EXTENSIVE BURNS TREATED BY EARLY EXCISION, SPLIT SKIN GRAFTING AND TOPICAL NEGATIVE PRESSURE WOUND THERAPY

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SUMMARY. Cases of major burns present challenges to clinicians with regard to wound care, patient comfort and skin coverage of extensive burn-related and post-operative defects. Topical negative pressure has been described as a valuable option in the treatment of some burn injuries. Its usefulness lies in its ability to not only remove wound exudates, but also to act as an effective split, providing highly-localised immobilisation, facilitating optimal skin graft revascularisation and wound healing. The authors present a case of extensive deep burns of the neck, trunk, shoulders and upper limbs, amounting to 27% of the total body surface area (%TBSA), successfully treated with tangential debridement, split thickness skin grafting, and topical negative pressure wound therapy. This case represents the largest documented %TBSA skin grafted burn treated in this way.

Keywords: burns, debridement, negative-pressure wound therapy, skin transplantation

Introduction

Tangential excision and split skin grafting is the generally-accepted method for treatment of deep partial thickness and full thickness burns. However, large excised and skin grafted areas present a management challenge to burn care teams. Wound exudates may be excessive, necessitating earlier and more frequent dressing changes than anticipated at the time of surgery. In addition, large skin grafted areas present high risks of graft loss due to shear forces, as a result of patient postural care in the days following surgery. With traditional dressings, these risks are institutional – it is difficult to completely immobilise a patient for five days, without incurring unacceptable risks of thrombo-embolism, and it may be clinically and ethically unacceptable to simply leave a patient in wet dressings. Topical negative pressure dressings offer a means of avoidance of these problems by providing a sealed system with removal of exudate, as well as effective immobilisation of the treated area. This technique has been shown to be a safe and reliable method of securing split skin grafts and may offer benefits in graft survival over more traditional dressing techniques, in unconscious ventilated patients who would otherwise present serious challenges to the achievement of optimal graft survival.

An extensive literature search, using EMBASE and MEDLINE for English language articles, showed no cases of similarly-treated patients with wound sizes in excess of 20%TBSA. The authors present the case of a patient with 27%TBSA full thickness and deep partial thickness burns, treated by early tangential burn excision, split skin grafting and intra-operative application of topical negative pressure wound therapy for provision and maintenance of graft immobilisation and reduction of wound exudate and oedema.

Materials and methods

A previously healthy 37-year-old male was brought to the emergency department with 27% TBSA deep dermal and full thickness flame burns and an airway injury. He required immediate intubation and ventilation, as well as formal burns fluid resuscitation. Surgical management consisted of early tangential burn excision and split skin grafting on day two post-burn. All of the burned area (27%TBSA) required skin grafting using 1:1.5 meshed autograft, harvested from both lower limbs. Grafts were secured using N-butyl-2-cyanoacrylate tissue adhesive (Histoacyl®, B. Braun GmbH, Tuttingen, Germany) and topical negative pressure wound therapy, in view of the need for postoperative intensive care (V.A.C.® GranuFoam®,...
KCI, San Antonio, USA). The patient was 1.77m in height and 90kg in weight, with a calculated body surface area of 2.1m². Grafted body sites included anterior and posterior trunk, neck and both upper limbs. The area covered measured 0.57m² or 27% of the patient’s body surface. Topical negative pressure therapy was continued for a total of 7 days, at which time a change of dressing and graft check was performed.

Results

There was a 100% take of the split skin graft followed by a rapid healing of the burn. During this period, the fluid exudate into the VAC canister was carefully monitored and any loss was replaced using an equal volume of salt poor 4.5% Human Albumin solution. Daily fluid loss into the negative pressure device ranged from 150ml to 1000ml with a mean volume of 415ml/24hrs. The maximum daily output was 1000ml, which occurred on day two post-operatively.

Discussion

Accumulation of tissue fluid or hematoma between wounds and skin grafts is a major cause of skin graft loss. This directly impedes revascularization and graft survival. Skin graft fixation over large wounds is challenging, especially in unconscious patients. Such patients require regular postural changes, which can result in shearing of grafts, and consequent graft loss. The efficacy of topical negative pressure in reducing graft loss has been demonstrated. A standard topical negative pressure polyvinyl chloride foam dressing was used in this case and was covered using multiple large iodine impregnated polyurethane drapes (3M Ioban; 3M Healthcare, St. Paul, Minnesota), providing a sealed system. No problems were encountered in maintaining the seal on this negative pressure system. After seven days, graft take was noted to be 100%.

Conclusion

This experience shows that even large skin grafted wounds exceeding one quarter of the body surface may be successfully treated with negative pressure wound dressings.

RÉSUMÉ. Les cas de brûlures graves présentent aux cliniciens des défis en ce qui concerne le soin des plaies, le confort du patient et la couverture des défauts de la peau causés par la brûlure et par la chirurgie. La pression négative topique a été décrite comme une option valable dans le traitement de certaines brûlures. Son utilité réside dans sa capacité à éliminer les exsudats de la plaie et aussi d’agir comme un partage efficace, assurant l’immobilisation très localisée, ce qui facilite la revascularisation optimale des greffes de peau et la cicatrisation des plaies. Les auteurs présentent le cas d’une brûlure étendue et profonde du cou, le tronc, les épaules et les membres supérieurs de 27% de la surface corporelle totale (% de la SCT), qui a été...
traitée avec succès par le débridement tangentiel, les greffes de peau mince, et par la thérapie de la pression negative topique. Parmi les cas documentés, celui-ci représente la plus grande % de la surface de la peau greffée après une brûlure traitée de cette manière.

**Mots-clés:** brûlures, débridement, traitement des plaies par pression négative, transplantation de la peau

**BIBLIOGRAPHY**