Managing a Stage 4 pressure ulcer using the Talley VENTURI™ negative pressure wound therapy system

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Introduction

The application of sub-atmospheric pressure to the wound bed in order to improve the clinical situation and speed up healing is not a recent concept. The Chinese were using a rudimentary form thousands of years ago – applying heated glass cups which, when the air inside them cooled, caused a slight reduction in pressure. This method was imported to Europe by Junod in 1841, as a circulatory stimulant[1]. More recently, studies were performed by Raffel in 1952, and in Russia between 1986 and 1991[2]. Since then, there have been many variants of negative pressure therapy, of which there are two principal methods of applying negative pressure to the wound bed.

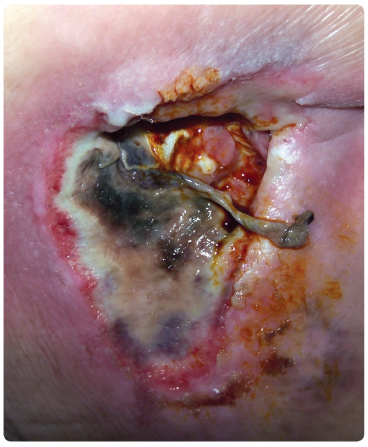
The first method, developed by Dr. Louis Argenta and Dr. Michael Morykwas of Wake Forest University School of Medicine (Salem, North Carolina, USA), involves the use of a sealed polyurethane foam dressing attached to a suction pump. The second method, developed in 1989 by Dr. Mark E. Chariker and Dr. Katherine F. Jeter, of Spartanburg Regional Medical Center (Spartanburg, South Carolina, USA) instead uses a silicone drain wrapped in moistened antimicrobial gauze and a transparent dressing to seal the wound. In this case too, the drain is then attached to a suction system.

Although the negative topical pressure system, referred to as NPWT (Negative Pressure Wound Therapy) has been mentioned in the literature for decades, and its efficacy documented in numerous studies and articles, the physiological and molecular mechanisms by which it explicates its action of accelerating healing are for the most part unknown. As Miller and Lowery[3] point out, the question is no longer whether or not NPWT benefits wound care, but if the method most commonly used at the present time to apply negative pressure is as safe and effective as possible.

The aim of this study is to document our experience of wound management (in this case, of an advanced state pressure sore) using the VENTURI™ NPWT system produced by British company Talley Medical.

Assessment of the patient and wound

The patient, a 97 year old female with a medical history of severe arteriopathy presented with a severe sacral pressure ulcer that had developed after an episode of acute fever, present for over 4 weeks. The patient, receiving care at home, was receiving supplementary drinks and presented with problems related to faecal incontinence. The sacral wound had undermining at 9 a.m. and 12 a.m., measured 5.2cm x 5.6cm (29.12cm^2) at the start of the study, and was compatible with a Stage 4 pressure ulcer, using the EPUAP classification system. The wound was photographed before the start of treatment, and its development was subsequently documented photographically.



The wound as it presented prior to negative pressure wound therapy

Method

The interface method used by the Talley VENTURI™ system to apply negative pressure is the Chariker-Jeter system (moistened gauze + silicone drain) described in the introduction.

After initial cleansing of the wound, a piece of non-adherent dressing was placed in contact with the wound bed, and a layer of antimicrobial gauze, trimmed to fit and moistened with saline solution, was positioned on top of it. The flat silicone drain contained in the sealing kit was trimmed to fit, wrapped in additional antimicrobial gauze and was positioned over this layer. The whole arrangement was then sealed to the skin with a transparent dressing. Given the irregular shape of the area, part of the gel patch in the sealing kit was placed at the peri-ulcer area, towards the natal cleft, while the remainder was applied to the point at which the drain tube exited, to protect the healthy skin and hold the drain securely in place. The suction was then applied, setting the Talley VENTURI™ system on continuous therapy mode at 80mmHg. The dressing changes were every 2 days and the canister was changed when it became full.

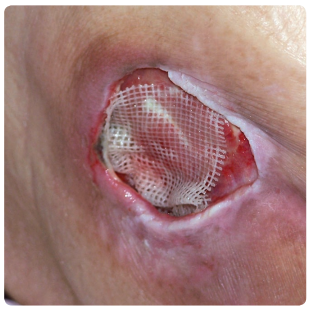
During the period of the study, the patient continued to lie on a pressure relieving mattress and sit in a wheel chair supported by a foam cushion.

Results

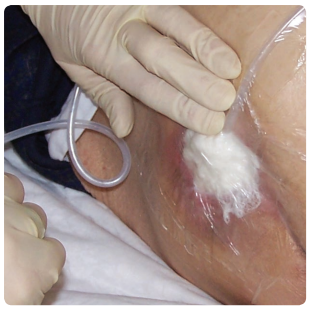
Although the trial had to be stopped after 14 days due to a deterioration in the patient's general condition, encouraging results were obtained even in this short period of time.

In particular, the area of the wound reduced by almost 18% in just 14 days, from 5.2cm x 5.6cm at the start to 4.8cm x 5.0cm on day 14. The quantity of exudate also fell drastically (over 66%), from 150ml on day 1 to 50ml on day 14.

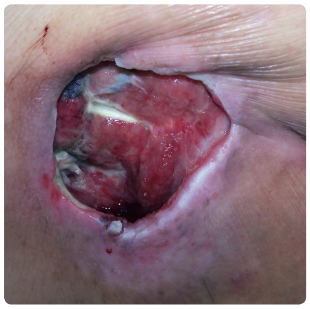
When discharged, the wound showed a considerable improvement, with no necrotic tissue, reduction in size and less inflammation. Healthy granulation tissue was present in the wound bed, undermining had noticeably reduced, and the tendonous band initially visible at the centre of the wound was almost completely covered.



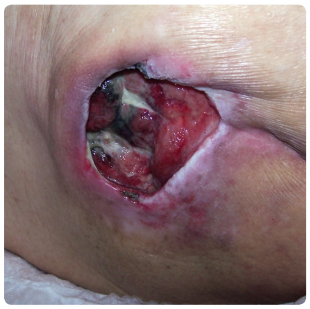
Day 1 - The wound during application of the dressing



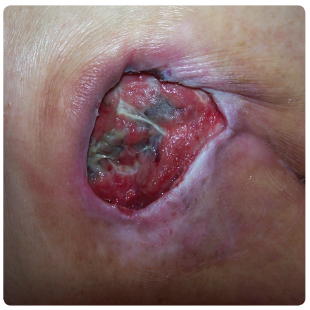
Day 1 - The wound with the dressing applied.



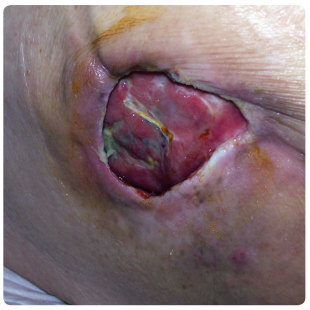
Day 3



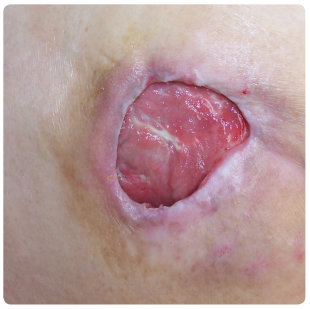
Day 6



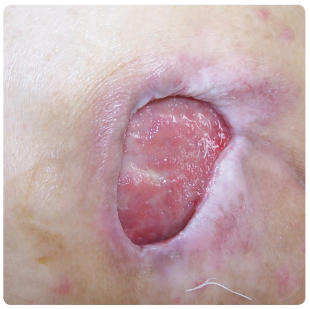
Day 8



Day 10



Day 15 (end of treatment)



Appearance of the lesion on Day 22 (1 week post-treatment)

Evaluation

Medical staff found application and replacement of the dressing easy and not too time consuming (10-12 minutes). The use of moistened gauze allowed the dressing to be adapted to the edges of the wound extremely effectively, particularly the undermining of the wound, thus enhancing the efficacy of the dressing. Slight maceration of the edges of the wound was always present, but this did not appear to have a negative influence on the repair processes.

The VENTURI™ negative pressure pump proved easy to use and very quiet. Overall, the Talley VENTURI™ system proved to be an effective aid to wound management, accelerating the healing process.

Conclusion

If adequate preventative measures such as pressure relieving mattresses are not utilised effectively, then patients with medical conditions similar to the patient in this study are highly likely to develop pressure ulcers.

However, sometimes the best prevention is not enough: in the case reported here the patient was already receiving adequate anti-pressure ulcer prophylaxis, was well cared for by nursing staff, and had presented no particular problems prior to the sudden episode of fever that was the event which triggered the lesion.

Over the years, however, new technologies have emerged that have evolved to manage pressure ulcers, and in this field the Talley VENTURI™ system is a functional, economical and easy to use alternative to the traditional methods of treatment.

References

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2. The Kremlin Papers: A collection of published studies complementing the research and innovation of wound care. Vestnik Khirurgii 1986-1991.

3. Miller, M.S., Lowery, C.A. (2005) Negative Pressure Wound Therapy: "A rose by any other name". *Ostomy Wound Management*, 2005 Mar;51(3):44-6, 48-9

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