Vacuum-Assisted Closure Therapy for Groin Vascular Graft Infection

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Abstract: Vascular graft infection is a serious complication associated with high morbidity and mortality. Because of this, various graft preservation techniques have been increasingly utilized in an attempt to improve outcomes. When this devastating complication occurs, several possibilities for treatment are available. The traditional treatment consists of graft excision and extra-anatomic reconstruction. Reconstruction can also be done in situ using homografts or autologous grafts, as well as new synthetic prostheses with antimicrobial properties. A more conservative approach and graft preservation may be indicated in some cases. This paper presents a case of successful graft preservation using a vacuum-assisted closure system.

Key words: groin wound, synthetic graft infection, conservative treatment, vacuum-assisted closure

A 63-year-old obese woman was admitted to Dedine Cardiovascular Institute, University of Belgrade (Belgrade, Serbia), due to ischemic rest pain.
in the left leg with an ankle-brachial index of 0. The patient had undergone an aortobifemoral reconstruction 3 years earlier for aortoiliac occlusive disease. Multislice computed tomography revealed occlusion of the left limb of the y-shaped prosthesis. Immediate reoperation was undertaken and a transfemoral thrombectomy was performed. On the first postoperative day, reocclusion of the left limb occurred and a new transfemoral thrombectomy was done. Two days after the second procedure the patient underwent another transfemoral thrombectomy of the left limb aortobifemoral graft and femoropopliteal graft insertion on the same leg. At that point hematologic tests showed the patient had an antithrombin III deficiency and resistance to aspirin and clopidogrel. Substitution therapy for antithrombin III deficiency was done and antithrombotic therapy with prasugrel initiated. Further postoperative course was complicated with purulent discharge from the left groin and a supragenual wound on the left leg. Both wounds were opened and debridement was performed in the operating room (Figure 1). In both wounds, grafts were exposed. A vacuum-assisted closure system was applied to both wounds 24 hours later. The cultures from the wounds grew *Acinetobacter* and *Proteus mirabilis*. Adequate antibiotic therapy with vancomycin was provided for 2.5 months, the entire length of the patient’s hospitalization. Wounds after 10 days of vacu-

![Figure 1](image1.png)

**Figure 1.** Open groin wound with exposed left limb of y-shaped prosthesis and femoropopliteal graft and their anastomosis.

![Figure 2](image2.png)

**Figure 2.** a) Supragenual wound; b) Groin wound after 10 days of vacuum-assisted closure therapy.

![Figure 3](image3.png)

**Figure 3.** a) Supragenual wound; b) Groin wound after 1 month of vacuum-assisted closure therapy.

![Figure 4](image4.png)

**Figure 4.** a) Supragenual wound; b) Groin wound after 2 months of vacuum-assisted closure therapy.
um-assisted closure therapy are shown (Figure 2).

After 1 month of vacuum-assisted closure therapy, wounds showed significant improvement with healthy granulation tissue and wound contraction (Figure 3). Figure 4 shows wounds after 2 months of vacuum-assisted closure therapy. Wounds at the end of therapy (2.5 months), and at follow-up examination 1 year after the patient’s discharge from the hospital, are shown (Figures 5 and 6). No additional antibiotic therapy was prescribed after discharge.

**Discussion**

Groin infections after bypass procedures remain a major source of morbidity and mortality. Vacuum-assisted closure therapy has been increasingly used in wounds with infected and exposed vascular grafts. The effect of vacuum-assisted closure therapy on the reduction of bacterial content in wounds has been reported. Removing excess fluid from the wound may cause increased lymphatic and blood flow, with greater amounts of oxygen and antibiotic delivery in the wound necessary for bacterial killing. One concern with vacuum-assisted closure therapy on exposed grafts is that placing the sponge close to the anastomosis creates a risk of bleeding complications. Such use in wounds with exposed grafts is not recommended by the manufacturer. Despite this recommendation, studies by Dosluoglu et al. and Acosta and Monsen, were conducted by directly applying a vacuum-assisted closure system to exposed grafts.

According to this, the author’s protocol consisted of a polyurethane sponge applied with a continuous topical negative pressure of 125 mmHg directly on grafts, with a layer of nonadhesive petroleum jelly-infused gauze covering grafts and anastomosis to minimize any possible trauma to these structures. No previous muscle flap coverage of grafts was performed due to possible flap necrosis reported in up to 35% of cases. Dressing changes were performed 3 times per week. The patient was treated in-hospital as long as any graft material was visible (Figure 5). This protocol proved safe since no bleeding complications occurred. Similar experiences have been previously reported.

Vacuum-assisted closure therapy commonly is reported as a cost-effective treatment, but few reports confirm this. In the current case, therapy duration was 75 days. Although it seems like a long time period, alternative treatment with extra-anatomic or in situ reconstructions have life threatening complications with possible limb loss, which prompted the authors to take a more conservative approach and apply the vacuum-assisted closure therapy device. A possible reason for such an extended use of vacuum-assisted closure therapy lies in fact that graft infection was polymicrobial with virulent microorganisms. An advantage of this therapy is the control of wound drainage, infection, as well as the promotion of granulation tissue. Also, it is more comfortable for patients, and convenient for surgeons avoiding the need for multiple dressing changes on daily basis.

**Conclusion**

In this case, vacuum-assisted closure therapy proved to be safe and successful in treating a deep groin infection with graft involvement. This treatment modality can be safely applied on exposed synthetic grafts, but
the authors would not recommend it when anastomosis between synthetic graft and native artery is present, or when autologous graft is exposed, since these structures are less resistant to rupture due to the infection process. Further, larger case series are needed to draw valid conclusions regarding safety and efficacy of this therapeutic approach in treatment of vascular graft infections.

References