophlebitis,[2,3] endocarditis,[4,5] and mycotic aneurysms.[4-10] The aorta remains the main location of *C. fetus*-associated aneurysms. Given the increased risk of rupture in mycotic aneurysms, early diagnosis and rapid therapeutic management remain vital. Here, we report a case of abdominal aortic aneurysm (AAA) in a patient with *C. fetus* infection. Urgent surgical treatment was chosen following a large increase of the aneurysm diameter within 1 month of follow-up.

Case Report

A 61-year-old man with a history of cerebral stroke, hypertension, dyslipidemia, appendectomy, sinusitis, hiatal hernia, smoking, and alcohol abuse was admitted to the internal medicine department for investigation of a digestive disorder. Anamnesis revealed chronic intermittent abdominal pain associated with diarrhea and nausea. A loss of 12 kg over 6 months was reported. At his first admission, physical examination identified a thin, febrile patient (temperature: 39° C [102° F;] body mass index, 18.3 kg/m^2) with a normal heart rate. The abdomen was slightly tender and painful at palpation without any other anomalies. Samples of blood, stool, and urine were obtained for culture. All of the cultures were negative except for the blood culture that grew *C. fetus*. Additional laboratory tests showed hemoglobin count, 14.2 g/dL; platelets, 242 G/L; leukocytes, 8 G/L; creatinine clearance, 98 mL/min; potassium, 3.9 mmol/L; calcium, 2.6 mg/dL; and albumin, 41.6 g/L. C-reactive protein (CRP) and natremia were abnormal at 174 mg/L and 127 mmol/L, respectively. A positron emission tomography scan showed esophagitis with an intense fixation at the stomach, and a fixation at the left colic angle as well. Fibroscopy and a thoraco-abdomino-pelvic computed tomography (CT) scan revealed no particularities. However, an infrarenal AAA was seen, measuring 42 mm x 33 mm (**Figure 1**).

Total colposcopy with resection of 3 polyps at the left colon showed tubular adenoma with low-grade dysplasia. Bronchoscopy with bronchoalveolar lavage as well as serology of human immunodeficiency virus, hepatitis B and C, Lyme disease, Epstein-Barr virus, prostate-specific antigen, and lactate dehydrogenase were negative. The patient was diagnosed with *C. fetus* colitis and was given IV amoxicillin clavulanate (1 g 3 times/day for 10 days). One month later, he was readmitted for recurrence of the same symptoms. This time, testing showed a patent biologic inflammatory syndrome

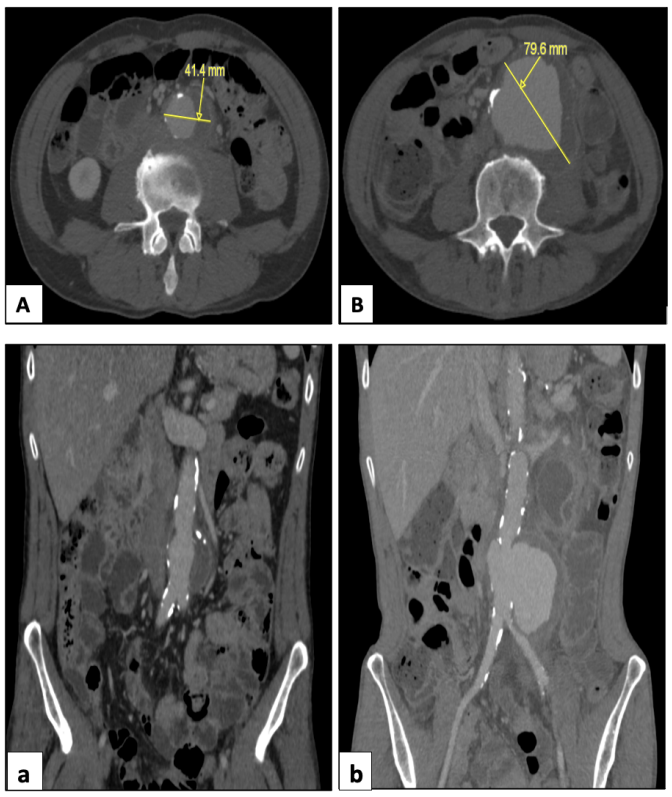

Figure 1. Angio-computed tomography scans visualizing the augmentation of IRA diameter within 1 month (**A/a** before; **B/b** after).

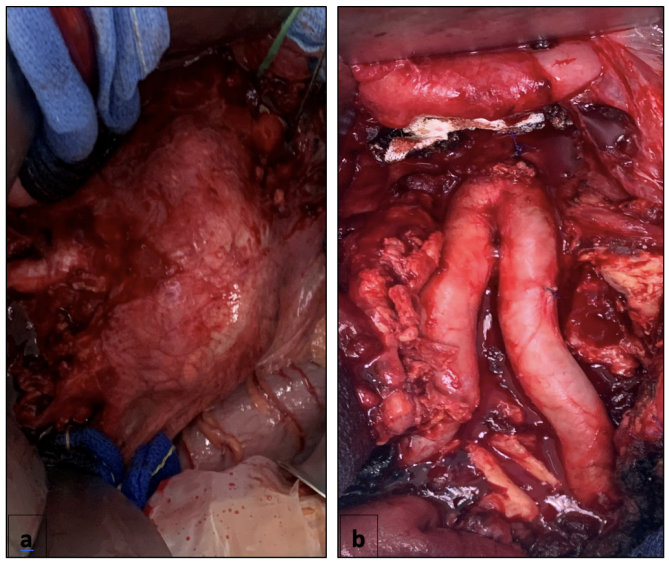

Figure 2. Preoperative iconographies showing abdominal aortic aneurysm **(a)** and its replacement by bifurcated allograft **(b)**.

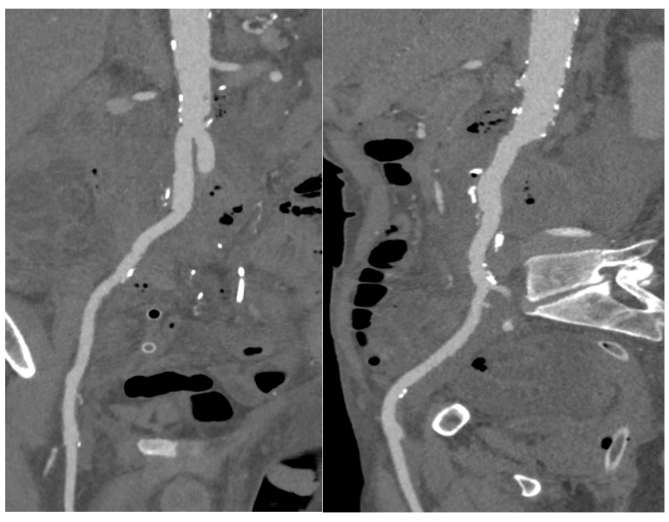

Figure 3. Angio-computed tomography scan of control at first month of postoperative treatment surgical showing no complications.

(anemia, 9.4 g/dL; thrombocytosis, 1038 G/L; and CRP, 229 mg/L). An abdomino-pelvic CT scan identified left pyelocaliceal dilation without a detected obstacle and an empyema measured at 35 mm plus abscessed collections measuring at most 25 mm. The aortic aneurysm had increased in diameter, reaching 65 mm x 40 mm and 79 mm at its greatest axis (**Figure 1**). Ureterohydronephrosis of the left kidney was also identified. Findings on transthoracic echocardiogram were normal. A transesophageal echocardiogram ruled out endocarditis. Blood culture grew *C. fetus*, and urine and feces cultures were sterile. Ultimately, strong IV antibiotic therapy was immediately initiated based on a consult from infectious disease specialists (amoxicillin clavulanate 2 g/4 hours and gentamicin 180 mg/24 hours). Given the high risk of rupture, an urgent surgical repair of the AAA was considered, preceded by the placement of a double J stent to treat ureterohydronephrosis. Through a midline laparotomy, an excision of the mycotic aneurysm and establishment of vascular continuity using allograft bypass in the infrarenal aortic bilateral common iliac arteries were performed (**Figure 2**). Pre- and post-operative courses were uneventful except for a blood transfusion.

After 48 hours of surveillance in the intensive care unit, the patient was transferred to the internal medicine and infectious disease departments for management of undernutrition and close monitoring of antibiotic response. As cultures of all surgical specimens yielded *C. fetus*, the antibiotic regimen was continued for 6 weeks after surgery. Gentamycin was suspended after 2 weeks of treatment. The patient was discharged home on his 16th postoperative day. Findings of clinical and biological systemic inflammatory syndrome were completely regressed at the first follow-up (first month). The angio-CT scan showed no anomalies (**Figure 3**). The patient later benefited from removal of the double J stent.

Discussion

There are limited cases documenting aneurysms in patients with *C. fetus*.[11] The first case of AAA associated with *C. fetus* bacteremia was reported by Dolev in 1971.[12] Our review of the literature revealed that these aneurysms were seen in the abdominal aorta exclusively. However, different arteries may be involved as well (**Table**). Among the mechanisms implicated in mycotic aneurysms are septic emboli (endocarditis), local injury in cases of IV drug abuse, local extension of infection to the adjacent arteries, and bacteremia in the context of sepsis.[13] These mechanisms can intertwine and result in a multifactorial disease.[14] We assume that the reported case of aortic aneurysm was due to *C. fetus* bacteremia in a fragile predisposed patient. It was recorded that atherosclerosis appears to be a favoring factor for contamination of the arterial wall.[15] Other prerequisite situations weakening the vessel have been identified, including advanced age, malignant diseases, immunosuppressive treatment, diabetes, and liver cirrhosis.[16-21] *C. fetus* infections are seen in patients with iatrogenic risk, including infections due to endovascular manipulations or implanted medical devices.[21]

The patient in question had multiple risk factors that predisposed him to *C. fetus* bacteremia. He had numerous cardiovascular risk factors (dyslipidemia, hypertension, cerebral stroke, and chronic tobacco abuse) and probably an atheromatous aortic aneurysm that predated the bacteremia. We

believe that *C. fetus* bacteremia had a tremendous impact on the rupture of atherosclerosis in the wall of the abdominal aorta, eventually causing a rapid enlargement of the aneurysm within 1 month.

Table. Characteristics of *Campylobacter fetus*-associated arterial aneurysms (reported cases).

Reported case	Age/gender	Location of aneurysm	Therapeutic management (besides antibiotics)	Outcomes
Loeb H et al 1966[4]	49/M	FA	Conservative treatment	Cured
Doley et al 1971[12]	68/M	AA	Dacron Y graft after rupture	Died
File et al 1979[37]	63/M	AA	ND	Died before surgery
Taylor et al 1979[38]	67/M	AA	ND	Died before surgery
Marty et al 19983[39]	54/M	AA	Aorta replaced with polyester graft	Cured
Blabey et al 1983[40]	68/M	AA	Aneurysm excision, ABF bypass	Cured
Anolik et 1983[41]	73/M	AA	Aneurysm excision, ABF bypass	Cured
Perry 1985[42]	70/M	AA	Woven Dacron bifurcation graft	Cured
Righter et al 1985[43]	56/F	AA	Tube graft	Cured
Rutherford et al 1989[6]	59/M	AA	Tube graft of knitted Dacron	Cured
Jacobs et al 1989[7]	64/M	AA	Aneurysm excision, ABF bypass	Died
Kato et al 1990[8]	61/M	AA	Aneurysm excision, ABF bypass	Cured
Allerberger et al 1991[5]	84/F	AA	ND	Died before surgery
Grollier et al 1993[9]	56/M	AA	Replaced with polyester graft	ND
Abassade et al 1994[10]	64/M	As A	Excision of aneurysm (ND)	Died
Kuzniec et al 1995[44]	70/M	AA	Interposition of a Dacron prosthetic graft	Cured
Montero et al 1997[45]	69/M	PA	Femoropopliteal bypass	Cured
Sessa et al 1997[46]	63/M	AA	Extra-anatomic bypass	Cured
La Scola et al 1998[47]	64/M	AA	Bifurcated Dacron woven graft aorto-bi-common iliac arteries	Cured
Mii et al 1998[48]	45/M	AA	Replaced with polyester	Cured

Lozano et al 1998[49]	65/M	PA	Aneurysm resection through a posterior popliteal approach (ND)	Cured
Baty et al 1998[50]	91/M	PA	Aneurysm resection (ND)	–
Tran et al 2007[51]	78/M	AA	Replaced with polyester graft	Cured
Cochennec et al 2008[34]	76/M	AA	Dacron tube graft	Cured
Cochennec et al 200[834]	76/M	AA	Zenith bifurcated stent graft	Died
Cochennec et al 2008[34]	79/M	AA	Zenith aortomonoiliac stent graft	Cured
Cochennec et al 2008[34]	79/M	AA	Aortoaortic bypass grafting with arterial cryopreserved allograft	Cured
Onoda et al 2008[52]	67/M	Bilateral DFA	Resection of infected aneurysm and bilaterial obturator bypass	Cured
Shiferson et al 2009[53]	69/M	Bilateral IIA	Excision of aneurysm (ND)	Cured
Brossier et al 2010[35]	69/M	AA	Replaced with polyester graft (Dacron graft)	Cured
Brossier et al 2010[35]	69/M	AA	Replaced with polyester graft alone (Silver graft)	Cured
Brossier et al 2010[35]	76/M	AA	Replaced with polyester graft (Dacron graft)	Cured
Brossier et al 2010[35]	76/M	AA	EVAR (Zenith bifurcated stent graft)	Died
Brossier et al 2010[35]	78/M	AA	Replaced with polyester graft (allograft)	Cured
Maeda et al 2011[54]	76/M	AA	Replaced with polyester graft	Cured
Maeda et al 2011[54]	57/M	AA	Replaced with polyester graft	Cured
Noda et al 2011[55]	72/M	AA	Replaced with polyester graft	Cured
Melendez et al 2014[56]	85/M	PA	Excision of the aneurysm via a posterior approach with reconstruction through a medial approach using autologous saphenous vein bypass	Cured
Hagiya et al 2014[57]	65/M	AA	Rifampicin (RFP) bonded J-graft	Cured
Dimitrief et al 2015[36]	73/M	AA	EVAR (Endurant II stent graft)	Cured
Hannah et al 2016[11]	41/M	CA	Coiling the common and external carotid arteries after 1 year of follow-up	ND

Ono et al 2020[58]	76/F	SFA	Self-expandable covered stent	Cured
Eke et al 2021[59]	36/M	AA	Resection of the inferior AA and neo-aorto-iliac replacement with femoral vein	Cured
Milanesio et al 2021[60]	76/M	AA	Conservative treatment	Cured
Present case	61/M	AA	Bifurcated allograft aorto-bi-common iliac arteries	Cured

M = male; F = female; FA = femoral artery; AA = abdominal aorta; As A = ascending aorta, PA = popliteal artery; DFA = deep femoral artery; CA = carotid artery; IIA = internal iliac artery; SFA = superficial femoral artery; PA = popliteal aneurysm; ABF = axillobifemoral; ND = not described

It is important to emphasize that infected aneurysms correspond only to 2% to 3% of all aneurysms.[22,23] The fact that this pathology is rare makes its management challenging. The diagnosis of an infectious cause of AAA was highly suspected by aspects of the patient's clinical course and confirmed by imaging and microbiological findings. Given the well-described association between AAA and endocarditis in patients with *C. fetus* bacteremia, it seems reasonable to perform cardiac workups.

C. fetus AAA management requires a multidisciplinary, medical-surgical team approach:

Medical component: It corresponds to early initiation of an adequate antibiotic regimen, antipyretics, and analgesics to relieve the patient's symptoms.

Surgical component: Various surgical options of mycotic AAA were described. It is represented essentially by in situ reconstruction; using usually cryopreserved allografts, rarely autografts; or extra-anatomical revascularization bypass. Thanks to advances in antibiotics, resection of mycotic aneurysms and immediate revascularization using allografts was the method of choice adopted by many authors.[24-27] Extra-anatomic reconstruction, widely advocated in the 1970s,[28-32] seems to be a perfect feedback option in case of unavailability of the appropriate graft, immediate limb-threatening ischemia, or in cases of patients with instability.[14]

The management of mycotic peripheral arterial aneurysms and AAA has been revolutionized by the development of endovascular grafts. The arrival of these devices has had a tremendous impact on surgeons' decisions. Nowadays, a trend toward endovascular repair has been seen. According to a European study,[33] endovascular aneurysm repair can be a durable treatment option for mycotic aortic aneurysms. However, literature on this approach outcome is still scarce.[33-36] More studies comparing these therapeutic options are required.

Conclusions

C. fetus-associated AAA is a rare vascular disease but is an emergent condition associated with high mortality and morbidity. The therapeutic use of antibiotic irrigation and surgical management of the mycotic aneurysm have shown good outcomes. Results of the operation can be improved by prolonged monitoring. ■

The authors have completed and returned the ICMJE Form for Disclosure of Potential Conflicts of Interest. The authors report no financial relationships or conflicts of interest regarding the content herein.

Manuscript accepted December 19, 2022.

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