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Case Report

Ruptured mycotic abdominal aortic aneurysm in the setting of an adjacent perinephric abscess

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ABSTRACT

Arterial aneurysms are most commonly present due to progressive vessel wall injury. They may then act as a nidus for bacterial seeding that can lead to the formation of a mycotic aneurysm in 2.5% of all abdominal aneurysms, which is associated with high mortality. Management of mycotic aortic aneurysm has been challenging always. Here we present a rare case of a ruptured mycotic aneurysm secondary to contiguous extension of a perinephric abscess. The patient required emergent surgery and underwent reconstruction of the aorta using a Dacron graft with a good 18 months outcome.

Keywords: Mycotic aneurysm, Perinephric abscess, Prosthetic vascular graft

INTRODUCTION

Arterial aneurysms are most commonly present due to progressive vessel wall injury. These pre-existing aneurysms may then act as a nidus for bacterial seeding that can lead to the formation of a mycotic aneurysm, which is associated with high mortality. It is estimated that only up to 2.5% of abdominal aortic aneurysms are infected while two third of them yield positive intraoperative cultures.[1] Previous reports have suggested that intra-abdominal infections can contiguously spread to an arterial wall, such as in cases of acute appendicitis, cholecystitis, colorectal surgery, and pancreatic pseudocysts.[2-5] Infected aneurysms are primarily treated surgically with urgent debridement and reconstruction of the affected aorta versus extra anatomical bypass.

CASE REPORT

A 71-year-old male presented to the emergency department with a three-day duration of vague, non-specific lower abdominal pain, dysuria, and fevers. He was taking amoxicillin for one day prior to presentation for a urinary tract infection. He was a 60-pack-year smoker and had not seen a physician regularly, denying any known medical or surgical history. Initial vital signs showed a low-grade fever (100.5 ºF), tachycardia to 117 beats/minute, and blood pressure of 115/64 mmHg. A physical exam revealed mild abdominal tenderness with a pulsatile mass palpable in the mid-abdomen. Laboratory analysis was significant for a white blood cell count of 18000 with a left shift of 84%, and urinalysis showed moderate leukocytes and bacteria.

Computed tomography (CT) angiogram showed a focal outpouching of contrast from the right posterolateral wall of the infrarenal aorta and extending between intimal calcifications, concerning an aneurysm with a contained rupture. The aneurysm was surrounded by an oval, 3-cm, low-density structure, with a contrast blush and peripheral rim enhancement. There was retroperitoneal and perinephric fat stranding with both kidneys having heterogeneous enhancement and faint hypodense areas suggestive of pyelonephritis (Figure 1).

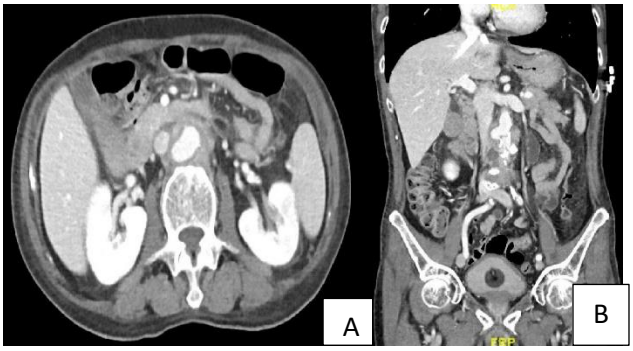

Figure 1 (A and B): Axial and coronal view on CTA showing the focal outpouching of contrast from the right posterolateral wall of the infrarenal aorta concerning an aneurysm with a contained rupture. The aneurysm is surrounded by an oval, 3-cm, low-density structure, with a contrast blush and peripheral rim enhancement along with retroperitoneal and perinephric fat stranding.

Broad-spectrum antibiotics (piperacillin/tazobactam) and fluid resuscitation were started, and the patient was admitted to the intensive care unit for hemodynamic monitoring. On hospital day two, he had worsening abdominal pain and hemodynamic instability. The patient emergently underwent laparotomy with abdominal aortic aneurysm repair. Intraoperatively, there was a contained ruptured abdominal aortic aneurysm with a small amount of reactive serous-sanguineous fluid intra-abdominally. The aneurysm's sac was not invaded directly by local adjacent kidney infection. After the peritoneum was incised overlying the aortic aneurysm, there appeared to be a penetrating aortic ulcer from the aneurysm which was contiguous with a surrounding abscess cavity. All infected tissue has been removed (Figure 2). In the setting of an emergency case, rifampin-soaked graft was not available therefore a 16/8 mm bifurcated aorto-Bi-Iliac knitted Dacron graft was used for reconstruction and the proximal aorta and right iliac artery were resected and sent for pathology.

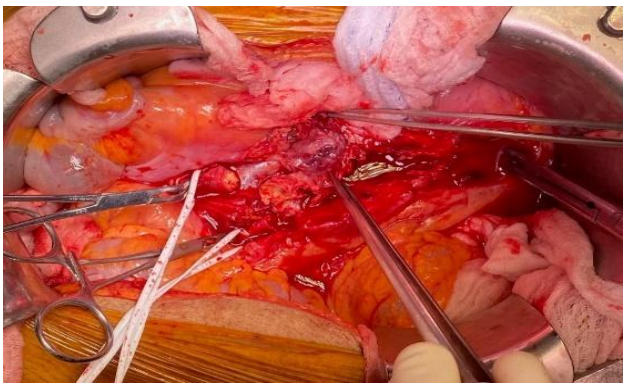

Figure 2: Intra operative finding of contained ruptured abdominal aortic aneurysm with a small amount of reactive serous-sanguineous fluid intra-abdominally. No obvious direct invasion by adjacent kidney infection.

The patient was septic postoperatively which was resolved with conservative management. The total ICU stay was 11 days, and he was stable for discharge on hospital day 22. Blood cultures on admission, as well as final intraoperative cultures, grew *Klebsiella pneumoniae*. After surgery the blood culture came back negative two times for five days. Therefore, he received a total of 14 days of IV antibiotics postoperatively and he was discharged home without antibiotics. Final pathology revealed a penetrating artery aneurysm with degenerative and inflammatory changes. At 18-month follow-up he is doing well, and CT angiogram shows graft patency (Figure 3). He also had repeat blood cultures which were found to be negative.

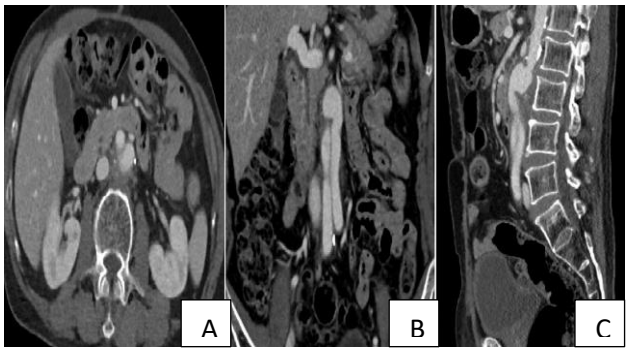

Figure 3 (A-C): Different view on CTA of abdominal aortic graft after 18 months shows appropriate patency of the graft.

DISCUSSION

Several factors have been implicated in the pathogenesis of mycotic aneurysms. These factors include bacteremia, local inoculation (e.g., trauma or iatrogenic causes), septic emboli, and local spread via direct extension. Most commonly, the infectious agents are bacterial in origin and are frequently *Staphylococcal* and *Streptococcal* species, although several other organisms have been reported.[1,6-8] Our patient had untreated pyelonephritis. He also likely had a concurrent, undiagnosed aortic aneurysm. considering there was no direct connection or invasion from the kidney to the aneurysm sac, our theory is that the bacteria was seeded via bacteremia into the pre-existing penetrating aortic ulcer (PAU). Indeed, the damaged intimal layer due to pre-existing atherosclerotic plaque got infected by bacteriemia. Though urine cultures had no growth, dysuria with radiographic findings of pyelonephritis and a positive urinalysis suggest this as the primary source. The final cultures of *Klebsiella* species also support this theory.

While both thoracic and abdominal PAU can be treated with endovascular repair, for mycotic aneurysm in either side open approach is preferred.[9,10] Cases of penetrating aortic ulcers of the abdominal aorta are uncommon and the management strategy is not clearly defined.[11] Extra-anatomic vs synthetic graft repair of the aorta are surgical approaches discussed in the literature.[7,9,10,12,13] An axilla-bifemoral bypass can be created, with debridement and

ligation of the aorta. This method has led to complications including loss of graft patency necessitating limb amputation and aortic stump ruptures. With the above information considered, we decided to utilize a prosthetic graft to minimize operative time, as our patient was unstable (on pressors) in the setting of damage control surgery. Though using an autologous bypass graft would have been ideal, the benefits of shorter operative time outweighed the disadvantage of using a graft in a contaminated field. To date our patient has had no subsequent infections and the graft is working as intended.

CONCLUSION

Abdominal aortic mycotic aneurysm is a rare entity. Bacterial seeding may happen either by direct invasion of an adjacent infected organ or infection of pre-existing PAU. Considering being rare there is no standard practice for the management of this disease including the best surgical approach, type of graft to use, and type and duration of the antibiotics. Therefore, each case should be reported to come to a common consensus for the management.

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REFERENCES

1. Chao CM, Lee KK, Wang CS, Chen PJ, Yeh TC. A Fatal Case of Klebsiella pneumoniae Mycotic Aneurysm. Case Rep Emerg Med. 2011;2011:498545.
2. Garb M. Appendicitis: an unusual cause of infected abdominal aortic aneurysm. Australas Radiol. 1994;38(1):68.
3. Fraser CD 3rd, Arnaoutakis GJ, George TJ, Owens JB, Conte JV, Shah AS. Acute cholecystitis preceding mycotic aortic pseudoaneurysm in a heart transplant recipient. J Card Surg. 2010;25(6):749.
4. Mazzalai F, Ragazzi R, Iurilli V, Toniato A, Da Giau G, Ballotta E. Pseudomonas aeruginosa-infected infrarenal abdominal aorta pseudoaneurysm secondary to laparoscopic colorectal surgery: failure of endovascular stent graft treatment after primary open repair failed. Can J Surg. 2009;52(5):E193.
5. Maalouf M, Moon W, Leers S, Papasavas PK, Birdas T, Caushaj PF. Mycotic aneurysm of the infrarenal aorta after drainage of an infected chronic pancreatic pseudocyst: case report and review of the literature. Am Surg. 2007;73(12):1266.
6. Guo Y, Bai Y, Yang C, Wang P, Gu L. Mycotic aneurysm due to Salmonella species: clinical experiences and review of the literature. Braz J Med Biol Res. 2018;51(9):e6864.
7. Muñoz-Muñoz L, Paño-Pardo JR, Torrubia-Pérez C, Algarate-Cajo S, Morte-Romea E, Salvo-Gonzalo S. Mycotic aneurysm of the abdominal aorta due to Listeria monocytogenes. Rev Esp Quimioter. 2018;31(3):293-4.
8. Thawait SK, Akay A, Jhirad RH, El-Daher N. Group B streptococcus mycotic aneurysm of the abdominal aorta: report of a case and review of the literature. Yale J Biol Med. 2012;85(1):97-104.
9. Aoki C, Fukuda W, Kondo N, Minakawa M, Taniguchi S, Daitoku K, et al. Surgical Management of Mycotic Aortic Aneurysms. Ann Vasc Dis. 2017;10(1):29-35.
10. Kotsis T, Spyropoulos BG, Asaloumidis N, Christoforou P, Katseni K, Papaconstantinou I. Penetrating Atherosclerotic Ulcers of the Abdominal Aorta: A Case Report and Review of the Literature. Vasc Specialist Int. 2019;35(3):152-9.
11. Batt M, Haudebourg P, Planchard PF, Ferrari E, Hassen-Khodja R, Bouillanne PJ. Penetrating atherosclerotic ulcers of the infrarenal aorta: life-threatening lesions. Eur J Vasc Endovasc Surg. 2005;29(1):35-42.
12. Qi YF, Xiao ZX, Shu C, Yue J, Liu SH, Chen H, et al. Infected Abdominal Aortic Aneurysms Treated with Extra-anatomic Prosthesis Bypass in the Retroperitoneum. Ann Vasc Surg. 2017;45:231-8.
13. Dubois M, Daenens K, Houthoofd S, Peetermans WE, Fourneau. Treatment of mycotic aneurysms with involvement of the abdominal aorta: single-centre experience in 44 consecutive cases. I Eur J Vasc Endovasc Surg. 2010;40(4):450.

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