

Topical negative pressure: an alternative approach

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This case study discusses the use of a new approach to topical negative pressure therapy that resulted in reported benefits for both patients and staff. The patient was a 68-year-old woman who presented to the district nursing service for wound care following aortic valve replacement surgery. She had a medical history of type 2 diabetes, and coronary heart disease. At the first visit, the wound on the medial aspect of the left thigh was primarily closed with clips, however there were clear signs of infection with redness extending 3–4cm from the wound margins, which was hot to touch and weeping haemoserous fluid. These symptoms indicated that she had a post-operative wound infection as described by Cutting and White (2004). A wound swab was taken and sent for culture and sensitivity and the patient was started on oral antibiotics while awaiting the results.

Despite the above intervention and regular dressing changes the wound had partially dehisced within a week to reveal a large, sloughy wound that was producing copious amounts of exudate. The muscle layer was still intact. Treatment with cadexomer iodine paste (Iodoflex®, Smith & Nephew) was used for its antimicrobial properties, in order to reduce the micro-organisms at the wound bed. Biatain® non-adhesive dressing (Coloplast) was used in combination to manage the copious amount of exudate. Conservative sharp debridement of the wound bed was carried out in the patient's home by the clinical nurse specialist in tissue viability.

At this stage, the decision to start negative pressure wound therapy (NPWT) was made. The primary objective was to accelerate wound healing in an unobtrusive way for the patient and prevent the need for readmission to hospital. Secondary objectives included managing the copious

amounts of exudate effectively and reducing maceration to the surrounding skin. In addition, it was hoped to reduce the odour associated with the wound as the patient was finding this very distressing. Finally, it was essential to reduce the amount of staff contact time required, as the wound needed to be redressed twice daily at this time. Costs associated with wound care are largely driven by four factors — cost of materials, care setting, staff time and wound duration. Cost savings can only be achieved by instigating treatments which have a positive impact upon these variables.

NPWT systems work by inducing positive pressure at the wound bed which creates a zone of hypoxic tissue local to the wound bed that is surrounded by a zone of hyperaemia in the periwound tissue (Wakenfors et al, 2004; Malmjö et al, 2008). Other mechanisms of action associated with NPWT can be grouped into three physical actions — physical force on the tissue, removal of excess fluid and covering the wound bed (Smith and Martin, 2008). These physical actions trigger physiological pathways including macro-deformation, localised tissue compression which leads to wound splinting, formation of granulation tissue and reverse tissue expansion, reduction of oedema and removal of exudate, bacteria and slough by maintaining a moist wound environment. The resultant clinical effects are also threefold;

reduction in wound size, removal of the barriers to healing and initiation/promotion of healing.

The NPWT market has seen recent newcomers which often use gauze-based as opposed to conventional foam-based fillers as an interface material. One such device VISTA® (Smith & Nephew) and associated dressings (flat drain and PHMB gauze kit) was chosen in this instance. The authors felt this method may be easier for staff to learn, teach and therefore implement. Additionally, the chosen system offered significant cost savings in rental charges to that used previously.

Community nursing staff were supported by the tissue viability nurse team and the Smith & Nephew local clinical support nurse. Initial staff concerns and apprehension were centred on difficulties staff had experienced using other systems, especially in getting foam dressings cut to conform exactly to the wound dimensions. Gauze-based NPWT works by inserting a drain into the wound bed over a non-adherent wound contact layer which is then surrounded by moistened gauze that can be moulded to the shape of the wound. The drain is held in place where it exits the wound with a hydrocolloid paste and a film dressing used to hold the dressing in place.

Table 1

A comparison of treatment costs for two different treatment regimens

Product	Product costs*	Frequency	Nursing time**	Weekly costs
Biatain® 18x28cm Iodoflex® 30g	£7.06 £7.46 (x3 10g)	Daily	40minutes	£500.08
VISTA® NPWT	£20.70 Medium flat dressing pack £20.70 Canister*** Rental £20 per day	72 hourly	40 minutes	£286.10

* Drug Tariff prices Feb 2009

** Nursing time calculated at £21.00 per 20 minutes (Curtis, 2001)

*** Changed once per week



Figure 1. Post sharp debridement to remove a thick layer of slough before applying NPWT.



Figure 3. The wound at week 6 when NPWT was discontinued. Complete healing was achieved two weeks later.

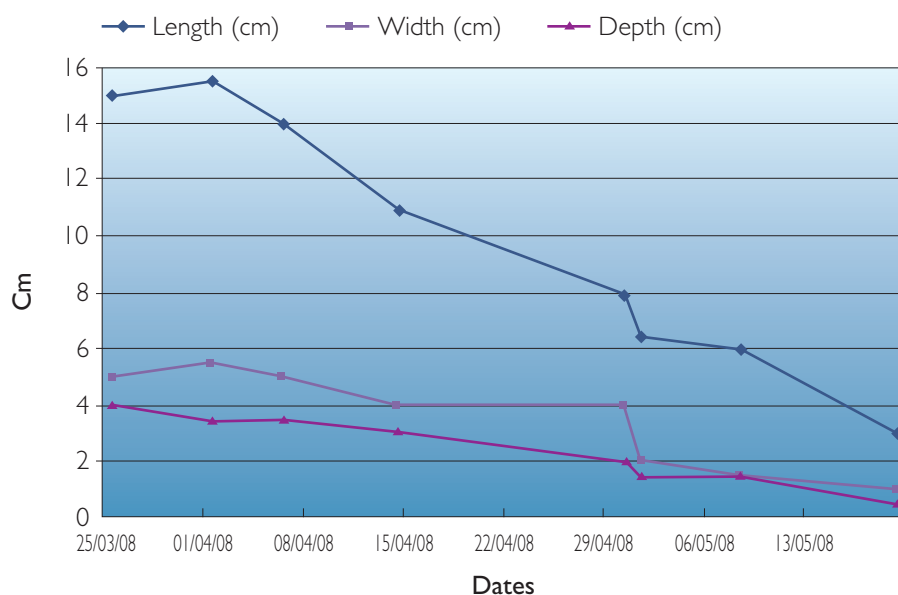


Figure 2. Wounds dimensions over time.

During the evaluation this method appeared to be much more user-friendly, and, once staff became familiar with using the new dressing, they reported that they found it easier as only the adherent wound contact layer needed to be cut exactly to the wound shape. Since the NPWT dressing only needed to be renewed every 72 hours, a reduction in the amount of staff contact time was noted from 40 minutes daily to 40 minutes every 72 hours (Table 1). This equates to a resultant cost benefit to the PCT of £213.98 per week based on the comparative costs of

the current treatment at the time of the switch to NPWT.

From the patient's perspective she reported little pain from the wound and the non-adherent layer made dressing removal simple and pain free. She did require additional psychological support and reassurance from staff because she was worried about the lack of progress towards wound healing before the application of NPWT. After applying NPWT her anxiety was initially exacerbated by the fact that she was acutely aware that this system was new

to staff, and that she was to some extent in her words 'part of an experiment'.

When NPWT was commenced, the wound measured 15.5x5cm with an estimated depth of 4cm (Figure 1) after sharp debridement, which resulted in 60% granulation and 40% sloughy tissue in the wound base.

After three dressing changes staff were pleased to note that the percentage of granulation tissue had increased with a significant reduction in the wound dimensions. The decrease in the wound dimensions was evident at each dressing change which was very reassuring for the patient (Figure 2).

One complication encountered was that a small sinus formed in the proximal part of the wound extending about 2cm towards the groin when probed. After consulting the local Smith & Nephew clinical support nurse, a small wick of gauze was used to stimulate angiogenesis inside the sinus and the opening closed within two weeks. Within seven weeks this serious, debilitating post-operative wound was almost healed and NPWT was discontinued (Figure 3). Two weeks after that the patient was discharged from the community nursing service with the wound healed.

The nursing team were pleased to be involved in an intervention that had such positive outcomes for the patient. Before starting NPWT the patient was debilitated by this complex wound, with further risk of infection and setbacks. Advantages for the patient included the largely noiseless function of the pump enabling essential rest and sleep. The system was also able to help meet the patient's needs by eliminating odour from the wound. This had been a major source of worry and stress for her as it had the potential to restrict her social contact with family members. She was also pleased with the end result, especially with the minimal scarring that was incurred.

For nurses, as well as being pleased with the positive view of the treatment

regimen expressed by the patient, the accelerated healing was a great advantage over conventional methods along with the reduced frequency of visits.

Setting up a new system has its challenges for staff and patients. It requires flexibility and patience and initially intensive support for staff. However, feedback from staff by the end of the process indicated that they had found the new system easier to use than other negative pressure wound therapy systems they had used, and they had taken great satisfaction from being part of such a successful patient outcome. **WUK**

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