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CASE REPORT

An axillofemoral bypass graft transgressing the chest wall

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Key Clinical Message

Explantation of an infected patent vascular graft does not necessarily require concomitant revascularization procedures. The need for revascularization can be determined by a trial cross-clamping of the graft and clinical assessment of limb perfusion. We report a case of an infected axillofemoral graft transgressing the chest wall in a surgically high risk patient.

Keywords

Extra-anatomic bypass, graft infection, prosthetic grafts.

Introduction

Extra-anatomical revascularization for aortoiliac occlusive disease is an effective alternative to limb amputation or aortobifemoral bypass reserved for surgically high risk patients and when previous endovascular recanalization has failed or is contraindicated [1–3]. Axillofemoral bypass grafts have improved since their emergence in 1963, with patency rates reasonable but inferior to aorto-femoral and aortobifemoral grafts [1, 3]. Graft infection and thrombosis can complicate axillofemoral bypasses, with the subsequent management in surgically high risk patients and hostile abdomens being difficult. We report a rare case of an infected patent axillofemoral graft transgressing the chest wall.

Case Report

A 96-year-old man presented to A&E unwell. His past medical history was significant for frailty, COPD, ischemic heart disease and multiple vascular operations including a right axillofemoral bypass graft for occlusion of a previous aorto-uni-iliac stent. On admission, he was septic with a temperature of 38.6°C, heart rate of 118 bpm and a blood pressure of 179/80 mmHg. The axillofemoral bypass graft was found to transgress the right lateral chest wall with 10 cm of the graft externalized and exposed (Fig. 1). Purulent discharge and erythema surrounded the site. On further questioning, the graft had eroded through the skin several years prior with no surgical advice sought. Both feet were warm and well perfused. Femoral pulses only were palpable. His inflammatory markers were markedly elevated with a white cell count of $21{\cdot}7 \times 10^9$/L and CRP of 181·4 mg/L. Proteus mirabils and coagulase-negative staphylococcus were cultured from the blood. A duplex ultrasound confirmed the axillofemoral graft's patency. CT angiography of the aorta additionally demonstrated no significant graft enhancement within the body (Fig. 2).

A diagnosis of graft related sepsis was made. He was commenced on intravenous Pipercillin/Tazobactam as per microbiological culture sensitivities. With overt clinical and biochemical evidence of sepsis definitive treatment in the form of graft explantation was required. In view of the patient's comorbidities and high anesthetic risk, surgery was performed under local anesthesia. The axillofemoral graft was test-clamped for 30 min following heparinization (5000 units). The leg was seen to remain

Figure 1. Externalized section of the axillofemoral bypass graft.

Figure 2. 3D reconstructed CT Angiography: The axillofemoral graft extends from proximal to the axillary artery to the common femoral artery, descending superficial to the thoracic cage.

viable allowing for the graft to be explanted without the need for further revascularization. Proteus mirabils and coagulase-negative staphylococcus were also cultured from the graft confirming the diagnosis of graft sepsis. The patient made an uncomplicated recovery with the leg remaining neurovascularly intact. He was discharged home on postoperative day 9 on a prolonged course of oral antibiotics.

Discussion

Prosthetic graft infection is a devastating outcome of aortoiliac revascularization procedures. It complicates 0.5–3.5% of patients [4, 5], and has a mortality rate as high as 75% [6, 7]. Definitive management is graft excision with subsequent revascularization either by extra-anatomical or in situ reconstruction. In clinical practice, however, treatment is tailored according to patient comorbidities and the Samson's modified Szilagyi classification system of extracavitary vascular graft infection is useful (a system which correlates extent of infection with prognosis) [7, 8]. Challenges arise when managing axillofemoral graft infections when they occur in patients who have few revascularization options and are unable to tolerate major reoperative procedures. In such cases, the most appropriate treatment option may actually be graft salvage or conservative management with antibiotics rather than graft excision [7, 8]. In the context of overt sepsis with hemodynamic compromise, an infected vascular graft which has eroded through adjacent structures mandates graft removal.

In our case, further revascularization upon graft removal initially appeared inevitable given that it was the only source of perfusion to the right lower limb. Cross-clamping a patent vascular graft with clinical assessment of limb viability is a useful and simple technique which can be used to predict the need for a revascularization procedure following removal of an infected graft. This allows the surgeon to better plan or avoid a prolonged open aortic procedure and its associated morbidity and mortality in surgically high risk patients.

An array of therapeutic options for graft infections have been described in the literature. Evolution of minimally invasive techniques has allowed many procedures historically preformed under general anesthesia to be performed more conservatively under local and spinal anesthesia. This has provided an alternate limb salvage option for elderly patients where endovascular recanalization is anatomically not feasible or their cardiorespiratory fitness is of concern. Al-Wahbi [9] reported the successful revascularization of an ischemia foot in an octogenarian with an axillofemoral bypass graft under local anesthesia. Cappello et al [6]. reported 100% success rate in limb revascularization at 30 days when spinal and local anesthesia were used to gain femoral and axillary access, respectively, in constructing an axillofemoral bypass. Such surgical advancement has reduced patient mortality and morbidity compared to earlier results. A retrospective study of infected axillofemoral grafts presenting to a university hospital from 1982 to 1993 reported 57% of survivors resulted in having a limb amputation [10]. Had our patient required a further revascularization procedure then the option of a left axillofemoral

bypass under local anesthesia would have been the next step.

Restoring lower extremity perfusion following axillofemoral graft excision with endovascular reconstruction has too been reported in the literature [11]. There is hesitancy from surgeons to replace extra-anatomical and endovascular grafts in an infected field due to the risk of local recurrence. Prompt administration of empirical antibiotics and debridement of tissue within the perigraft area will help to reduce bacterial colonization. Staphylococcus is the predominant microorganism cultured. Colonization with non-coagulase-negative staphylococcus correlates with late infections. Proteus mirabils and other gram negative organisms are associated with high rupture and anastomotic failure rates [12]. As seen in our case, empirical antibiotic treatment with anaerobic coverage should therefore be promptly administered to improve patient outcomes.

Conclusion

In summary, explantation of an infected patent vascular graft does not necessarily require concomitant revascularization procedures. The need for revascularization can be determined by a trial cross-clamping of the graft and clinical assessment of limb perfusion. Our report of an infected axillofemoral graft which has transgressed the chest wall contributes to the limited literature on managing extra-anatomical graft infections in surgically high risk patients. An understanding of the management of prosthetic vascular graft infections is of equal importance to nonvascular surgeons as it is to vascular surgeons. Though it is rare, graft infections are associated with significant mortality and morbidity.

Conflict of Interest

None declared.

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