

In Patients with Diabetic Feet, Flap Monitoring in Conjunction with Incisional Negative Pressure Wound Therapy

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Abstract

For patients with diabetic foot ulcers, many types of flaps are taken into consideration as reconstructive solutions. However, due to the relatively low levels of collateral circulation in the distal lower extremities, flap reconstruction for the treatment of diabetic foot ulcers is particularly difficult. In order to treat diabetic foot, this study assessed the effectiveness and safety of a novel postoperative monitoring technique used in conjunction with negative pressure wound care right after flap procedures. Patients with diabetic feet who underwent free flap and perforator flap procedures between March 2019 and August 2021 were the subject of a retrospective investigation. The rates of complications and survival following surgery were the outcomes of interest.

Patients underwent computed CT angiography on the third postoperative day to look for pedicle compression or fluid accumulation in the sub-flap plane. tracking time, Analyses were done on NPWT and conventional technique comparisons. A statistical comparison between the two groups was done. 26 patients were involved in the study. Patients in the negative pressure wound therapy treated group had 14 flaps, while those in the group receiving standard monitoring had 12 flaps. The flap survival rate did not change significantly across groups ($p = 0.83$). Additionally, before and after negative pressure wound therapy, there was no discernible intergroup difference in the diameters of perforators or anastomosed arteries ($p = 0.97$).

Up until the fifth postoperative day, flap monitoring with incisional negative pressure wound therapy was connected to a noticeably decreased mean monitoring time per flap than traditional monitoring. Although standard monitoring is often advised, particularly for the management of diabetic foot ulcers, the innovative incisional negative This study's pressure wound therapy allowed for simple serial flap monitoring without raising the risk of complications. For diabetic foot patients, the innovative flap monitoring technology is effective and secure, making it a promising contender for acceptance as the industry's gold standard in the future.

Keywords: Therapy • Diabetic

Introduction

Over the course of the disease, one-third of patients with diabetes mellitus may get at least one diabetic foot ulcer (DFU), and estimates of the 5-year mortality rates linked to DFU as high as 30%¹. The restricted therapeutic choices make treatment failure one of the most difficult problems to manage, and DFUs are one of those issues. Due to the distal lower extremity's relatively low collateral perfusion, flap reconstruction for DFU treatment is particularly difficult. Negative pressure wound therapy (NPWT) has become a promising approach for wound management, especially for wounds of the extremities, such as deformities brought on by trauma, malignancies, and diabetic gangrene. Improved blood flow, wound contraction, and interstitial fluid clearance are made possible by NPWT^{6, 7}. The indications for NPWT have changed recently [1-5].

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Description

This retrospective analysis of postoperative DFU patients monitored utilising our unique immediate postoperative monitoring technique in conjunction with NPWT was authorised by our institutional review board. After one postoperative month at the outpatient clinic, every patient included in this analysis gave written informed consent. The Declaration of Helsinki and its later revisions were followed in the study's conduct. Patients gave their informed consent for all surgical operations, wound care, and the potential use of anonymous photos. Patients who underwent flap operations (free flap, perforator flap) for DFU treatment between March 2019 and August 2021 were eligible. In this one-center study, all surgeries were carried out by a single attending plastic surgeon (J.H. Park) with 17 years of expertise. performed utilising standardised procedures [6].

Following flap inset, the suture site was completely protected with antibiotic ointment-coated Physiottle (hydrocolloid-based, non-adherent wound contact layer, Coloplast, Ltd. Peterborough, UK), and then a black NPWT sponge (V.A.C. Granufoam, KCI, now part of 3 M company, San Antonio, TX, USA) was applied on top. The device was set to continuous mode with a pressure of 75 mmHg (INFOV.A.C. Therapy Unit, KCI, now a division of 3 M corporation, San Antonio, TX, USA). The sponge edge did not intersect the flap paddle more than 1 cm from the incision site, therefore a large window almost the whole flap—was frequently produced to permit serial flap monitoring. Serial inspections were used to check all flaps through the transparent window made by as a unique NPWT method component. After five surgical days, NPWT devices were removed. Several patients were assigned to a standard monitoring group. These patients had conventional manual dressing, manual

monitoring, and suture site cleaning using saline-soaked gauze by a clinician wearing sterile surgical gloves. After placing the antibiotic-coated Physiottulle, the suture site on the flap was loosely covered with sterile gauze [7,8].

Patients underwent computed tomography (CT) angiography on the third postoperative day to look for pedicle compression or fluid accumulation in the sub-flap plane. A image archiving and communication system was used to visualise the pedicle diameter (both before and after NPWT). Each patient had a total of five postoperative days of monitoring time recorded, and the outpatient clinic examined the surgical results one month after the procedure. The Kolmogorov-Smirnov test was used to determine the degree of normalcy. The Mann-Whitney U test was used to examine monitoring time and contrasts between NPWT and traditional approaches. SPSS Statistics for Windows, version 26.0, was used for the statistical analyses (IBM Corp., Armonk, NY, USA). P values below 0.05 were used to indicate statistical significance [9,10].

Conclusion

The success of the flap depends on postoperative flap monitoring. The unique NPWT monitoring approach tested in this work permitted simple serial flap monitoring without raising complication risks, despite the fact that traditional monitoring is generally advised, particularly for DFU treatment. The innovative flap monitoring method is effective and secure for DFU patients, making it a promising contender for certification as the industry's gold standard in the future.

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