

Lt Colonel Steve Jeffery, Burns and Plastics Surgeon, The Royal Centre for Defence Medicine, University Hospitals Birmingham Foundation Trust, Selly Oak, Birmingham B29 6JD, email: sjeffery@nhs.net  
Major John Clark, Senior Military Nurse for Burns and Plastics, The Royal Centre for Defence Medicine, University Hospitals Birmingham Foundation Trust, Selly Oak, Birmingham B29 6JD, email: johnclark@blackberry.orange.co.uk

## The use of gauze-based Negative Pressure Wound Therapy in a landmine injury

### Introduction

Gauze-based Negative Pressure Wound Therapy (NPWT) is emerging as a management option for wound healing in military personnel injured by incendiary devices. This case study was undertaken to illustrate the efficacy of this type of NPWT in stabilising and acting as an aid to closure in a surgical wound created to alleviate compartment syndrome sustained post blast injury.

### Method

Soldier A fractured his left tibia as a result of a landmine injury. He underwent stabilisation and surgical debridement of the wound, developing compartment syndrome post operatively. A medial and lateral fasciotomy was indicated to alleviate these symptoms.

A split thickness skin graft (STSG) was then applied to the area and stapled in situ. The sutures were placed strategically at opposing edges in pairs to form a loop. A wound contact layer was applied on top of the graft to protect it and NPWT applied (Smith & Nephew, Hull, UK). Gauze was applied to the graft, half filling the defect centrally. The Jackson-Pratt surgical drain was then placed onto the first layer of gauze extending the length of the wound and then covered with a second layer of gauze to fill the defect. The sutures at the wound edge were opposed and pulled tight at this point to apply tension and approximate the wound edges. The drape to seal the system was applied once appropriate tension had been achieved. A negative pressure of -80mmHg was instituted using the EZCARE pump (Smith & Nephew), and the sutures removed. The system was left in situ at this pressure for five days prior to dressing removal.

### Results

The dressing was removed after five days. A 100 per cent graft uptake was observed on both wounds. NPWT was then applied for a further five days to protect the graft sites using the same application technique. On day ten the clips were removed and the gauze-based NPWT was discontinued.

### Discussion

Chariker<sup>1</sup> suggest that gauze-based NPWT is a 'relatively atraumatic bridging technique to manage soft-tissue defects in complex extremity wounds'. In addition, it has also been suggested by the same authors that NPWT allows closure by secondary intention with a skin graft or flap rather than more complicated microvascular procedures. In the challenging situations demonstrated by this case study, NPWT has been shown to promote granulation for successful uptake of the STSG on wounds that were unsuitable for primary closure. Additionally the nature of the NPWT dressing provides protection from infection if correctly applied.

Timing in the management of lower limb trauma remains controversial, with most sources suggesting that definitive bony and soft tissue reconstruction should be achieved within a critical period of 72 hours<sup>2</sup>. However this author also suggests that NPWT can be used to prolong the time to closure, if surgery is delayed or other injuries prevent rapid treatment. The results of the case study show themselves to be in line with this conclusion, as NPWT was used up to day ten to both protect and help to secure the graft. Steiert<sup>2</sup> also conjectured that debridement and NPWT in conjunction with soft tissue reconstruction can provide definitive coverage of a wound. This statement is also born out by the results in the above case; the wound bed was debrided prior to application of NPWT, potentially forming a healthier environment for granulation to occur.

### Conclusion

In the case described, gauze-based Negative Pressure Wound Therapy was shown to be both a suitable protection for the STSG, but also potentially significant in the successful uptake of the graft. There was no skin graft loss, potentially showing the importance of debridement and NPWT in achieving rapid wound closure. In the authors' experience the advantages of conventional wound dressings are reduced in the challenging environments in which military medicine occurs. In this case gauze based NPWT proved to be effective in managing closure of this soft tissue extremity wound, whilst proving a relatively atraumatic technique which can be easily adapted to the surroundings.



Image 1: Medial and lateral fasciotomy wounds post surgical debridement



Image 2: Application of STSG



Image 3: Wound edge approximation



Image 4: NPWT in situ



Image 5: 100% Graft take at day 5



Image 6: 6 week follow up

### References

1. Chariker, M.E, Gestle, T.L, Morrison, C.S (2009) An Algorithmic Approach to the Use of Gauze Based Negative Pressure Wound Therapy as a Bridge to Closure in Pediatric Extremity Trauma Journal of Plastics and Reconstructive Surgery (May 2009) 1510-1520
2. Steiert *et al* (2009) Delayed Flap Coverage of Open Extremity Fracture after previous Vacuum Assisted Closure<sup>®</sup> (VAC) therapy – worse or worth? Journal of Plastic, Reconstructive and Aesthetic Surgery (2009) 62, 675-683

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