

Role of Suction Assisted Epidermal Blister Grafting in Wound Management

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ABSTRACT

Skin grafts are commonly used in plastic and reconstructive surgery. Chronic wounds are linked to a patient's delayed healing and increased morbidity. Flaps, skin grafting, temporary alternatives for dressings, and other types of wound coverage are available. In this case study, we tested the efficiency of a novel approach of Suction Assisted Epidermal Blister Grafting for a raw area cover.

Keywords: Body polishing; Non invasive; Acne scars; Hyperpigmentation; Bimanual technique ; Aluminium oxide; Office procedure

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INTRODUCTION

Chronic wounds require skin transplants for covering following sufficient wound preparation (WBP). Split thickness skin grafts (STSG), full thickness skin grafts, pixel grafting, and mild grafting are all examples of skin grafts. STSGs necessitate anesthesia and an operating room because the dermatome harvester extracts the graft in the plane between the papillary (superficial) and reticular (deep) dermis, exposing the sensory nerves and dermal appendages that are necessary for donor site healing, causing postoperative pain. Additionally, donor site bleeding, infection, and pruritis can all slow healing.¹ When only the epidermis is required for superficial wounds, epidermal skin grafting is utilized. Because only the epidermal layer is removed from the donor site,

it avoids many donor site issues and eliminates the need for an operating theatre. We describe our experience with harvesting Suction Assisted Epidermal Blister Grafting (SEBG) for the treatment of raw areas in this study.

MATERIALS AND METHODS

This study was conducted in the Department of Plastic surgery in a Tertiary care center in South India. Departmental ethical clearance and consent from the subject were obtained. The details of the patient in study are as follows: 40 year old male (known diabetic) with history of left lower cellulitis for which he underwent debridement and subsequent split-thickness skin grafting; now has small residual 1.2x1 cm raw area (figure 1). The



Fig. 1: Residual raw area 1.2x1cm

Suction Assisted Epidermal Blister Grafting was done by using the cut end of a 2ml syringe to raise a blister in the epidermo-dermal plane (figure 2). The epidermal graft was taken by using a size 15 blade and harvesting the epidermis alone. The harvested graft was applied into the raw area with the help of 2-octyl cyanoacrylate adhesive.

RESULT

There was complete wound healing of the recipient area (figure 3) as well as the donor area at the end of 3 weeks.



Fig. 2: Suction-Assisted Bleb Raising



Fig. 3: Post grafting (3rd week) of SEBG graft on raw area

DISCUSSION

Kiistala and Mustakallio¹ introduced epidermal grafting using suction blisters in human skin in 1964, and Falabella² utilized it to treat vitiligo. SEBG, or autologous suction blister epidermal grafting, has been used to treat persistent vitiligo and other secondary leukodermas, as well as difficult to heal lesions such as burns and lower limb ulcers.³⁻⁷ Scarring does not form since the donor site's dermis is not injured, albeit some pigmentation loss may occur. The upper thigh is the best place to start. Because the dermal plexus is not disrupted, no bleeding occurs, making it ideal for individuals taking anticoagulants.

Suction blister epidermal grafting techniques result in epidermal division at the lamina lucida, uneven hemidesmosome rupture, and cytoplasmic vacuole development in keratinocytes.⁸ The epidermis' essential structure is preserved, and the dermis is unaffected.⁸ Separation at the dermal-epidermal (DE) junction and transfer of the whole, intact basal layer to the recipient site is required for success.

The precise mechanics of epidermal transplant acceptance are unknown. Costanzo et al⁶ proposed that epithelialization begin at the ulcer's edge as the primary strategy. Other authors⁹⁻¹¹ claimed that epidermal grafts do not "take" to the underlying granulation tissue, but that re-epithelialization occurs at the wound borders. This edge effect, according to Costanzo et al⁶, could be caused by growth factors released by grafted keratinocytes. In vitro analysis of epidermal grafts obtained utilizing the epidermal harvesting technology revealed that migratory basal layer keratinocytes and melanocytes proliferate in vivo, according to a recent study. Viable basal cells produced key growth factors important for controlling wound healing responses, including vascular endothelial growth factor (VEGF), hepatocyte growth factor (HGF), granulocyte colony stimulating factor (G-CSF), platelet-derived growth factor (PDGF), and transforming growth factor alpha, according to a study of intact microdome roofs derived from healthy human subjects (TGF alpha).

In our study, the advantages of Suction-Assisted Epidermal Blister Grafting is that it can be easily taken, easy to apply, less pain on taking graft, and it allows the donor site to heal. However the disadvantage is that there is less amount of the graft available and it takes a considerable amount of time (1-2 hours) for the blister to be raised in the

epidermo-dermal plane.

CONCLUSION

In our study, we found that the Suction Assisted Epidermal Blister Grafting is as efficacious as split thickness skin grafting using a Humby's knife or a dermatome, especially for covering relatively small raw areas. As this is a novel method, further large scale randomized control study is required to comment on its efficacy.

Conflicts of interest: None

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