Vacuum-assisted Conservative Treatment for the Management and Salvage of Exposed Prosthetic Hemodialysis Access

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Recurrence puncture of dialysis grafts can cause erosion and ulcer formation in the skin over the prosthetic material. Contamination of the wound can lead to infection of the graft, and the necessity to remove it. We describe four cases where aggressive treatment with debridement, intravenous antibiotics and negative pressure therapy allowed prosthesis salvage without discontinuation of hemodialysis.

Key Words: Arteriovenous fistulae; End stage renal disease; Hemodialysis; Infection; Vacuum-assisted therapy.

Introduction

Several complications associated with expanded polytetrafluoroethylene (ePTFE) graft placement for hemodialysis vascular access have been described. The leading cause of patient morbidity as well as access failure is infection.1,2 Recurrence puncture of dialysis grafts may cause erosion and ulcer formation in the skin over the prosthetic material.2 Contamination of the wound can lead to infection of the graft, and the necessity to remove it surgically.3 A vacuum-assisted closure device (VAC) is used for the management of complicated wounds; it is associated with accelerated development of granulation tissue, earlier reepithelialization of wounds and decreased wound bacterial counts.4,5

To allow salvage of ePTFE grafts we used a vacuum dressing combined with intravenous antibiotics after debridement of the wound in four cases.

Short Report

Four cases of wound dehiscence over ePTFE grafts for hemodialysis access presented between September and November 2002. There were three men and one woman, and the median age was 66.2 years old. Treatment consisted of debridement of the wound and application of a vacuum dressing, combined with intravenous antibiotics, after blood cultures and a swab of the wound were taken for microbiological examination. VAC consisted of placing a dressing sponge made of open-cell polyurethane foam onto the wound. Embedded in this sponge was a noncollapsible, sideported evacuation tube connected to an adjustable vacuum pump. A plastic adhesive drape was placed over the sponge to obtain an airtight seal. The vacuum pressure was adjustable up to 2125 mmHg and was used intermittently. Dressings were removed every 3–4 days. The pump, we used was a portable small pump designed for ambulatory treatment (KCI, San Antonio, TX, USA).

Patients 1 and 2 developed wound dehiscence over the graft after repeated skin puncture (Fig. 1). Patient 3 had a wound dehiscence following surgery after a small infected haematoma was evacuated over the alloplastic material. Patient 4 developed a voluminous haematoma at the anterior aspect of the elbow after puncture. Blood cultures taken at the time of admission were sterile in all cases. Both haematomas were infected with Staphylococcus aureus and Staphylococcus
epidermidis, respectively. Antibiotics were stopped if the culture were sterile and maintained for a total of 15 days if pathology was identified. Retraction of the wound over the ePTFE graft was obtained in patients 1–3 with development of granulation tissue on two thirds of the graft’s circumference. Coverage of the alloplastic material was obtained by a local skin flap done under local anaesthesia (Fig. 2). For patient 4, coverage was obtained after direct closure under general anaesthesia. Wounds have been stable from 7 to 9 months. During all the treatment hemodialysis was continued using the same vascular access. Subatmospheric suction did not impair AVF outflow.

Discussion

Infection accounts for about 20% of all vascular access complications. Native primary AVF have the lowest rate of infectious complications. Permanent dual-lumen venous catheters and ePTFE grafts have a much higher complication rate. Poor healing after

Fig. 1. Close view of the wound dehiscence over prosthetic material.

Fig. 2. Result after local skin flap.

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graft placement can cause erosion of the overlying skin with exposure and contamination of the graft. Haematomas can occasionally form around anastomosis sites and as well as seromas can act as infectious niduses developing into perigraft abscesses. Most of all, repeated needle puncture is the most common cause of infection. These mechanical injuries might result in ulcer formation overlying the access, which can become secondarily infected. If left untreated, infection can propagate to the subcutaneous tunnel surrounding the ePTFE graft and it becomes necessary to remove it surgically. VAC therapy has been reported to be useful in the treatment of wound infections by decreasing the wound bacterial counts and accelerating granulation tissue development. We demonstrated in four cases that graft salvage could be obtained with aggressive local care, vacuum-assisted therapy and systemic antibiotics. These preliminary results suggest that a randomised clinical trial comparing healing with or without vacuum-assisted therapy should be carried out.

References


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