Limb Salvage in Severe Diabetic Foot Infection Using Negative Pressure Wound Therapy

Presenting:

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Background:
Diabetic foot often involves a serious, limb-threatening infection that eventually leads to major amputations. Negative pressure wound therapy (NPWT) using Vacuum Assisted Closure (VAC) Therapy System is known to improve the rate of wound healing in diabetic foot ulcers. However, few reports exist showing its outcome in severely infected diabetic foot. We analyzed the efficacy of NPWT and the rate of successful limb-salvage in septic diabetic feet.

Methods:
Thirty-one septic diabetic feet (30 patients) treated with the VAC system between January, 2006 and December, 2008 were included in this study. The mean age was 59.9 years and the mean follow-up after complete healing of the wound was 17 months (range, 3-35 months). A ‘septic foot’ was defined by the presence of cellulitis, edema, purulent discharge or abscess in the deep soft tissue or bone, with or without concomitant fever or leukocytosis. All wounds were classified according to the University of Texas diabetic wound classification system. Wounds were initially managed with evacuation of abscess, debridement with/without minor foot amputation. Then the VAC system was applied and the dressings were changed every 24 ~ 48 hours. Wound progress was measured using Visitrak (smith&nephew, Hull, UK) and the percentage of wound area that is filled with granulation tissue was calculated. Time to achieve >75% wound area covered with granulation tissue and days until complete wound closure was analyzed. Any further operations performed after removal of the VAC system were analyzed and the final statuses of the limbs were assessed. A limb was considered salvaged if complete healing was achieved with minor amputation up to the level of Syme amputation. Amputation at or proximal to below-knee level was regarded as a failure.

Results:
The mean duration of application of the VAC system was 26.2±14.3 days (range, 7-56 days). The median time to >75% wound area granulation was 23 days (range, 4-55 days) and 104 days (range, 38-255) to complete wound healing. Successful limb salvage was achieved in 30 cases (96.8%). Among these, 14 (46.7%) healed without any further surgery, 5 (16.7%) healed after additional debridement or stump revisions, and 11 (36.7%) achieved complete healing after additional proximal or further partial amputation. Total number of operations per limb, including operations performed before the VAC system application, was 2.39±1.28. Regarding the final status of the salvaged limbs, 8 (25.8%) healed with no amputation, while others ended up with resection arthroplasty at metatarsophalangeal joint (1 case, 3.2%), ray amputation (12 cases, 38.7%), transmetatarsal amputation (4 cases, 12.9%), Lisfranc disarticulation (2 cases, 6.5%), Chopart disarticulation (1 case, 3.2%), and Syme amputation (2 cases, 6.5%). There was one failed case which was managed with a below-knee amputation. No complication associated with the VAC system has occurred.
Discussion:
Septic diabetic foot can be saved and with complete debridement of the infected tissue and appropriate partial foot amputation, NPWT can lead to an excellent limb-salvage rate. NPWT using the VAC system is safe and effective in the treatment of infected diabetic foot.