Vacuum-assisted closure therapy with omental transposition for salvage of infected prosthetic femoral–distal bypass involving the femoral anastomosis

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Vascular graft infections are associated with the potential for devastating sequelae, including hemorrhage, septicemia, amputation, and death. Graft excision and debridement of the infected bed with revascularization via an extra-anatomic site or orthotopic vein bypass has been the traditional treatment of choice. Because the morbidity of these operations is substantial, less radical graft preservation techniques are desirable, such as myoplasty, omental flap transposition, and vacuum-assisted closure therapy. We report a patient with infection involving a prosthetic graft that was treated with vacuum-assisted closure and transposition of an omental tongue to enable coverage of the exposed graft. (J Vasc Surg 2011;54:1154-6.)

Peripheral vascular graft infections are associated with the potential for devastating sequelae, including hemorrhage, septicemia, amputation, and death. Complete or partial graft excision and debridement of the infected bed with revascularization through an extra-anatomic site or orthotopic vein bypass has been the treatment of choice when immediate revascularization is imperative to secure limb salvage. Less radical graft preservation techniques have been reported to treat peripheral graft infections, including myoplasty, omental flap transposition, and vacuum-assisted closure (VAC) therapy.[1-4] We report a patient with infection involving a prosthetic graft and the proximal anastomosis that was treated with VAC and supplementary transposition of an omental tongue to enable coverage of the exposed graft.

CASE REPORT

A 64-year-old man underwent a common femoral-to-above knee popliteal artery bypass with expanded polytetrafluoroethylene (ePTFE) for disabling claudication. At postoperative week 10, the graft occluded and the patient developed rest pain. Six weeks later, the patient underwent a common femoral-to-posterior tibial artery bypass with ePTFE with complimentary distal arteriovenous fistula. The proximal part of the new graft was anastomosed to the proximal part of the original graft. Two weeks later, the patient presented with fever and a fluctuant mass in the area of the thigh incision. He was found to have methicillin-sensitive *Staphylococcus aureus* bacteremia and a white blood cell scan revealed uptake in an elongated pattern in the ipsilateral thigh.

Fig 1. Open wound with some granulation tissue and exposed graft.

Intravenous culture-directed antibiotic therapy was initiated. Exploration revealed a grossly purulent femoral-popliteal bypass

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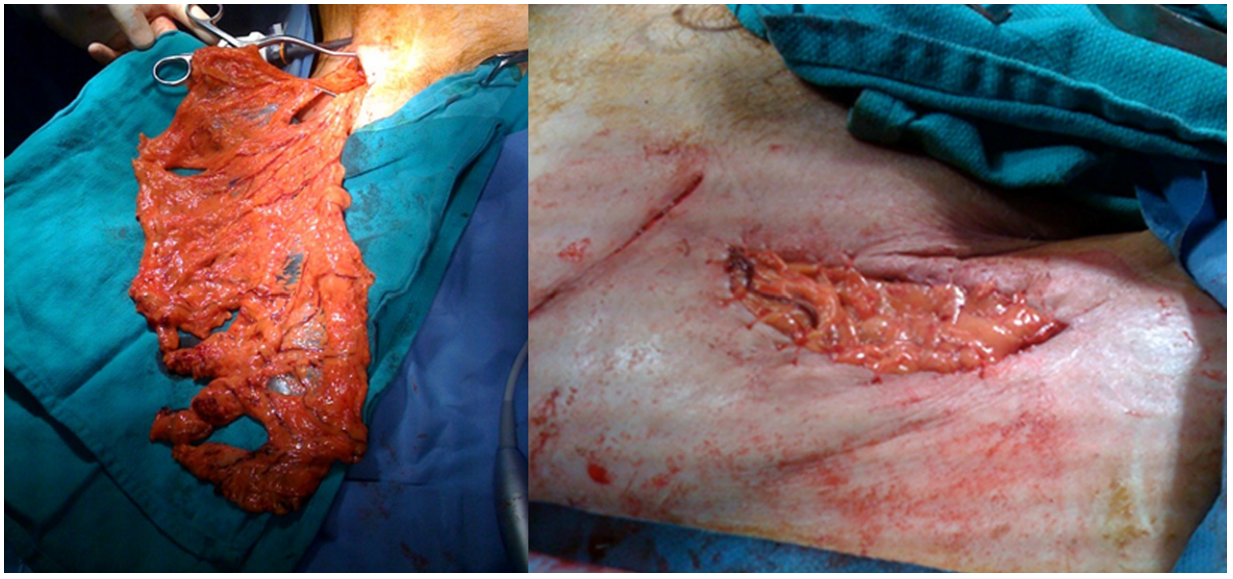

Fig 2. Left, The omentum has been mobilized with laparoscopic assistance. **Right,** The omentum has been secured in the wound.

involving the entire graft, including both proximal and distal anastomoses. The more recent femoral-posterior tibial remained patent. However, it was intimately associated with the infected older graft because of its proximal anastomosis, which originated from the hood of the infected graft in the area of the common femoral artery.

The infected femoral-popliteal graft was removed, with the exception of a very proximal stump anastomosed to the common femoral artery, serving as the inflow of the newer femoral-distal bypass. The proximal stump of the original femoral-popliteal bypass was over sewn with 5-0 Prolene (Ethicon, Somerville, NJ) and reinforced with a small Dacron patch because hemostasis at the stump was difficult to achieve.

Continuous vancomycin irrigant was flushed through the wound for 2 days. The proximal groin wound and the more distal popliteal incisions were left open and packed with moist gauze. On postoperative day (POD) 2, the patient underwent local debridement and irrigation of the open wounds, which were clean, with graft exposed in the groin. On POD 4, the wounds were noted to be clean, and a VAC dressing was placed over the exposed proximal anastomosis and graft stump. The VAC was set at 75 mm Hg continuous negative pressure with a nonadherent dressing interposed between the sponge and graft.

At POD 11, after several local wound debridements, substantial granulation tissue was present in the right groin, but 50% of the graft still remained exposed (Fig 1). The patient was discharged on POD 17 and continued with intravenous antibiotics and home VAC therapy as an outpatient.

After 2 weeks of outpatient therapy, there was no further granulation of the wound and 50% of the graft remained exposed. The adjacent sartorius muscle could not be used for graft coverage because it had been extensively involved with the infection. The patient underwent laparoscopic mobilization of an omental tongue that was tunneled subcutaneously from the right midabdominal laparoscopic wound directly into the inguinal wound and then sutured in place over the exposed graft material (Fig 2). This basically served as a biologic protective covering. The VAC was placed over the omentum to promote granulation tissue formation. The patient was discharged home on POD 3 with VAC therapy. Intravenous antibiotics were stopped and the patient began a lifelong course of suppressive oral cephalexin.

Six weeks later, the wound was clean and granulating. Platelet-rich fibrin matrix was applied to the groin wound and facilitated full healing by secondary intention at 8 weeks after the omental transposition (Fig 3). Repair of a hernia at the right midabdominal laparoscopic wound site was performed 15 months after the omental transposition operation.

The patient is now 2 years after excision of the infected femoral–popliteal graft, with continued patency of the femoral–posterior tibial bypass. He has no signs of infection and is being maintained on oral antibiotic therapy. A white blood cell scan showed no increased uptake in the ipsilateral lower extremity. Follow-up treatment will be determined by clinical examination supplemented with duplex ultrasound imaging.

DISCUSSION

Mortality and morbidity rates associated with the standard approach to managing infected lower limb bypass grafts continue to be substantial. As VAC therapy evolves, we are now in an era where radical graft excision for infected prosthetic conduits is no longer the only acceptable mode of treatment. Despite warnings about the safety of VAC therapy in the setting of exposed grafts, there have been several favorable reports of VAC therapy for treating such wounds.[3-7] Reported complications of VAC therapy in the setting of exposed vascular grafts include bleeding and pseudoaneurysm formation.[8-10] Recognizing the potential

Fig 3. Fully healed wound is shown 8 weeks after the procedure.

for serious adverse outcomes, a nonadherent dressing should be interposed between the exposed anastomosis and VAC sponge and the patient should be in a critical care unit.

When treating an exposed anastomosis, we recommend avoiding negative pressure >75 mm Hg. In addition, outpatient VAC therapy should be reserved for patients who no longer have an exposed anastomosis. Myoplasty, with or without VAC, has been documented to also achieve success in managing infected groin grafts.[3] We chose omental transposition to avoid opening new spaces for potential infection. A hernia developed in our patient at the major laparoscopic wound site that required intervention. This has not been previously reported, but we believe that this may be due to atrophy or dissolution of the omental bulk as it exits the peritoneal cavity.

The omentum has been used in a wide variety of applications, including intra-abdominal vascular procedures, chest wall reconstructions,[11,12] and in the treatment of lymphedema and spinal cord injury.[13-15] The omentum is essentially a double layer of peritoneum that is highly vascularized and angiogenic. The abundance of macrophages and lymphatics explains its role in infection control and fluid absorption.[15] Omentum also contains various amounts of adipose tissue that secretes vascular endothelial growth factor and promotes angiogenesis. This elaboration of vascular endothelial growth factor is upregulated under hypoxic conditions, making omentum an appealing biologic covering for wounds with exposed prosthetic graft material.[16] An experienced laparoscopic surgeon can easily mobilize an omental tongue with its blood supply based on the gastroepiploic arcade. Its size renders it suitable to cover large defects, thereby obliterating dead space. Its abundance and mobility make it a desirable alternative when adequate soft tissue for coverage is unavailable and extra-anatomic revascularization is not possible, feasible, or appropriate.

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