In Situ Repair of a Mycotic Suprarenal Aortic Aneurysm Using a Cryopreserved Aortic Homograft and Visceral Debranching in a Patient with Spondylodiscitis and Left Psoas Muscle Abscess

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We present a patient with ruptured suprarenal aortic aneurysm, involving origins of visceral and renal arteries. Associated spondylodiscitis and left psoas muscle abscess were also diagnosed. The patient was initially treated with antibiotics. Diagnostic survey showed progression of the aneurysm diameter and enlargement of the psoas muscle abscess. Surgical treatment using a cryopreserved aortic homograft with debranching of visceral arteries was performed. Different modalities of surgical repair within the infected aortic segment and the rationale for usage of cryopreserved homografts are considered. The importance of optimal timing for surgery is emphasized as well.

Keywords: mycotic, aneurysm, homograft, spondylodiscitis, psoas abscess

Introduction

Mycotic aortic aneurysm, although rare, remains a highly lethal pathologic entity. Associated aneurysm rupture and psoas muscle abscess further increase the mortality.1–4) Surgical intervention is inevitable and is a life saving procedure in treatment of such a disease. Repair can be achieved either with in situ reconstruction or by performance of an extraanatomic bypass.5) If a visceral aortic segment is involved, in situ repair is recommended.6) Different types of grafts were used for in situ mycotic aortic aneurysm repair.6–9) Recently, cryopreserved aortic homografts regained importance due to advanced techniques of graft preservation and due to their favorable performance within the infected area.7,10,11) If a visceral aortic segment is affected, reimplantation of involved arteries or visceral debranching is mandatory. However, different graft materials as well as a variety of treatment modalities are continuously under investigation.

Case Report

A 63-year-old male was initially treated in the clinic for infectious diseases because of sepsis after acute prostatitis. His medical history revealed lumbar pain, intermittent febrility, chills and fatigue of 2 months duration. Magnetic resonance imaging (MRI) of thoracolumbar
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showed progression of almost 1 cm within a period of 3 weeks. The psoas muscle abscess also showed enlargement. Based on the clinical course of the disease and regarding morphological aneurysm characteristics with rapid progression of maximum diameter, the aneurysm was considered mycotic. As the aneurysm diameter showed progression and inflammatory parameters remained high. Lumbar pain showed progression and the patient was transferred to our department of vascular surgery.

His laboratory findings at admission were: C-reactive protein (CRP) 303 mg/L, leucocyte count 15.5 × 10^9/L with granulocytosis of 10%, thrombocyte count was 544 × 10^9/L, hemoglobin 108 g/L, urea nitrogen 13.3 mmol/L, creatinine 240 µmol/L, sodium 123 mmol/L. In our department, the antibiotics were continued. Multislice computed tomography (MSCT) showed a suprarenal aortic aneurysm of irregular eccentric multilobular shape and with a thickened and partially calcified aneurysm wall. The origins of the celiac trunk, superior mesenteric artery and renal arteries were involved within the aneurysm. Severe stenosis at the ostium of the celiac trunk was also identified (Fig. 2). Maximum aneurysm diameter

Fig. 1 MRI at thoracolumbar spine, showing large left psoas muscle abscess. Partial destruction of vertebral bodies is also visible.

Fig. 2 MSCT aortography - transverse (A) and sagittal (B) view, showing suprarenal aortic aneurysm. Notice the ostial celiac trunk stenosis. Arrow indicates the surrounding inflamed tissue with air bubbles.
remained high, the patient was scheduled for surgery 1 week after admission to our department. The value of the C-reactive protein just before surgery was 255.2 mg/L. Thoracophrenolaparotomy with medial visceral rotation was employed for the operative approach. A dense fibrotic retroperitoneal mass was exposed that involved the left kidney, suprarenal gland, ureter and the aortic aneurysm. A bifurcated (16 × 8 mm) silver impregnated Dacron graft was used for a bypass from the uninvolved descending thoracic aorta to the uninvolved portions of the celiac trunk and superior mesenteric artery. The aneurysm was then opened between clamps and a rupture of the posterior wall of 3 cm in length was identified. Renal perfusion was performed with cold Ringer’s lactate. The aneurysm and surrounding fibrotic and necrotic tissue were debrided. Curettage of the adjacent vertebral body and disc was also performed. Necrotic tissue and debris were removed from the left psoas muscle. The resected aneurysm was then replaced with a cryopreserved homograft of 25 mm in diameter taken from our institution’s cardiovascular tissue bank. Renal arteries were reimplemented within the homograft using short silver impregnated Dacron grafts of 8 mm in diameter (Fig. 3A). Histologic evaluation of the aneurysm wall confirmed the presence of necrotic aortitis. Staphyloccocus species and Propionibacterium species were isolated from cultures of the excised tissue. Linesolide and teicoplanin were administered intravenously for 4 weeks. Follow-up MSCT angiography showed an appropriate position and function of the performed vascular anastomosis (Fig. 3B), while the laboratory findings indicated a decrease of the inflammatory parameters. The antibiotics were then withheld and the inflammatory parameters were observed for the next 5 days. As they remained within normal

Fig. 3 Cryopreserved aortic homograft in situ (A). Side branches from descending thoracic aorta to the celiac trunk (CT) and to the superior mesenteric artery (SMA). A short silver graft interposition for right renal artery (RRA). Perfusion cannula introduced in the left renal artery (LRA). Postoperative MSCT aortography, showing corresponding vessels and conduits (B).
range, the patient was discharged from the hospital. At discharge he was afebrile, with CRP 4.7 mg/L and leucocyte count of 7.8 × 10⁹/L. Seven month follow-up was uneventful.

Discussion

The best treatment option for mycotic aortic aneurysms remains undetermined. The approach should comprise an optimal antibiotic strategy, optimal surgical management, and optimal timing for surgical intervention. Early antibiotic treatment should be the first step, followed by surgical treatment. However, in the presence of an aneurysm rupture or complicated infection immediate surgical intervention is inevitable. Surgical management of mycotic aneurysms and the choice of graft material is still being discussed.⁵,⁸,¹²,¹³) Improved endovascular techniques and materials brought into focus the employment of endografts alone or in combination with open repair – a hybrid approach.¹³–¹⁵) Although feasible, the implantation of an endograft within an infected area is highly controversial. In such cases infective aortic tissue is not removed and controversy remains not only regarding the persistence of an established local infection,¹⁶) but also with regard to the long-term durability of the endograft. Furthermore, in those patients, long-term or even lifelong antibiotic treatment may be inevitable. The favorable long-term results of implanted cryopreserved human cardiac valves¹⁷) have propelled the more common use of cryopreserved aortic homografts within the setting of aortic infections.⁷,¹⁰,¹¹) There is evidence which indicates that cryopreserved homografts are resistant to bacterial infection,¹⁸,¹⁹) and that the immune response of the host may be limited.¹⁹) In our patient wide debridement of the infected and necrotic tissue was performed prior to graft placement. The cryopreserved aortic homograft was then positioned within the most critical infected area next to the affected vertebral bodies and involved intervertebral disc. Debranching was performed because the origins of visceral arteries were within friable and necrotic aneurysmal tissue and direct reimplantation of visceral button was not feasible. Besides, the origin of the celiac trunk was severely stenosed. Our first choice for debranching graft material should have been the cryopreserved graft, but such graft was not available at the time. Besides, we considered that sacrificing autologous tissue (iliac artery, superficial femoral vein) would add unacceptable complexity and risk to the procedure. We therefore, decided to use silver impregnated Dacron grafts as a readily available and reliable option. Namely, antiseptic properties of silver salts have previously been well recognized and silver impregnated polyeter grafts performed fairly well as a treatment option for management of aortic infections.²⁰) Our patient received antibiotics for almost a month before surgery and the operation was delayed. Although his preoperative hemocultures were negative, the local finding was unfavorable, the aneurysm was ruptured and the operative procedure was demanding.

Conclusion

To avoid fatal septic complications, the rupture and progression of a local pathologic process to the unfavorable setting, early diagnosis and treatment of mycotic aneurysms should be preferable. So far, cryopreserved aortic homograft showed its potential for in situ repair.⁷,¹⁰,¹¹,¹⁹) Durability of such repairs remains to be confirmed on the ground of higher patient volume with extended follow-up. Different methods for visceral debranching as well as optimal duration of preoperative and postoperative antibiotic treatment are still discussed.

Disclosure Statement

Authors have no conflict of interest.

References


