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Objective

The objective of this presentation was to evaluate a technique for the fixation of a split thickness skin graft (STSG) using a novel powder dressing with different graft locations and different methods of external fixation including a sutureless, clipless graft.



Burn Prior to STSG Procedure



Mesh STSG in Place



Powder Dressing Applied



Powder Dressing Hydrated and Transformed



Post Op Day 5, Dressing in place



Post Op Day 5, Dressing Removed, 100% Take

Introduction

The ability to cover and protect a STSG easily with few dressing changes while managing fluid and preventing infection represents a list of attributes that are a proverbial "gold standard" for a dressing over a mesh graft. The importance of proper wound bed preparation including sharp debridement and management of microbial contamination followed by good surgical technique in graft harvesting and placement can not be understated in terms of successful outcomes. However, following surgery the "take" of the graft on the underlying bed is impacted by the management of the fragile tissue and the interface between new tissue and the wound. In protecting the graft during take, two primary factors to consider are fluid and moisture management, and immobilization. Common techniques for managing both include bolstering with foam and other padded dressing materials, and negative pressure wound therapy systems. Both of these techniques manage fluid and provide necessary pressure but the graft is typically held in place with sutures or clips (staples) and each technique has complications associated with dressing changes or equipment.

One other factor that is rarely considered in STSG is the use of clips or sutures. Although nearly ubiquitous in graft placement, the employment of these fixation devices does require an initial surgical technique, and following healing, the fastening devices must be removed which can be time consuming for the woundcare professional, and cause discomfort for the patient. A technique of mesh STSG fixation without sutures or clips is an important potential alternative to conventional graft application and management.

Methods:

We report on a case of a sutureless, clipless mesh STSG where fluid management and holding the graft in place are both achieved through the use of a novel powder dressing applied once and then monitored through the graft take and subsequent healing.

Patient History

72 year old male with history of hypertension, arthritis, urinary incontinence, heavy tobacco usage, deafness and low pain threshold.

Wound History

Patient received burn to lower left leg. During ER visit, the burn was treated with silver sulfadiazine cream. Patient complained of severe pain; patient was prescribed hydrocodone pain reliever. Dressings were changed daily in Home Healthcare situation. Patient compliance and pain tolerance made dressing changes problematic. The burn showed no improvement for two weeks.

Graft Procedure

Patient was referred to woundcare clinic and low tolerance for pain was a factor in decision to attempt a sutureless, clipless mesh graft. Previous use of staple fixtures resulted in intolerable pain for this patient. In the OR, a conventional STSG was harvested and meshed 1:3 then applied to the wound bed. The STSG was pressed gently into place and good contact was formed at all graft locations through careful placement. No clips or sutures were used to secure the graft to the tissue or surrounding skin.

Dressing Placement and Post-Operative Care

The powder dressing was applied liberally using a tongue blade to transfer the powder from a sterile cup over the STSG surface. The powder was initially applied approximately 2 mm thick and was white in appearance as shown in Figure 3 above. Previous experience with this novel dressing has shown that the material consistently adsorbs wound fluid and changes from a powder into a thin, translucent flexible covering on the wound and graft surface. Our experience has shown that this transformation can be accelerated by applying saline through a mist or by dripping it on the surface of the powder. Figure 4 shows the intact, moist dressing. For further protection of the dressing and graft, a fenestrated silicone wound contact layer^{**} was applied over the intact, transformed powder dressing and the leg was wrapped in gauze. No clips or sutures were used to hold the covering and no tieover bolster was employed.

The gauze and silicone contact layer could be removed as needed to observe the underlying dressing. In this case, observations of the graft held in place with the transformed powder dressing were made daily. At no point was there any wound fluid management issues with maceration and at the same time, the dressing maintained a moist layer on the graft itself. By day 5 the graft showed 100% take. Some areas covered by the transformed powder dressing remained intact while areas with epithelialized skin were uncovered as the dressing lost adhesion.

To date, the graft remains closed with improving cosmesis (3 weeks)

Results and Observations

It is important to understand that no dressing or post-operative care for a STSG can replace proper clinical treatment including establishing vascular flow and surgical debridement of non-viable tissue. Proper graft handling and placement is also critical. In most procedures, the use of clips or sutures is employed without a thought. Following the graft surgery, however, critical factors to improve success include holding the graft in place (bolstering) and managing exudate. In this evaluation we employed a novel powder dressing to a conventional mesh STSG, however, the dressing was used both to secure the graft in contact with the wound bed and to bolster and prevent movement or shear forces. In this single study, the dressing performed well. The mesh STSG showed no sign of movement, and moisture control provided by the dressings inherent physical properties prevented both excess fluid and drying. The material did not allow tissue to integrate into the material and the graft epithelialized smoothly beneath the dressing.

Conclusions

STSG will remain an important technique for the closure of wounds and this technique has been well refined to achieve positive results. Simple means of fixing the graft without sutures or clips have not been widely studied simply because materials did not exist to provide that type of fixation. Similarly, few major advances have been made in bolstering the graft site while managing fluid. We believe that this technique offers promise both for patients and clinicians in providing positive outcomes for the management of mesh STSGs.

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* Altrazeal Transforming Powder Dressing
** Mepitel fenestrated silicone