VENTURI™ Negative Pressure Wound Therapy: Bridging the Gap - An Alternative

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Introduction

Negative Pressure Wound Therapy (NPWT) is the controlled application of sub-atmospheric pressure to a wound using an electrical pump (Kloth, 2002). Negative pressure (suction) is delivered to the wound, affecting blood flow to the wound and disposal of cellular waste from the lymphatic system, which increases the rate of granulating tissue (Miller, Brown and McDaniel, 2005).

Recent innovations have demonstrated that moistened gauze (a non-adherent porous wound dressing) can be used as an alternative interface through which NPWT is applied. The moistened gauze is placed in the wound together with a silicone drainage tube, positioned adjacent to or inserted in the dressing. The wound is sealed with an occlusive dressing that contains the sub-atmospheric pressure applied to the wound site during NPWT, thereby promoting wound healing (Evans and Land, 2001).

The following case study demonstrates this alternative NPWT technique using the VENTURI™ NPWT system from Talley Medical.

Case Study

A 61 year old man presented with a history of renal failure stage 3 and cancer of the bowel. The patient was admitted to hospital for surgery to remove the cancer in his large bowel. Post-operative complications caused the wound to dehisce and the decision was made to proceed with NPWT.

Aims and Objectives

The aims and objectives of NPWT in this case were as follows:-

- Removal of excess exudate from the wound
- Provision of a moist wound environment
- Removal of slough
- Decrease a wound's bacterial burden
- Reduction in tissue oedema
- Promotion of white cells and fibroblasts within the wound

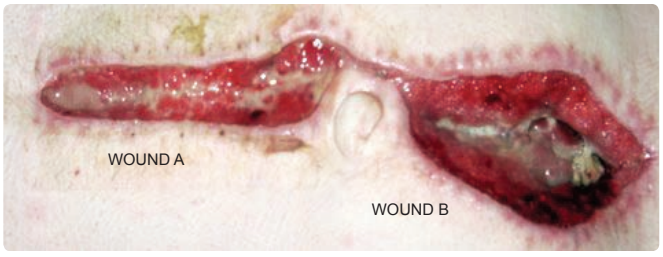
Method

The wounds were irrigated with normal saline and surrounding skin patted dry. Next, a single layer of moistened gauze was bridged directly across both wounds. Moistened gauze was used to fill in the tunneling. The intact skin was protected with hydrocolloid when bridged. A flat silicone drain was cut to length, 0.5 - 1.0cm from the edge of the wound to allow for contraction and then placed on top of the moistened gauze in the lower wound (wound B). A second layer of moistened gauze was placed over the drain and bridged across to the other wound (wound A). The moistened gauze was built-up to skin level. Hydrocolloid paste was positioned under the exiting drain onto the skin and then additional paste was positioned on top, sandwiching the drain to maintain a secure seal. The wound was then covered with a transparent dressing, creating a sealed moist environment. The drain tubing was attached to the VENTURI™ drainage canister connection tubing, and the power unit switched on. The gauze is 'puffed' before the pump is activated, but as NPWT is applied it collapses and compresses the wound bed (Chariker, Jeter et al, 1989). The pressure was set to 80mmHg. Exudate was removed through the drain into the sealed drainage canister.

Results

Prior to commencing NPWT the abdomen was photographed. Measurements of the wounds were as follows:-
Wound A: 9cm length x 1.5cm width x 1.5cm depth
Wound B: 9cm length x 5.5cm width x 2.5cm depth

Tunneling was recorded at the base of the wound measuring 2cm in depth.



Prior to NPWT

The District Nurses performed the first dressing change after 48 hours and redressed the wound every 72 hours.

After first dressing change

Results (continued)

Day 7: The wounds had begun to decrease in size and measured as follows:-
Wound A: 8.5cm length x 1.0cm width x 1.0cm depth
Wound B: 7.5cm length x 4.5cm width x 2.0cm depth

Day 14

Day 21: The surface area of the patient's wounds had changed. Healing of wound A had progressed to the point where NPWT was not required, so therapy on this wound was ceased. An absorptive filler and foam was used to dress the wound. The wound measurements were now as follows:-
Wound A: 8.0cm length x 0.7 width x 0.3cm depth
Wound B: 6.0cm length x 3.5cm width x 1.0cm depth

Day 21

Day 25: NPWT was also discontinued on Wound B on day 25. Both wounds had responded well to NPWT and showed considerable reduction in length, width and depth, with granulation tissue visible. The wound measurements were now as follows:-
Wound A: Healed
Wound B: 5.0cm length x 2.5cm width x 0.5cm depth

The patient started with radiotherapy treatment.

Discussion

Implementing Negative Pressure Wound Therapy to promote wound healing has many benefits including efficiency and ease of use. The technique of incorporating moistened gauze and a silicone drain has proved successful for this patient. Throughout the study the patient did not remark on any pain during dressing changes and the gauze was removed intact, with no adherence to the wound bed.

The VENTURI™ NPWT system uses pressure settings of 60-80mmHg. The use of lower vacuum levels is supported in literature. Usupov and Yepifanov (1987) report that, to avoid tissue damage, pressure should not exceed 80mmHg. In addition, Wackenfors et al (2004), suggests that low negative pressure may minimise possible ischaemic effects, especially in soft tissue and lower pressures reduce the effects of hypoxia and improve reperfusion.

Conclusion

In this case study the post-surgical dehisced wounds were successfully treated with the VENTURI™ NPWT system from Talley Medical. In addition, it has demonstrated that the bridging technique can treat more than one wound.

Incorporating the use of moistened gauze and a silicone drain as an alternative interface highlights that no single entity holds the mandate for NPWT.

References

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