A rare case of peripheral vascular graft infection by *Aspergillus fumigatus* and review of the literature

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ABSTRACT

We present an unusual case of a 74-year-old woman who presented with a pseudoaneurysm at the site of a previous prosthetic femoro-popliteal bypass graft and underwent an urgent repair with pseudoaneurysm excision and extra-anatomic placement of an autologous venous graft. Microbiology examination revealed *Aspergillus fumigatus* infection of the graft, which is a very rare condition. Long-term antifungal medication has been administered with positive outcome. Only a few cases have been reported in literature, mainly involving aortic grafts. Most patients are immunocompetent and with late presentation. Successful outcome can only be achieved with long-term antifungal treatment and extra-anatomic replacement of the graft.

KEYWORDS

Aspergillus fumigatus – Vascular graft

Accepted 7 August 2016

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Introduction

Bacterial graft infection is a serious complication that presents in less than 3% of grafts. Fungal infections are very rare, represented mainly by *Candida*.¹ *Aspergillus* species are rarely responsible for vascular graft infections, generally reported in aortic surgery. Infrainguinal prosthetic graft infections by *Aspergillus* species are extremely rare.² Infection is thought to occur at the time of graft placement by airborne fungal spores.^{1,2} This is one of the rare reported cases of distal prosthetic vascular graft infected by *Aspergillus fumigatus*. The current case and a literature review have suggested that excision of the infected graft with extra-anatomic replacement and antifungal therapy is mandatory for successful treatment and patient's survival.^{1,3}

Case presentation

A 74-year-old woman was admitted with a tender, erythematous, pulsatile mass on the right medial lower thigh. Previous vascular history included a right above-knee femoro-popliteal bypass 1 year ago with use of polytetrafluoroethylene (PTFE) graft, followed by acute occlusion of the graft 3 months later treated with catheter-directed thrombolysis and less than 24 hours later with surgical embolectomy. It also included recurrent episodes of bilateral leg cellulitis and infected ulcers and a left femoro-popliteal bypass with use of autologous venous graft. On presentation, the patient demonstrated a raised white cell count and tachycardia, with low-grade fever and a computed tomography angiogram revealed a pseudoaneurysm (Fig 1). She then

underwent surgery in which the distal anastomosis of the vascular bypass was found to be dehiscence, feeding the pseudoaneurysm. The pseudoaneurysm was excised and the macroscopically infected graft was extra-anatomically replaced with an autologous vein. The original PTFE graft was channelled through a graft tunneller in the subfascial subsartorial plane to reach the above-knee popliteal artery. The vein used as extra-anatomic replacement was the pre-marked long saphenous vein of the same leg, which was tunnelled in the adductor canal with a more medial and posterior approach to reach the below knee popliteal artery through a clean field. Intravenous antibiotics were started and tissue was sent for urgent microbiology examination. Secondary closure of the wound was achieved with application of vacuum dressing. The postoperative recovery period was uneventful. Microbiology examination revealed infection with *Aspergillus fumigatus* and the patient was started on antifungal treatment with oral voriconazole. She was followed-up regularly in the clinic with regular wound dressing and 6 weeks later the wound was completely healed. She also completed a full course of 1 month of oral antifungal treatment as per microbiology advice. The patient has been currently off antifungal medications for 20 months and is clinically well.

Discussion

No more than 15 cases with vascular graft infection due to *Aspergillus* have been reported.² Median time reported in literature between graft placement and *Aspergillus* infection is 8 months (range 1–39 months). Possible predisposing factors

Figure 1 Tridimensional reconstruction of the preoperative computed tomography angiogram depicting the pseudoaneurysm

for blood-derived infection include haemorrhage requiring re-exploration, multiple graft revisions, immunosuppression and pulmonary fungal infection. In the cases reported, there was no evidence of immunocompromise, except in three patients with pulmonary tuberculosis, therefore the grafts appear to have been contaminated at the time of the initial placement with airborne fungal spores.^{1,3,4} Only three cases have been reported with infra-aortic infections^{1,3,4} but, as far as we are aware, no cases with peripheral prosthetic graft infection have ever been documented. Between the *Aspergillus* species, *Aspergillus Fumigatus* was the one most frequently isolated. Except for two cases, blood cultures were negative and, as no specific radiological signs exist, diagnosis without tissue sample becomes extremely difficult.^{1,2} Infection can be associated with pseudoaneurysm formation^{1,4,5} or, more often, with thromboembolic complications.^{1,2,4} Excision of the previous grafts (followed by either extra-anatomic or in situ bypass), thrombectomies without excision of the graft and amputations have been described. Survival and absence of recurrent infection has only been associated with graft excision and extra-anatomic bypass, at least within the length of follow-up reported in literature.^{1,4} Median treatment time with antifungal medications was 4 weeks.

In the present case, infection was caused by *Aspergillus fumigatus*, appeared relatively late and became evident with formation of a pseudoaneurysm. A distal infrainguinal site

was involved and there was no associated bone infection. There were no predisposing factors for immunosuppression; however, the previous administration of long-term antibiotics may have contributed. All previous cultures from the leg ulcers were negative for fungal infection or colonisation. The possibility of infection during the previous catheter-directed thrombolysis has also been strongly considered. The lower level of aseptic technique in angiography suites or during the infusion makes this procedure a potential source of infection. Although the patient was under regular surveillance and no clinical manifestation of infection was evidenced for the period of 9 months until the time of presentation of the pseudoaneurysm, this period is still within the range of time reported in literature for manifestation of the infection.

Contamination of the graft at the time of surgery is another likely source, although the ventilation system and surgical instruments are regularly checked and no other case of aspergillosis has been documented in the hospital. The course of the infection was indolent and blood cultures were negative. Successful treatment was achieved by excising the pseudoaneurysm and the infected graft and creating an extra-anatomic autologous venous bypass associated with antifungal treatment.

Twenty months after completion of antifungal treatment the patient can be considered clinically cured. There have been no signs of infection during regular clinical follow-up examinations and the patency of the graft has been assessed with regular ultrasound duplex scans. However, follow-up examinations will be continued, as no other specific tests are available for confirmation of the cure of the patient and the time to presentation of the infection can be very prolonged.

The possibility of a late presenting fungal vascular graft infection should not be disregarded in symptomatic immunocompetent patients with negative blood cultures. Excision and extra-anatomic bypass is the more appropriate method of treating a potentially fatal disease, with concomitant long-term antifungal treatment.

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