The Use of Continuous External Tissue Expander for Anterior Ankle Incision Dehiscence

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Purpose and Literature Review:

Anterior incision wound dehiscence is a frequent complication with ankle arthroplasty and ankle arthrodesis. Risk factors for wound dehiscence are included but not limited to history of tobacco use, peripheral vascular disease and cardiovascular disease. Without immediate care to the incision site, there is a high chance of infection and hardware failure.

The use of continuous external tissue expander for fasciotomy wound sites is well described in plastic surgery literature. Within 5 days of application, there is a 93% chance of tension free closure without the use of flaps or skin grafts. It works by expanding the skin through subcutaneous planes through continuous controlled pulling force on the non traumatized skin adjacent to the wound or incision. It helps facilitate wound edge approximation of full thickness defects as well as reduction of tension on tenuous wound closure. This case study demonstrates an innovative approach for a surgical wound dehiscence with the application of the continuous external tissue expander.

Case Report

This is a 65 year old male with a past medical history of newly diagnosed diabetes and a 10 year history of a chronic medial malleolar ulceration with ankle valgus deformity. The patient underwent an ankle arthrodesis with split thickness skin graft in 1968 after his motorcycle accident.

Over time, he underwent a hardware removal and developed an ulcer to the medial ankle joint. He has a history of multiple infections to the lower extremity and was recommended a below the knee amputation. The patient refused a below the knee amputation and he underwent a revisional ankle arthrodesis with application of placental tissue graft.

On physical examination, the patient had a superficial granular wound measuring 5.7 x 2.5 x 0.2 cm. It did not probe to bone and no acute signs of infection noted. There was moderate serous drainage from the wound.

The initial x-rays demonstrated retained hardware with valgus deformity at the ankle joint. There appeared to be bony changes to the medial malleolus, which appeared to consistent with chronic osteomyelitis.

The patient was brought to the operating room and placed on the operating room table in supine position. A regional block was performed pre operatively and general anesthesia was provided intraoperatively. The left lower extremity was scrubbed, prepped and draped in usual sterile fashion. A 10 cm longitudinal incision was made between the talus and tibia and tibia were resected to create a flat bony surface and correct the valgus deformity. A tibial bone biopsy was sent to pathology and microbiology. Final form of fixation consisted of a tripod fixation with a 7.0 x 95mm partially threaded cannulated screw home run screw (Figure 1). A drain was placed with appropriate layered closure and the skin was reapproximated with staples. A couple days later, pathology report showed benign cortical and cancellous bone.

About three days later, the wound appeared to be stable. The patient returned to the operating room for the application of continuous external tissue expander. The open surgical wound measured 6.1 x 4.7cm after debridement. Three anchors were placed on either side of the surgical site and secured with skin staples. Next a shoe lace configuration was applied with the tension line and was attached to the tension controller. The tension controller was turned clockwise until sufficient offloading of the incision site is appreciated. This will create constant tension until the tissue expander is removed.

Four days later, the continuous external tissue expander was removed, delayed primary closure performed, and an incisional wound vac was applied to the anterior incision site. The patient was sent home with PICC line and 6 weeks of IV Zosyn. The incisional wound vac was removed after 5 days and sutures were removed 3 weeks later.

The patient was partial weightbearing in the CAM walker for 3 months. Three months later radiographic fusion was noted on XR and the patient now leads a functional lifestyle.

Discussion

Wound healing complications with anterior surgical incisions have up to 28% complication rate. Prior to continuous external tissue expander, wound complications were treated with regular wound debridements and application of allograft or autograft tissue. Complication such as blistering, maceration of the wound site and pain have been noted.

The use of continuous external tissue expander is a viable option for patients with increased risk of wound dehiscence. Armstrong et al found mechanically assisted wounds to close up to 40% quicker than traditional secondary intention healing. It has also been used effectively with a wound vac. A future study to consider is the cost comparison and efficacy of incisional wound vac and use of continuous external tissue expander.

References