

The Combination of a Hypertonic Saline Dressing and Negative Pressure Wound Therapy for Quick and Bloodless Debridement of Difficult Lesions in Complicated Patients

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ORIGINAL RESEARCH

Abstract—NPWT, also known as topical negative pressure wound therapy, is widely used in managing and accelerating wound healing. However in wounds where slough is highly represented NPWT efficiency is low. In the patients included in this study, clinical health conditions were precarious. We needed a rapid wound healing not to further compromise their health condition. We added Curity dressing to resolve the slough issue. Curity™ (COVIDIEN, Mansfield, USA) Sodium Chloride Dressing is a hypertonic saline dressing in a convenient, pre-saturated formulation. In all the patients, we observed slough reduction. This treatment provided beneficial for the patient, the surgeons, and the National Health Service.

Accelerating wound healing reduced hospitalization time and thereby the patients achieved a risks reduction of acquiring nosocomial infections and minimized physical as well as psychological distress.

Keywords—NPWT, gauze, wound healing, slough

I. INTRODUCTION

NPWT, also known as topical negative pressure wound therapy, is widely used in managing and accelerating wound healing. It stimulates wound healing by increasing local blood flow and mechanical stress, stimulating granulation tissue formation, decreasing bacterial colonization and edema with good exudate management.¹⁻³

However in wounds where slough is prolific NPWT efficiency is low. The best option in these cases is surgical debridement before NPWT, but in some patients compliance and general health conditions do not permit surgical procedures. In those patients, we need a rapid wound healing not to further compromise their health condition. Curity dressing with NPWT was used to reduce slough and to stimulate wound healing. In this article, our findings will be discussed.

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Figure 1. Curity™ in the package.

II. MATERIAL AND METHODS

The study was conducted in the Department of Reconstructive and Aesthetic Plastic Surgery at the University Hospital *Citta della Salute e della Scienza*, Turin, Italy during the period from January to May 2014.

In this study, for the treatment with NPWT, we always used a gauze impregnated with 0.2% polyhexamethylene biguanide (RENASYS™, SMITH&NEPHEW, London, UK) with a spiral pattern, placed on the bottom of the wound to transfer a constant negative pressure of 100–120 mm Hg. A transparent adhesive was used to fix the dressing around the drain to complete the seal in accordance with the manufacturer's guidelines.

Curity™ (COVIDIEN, Mansfield, USA) Sodium Chloride Dressing (Fig. 1) is a hypertonic saline dressing in a convenient, pre-saturated formulation. The dressing consists of the gauze (Fig. 2) (gauze soft and dry, pre-washed, with the weaving pattern woven and folded in boxes, high-consistency, and absorbency) pre-soaked in a solution of sodium chloride at 20%. This dressing was applied directly in contact with the

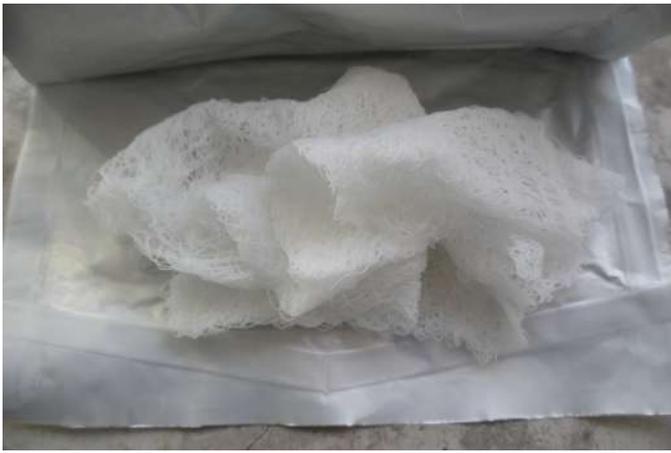


Figure 2. Curity™ unwrapped.

wound bed. We positioned the gauze over the dressing and applied NPWT.

The slough was evaluated every 3 days at dressing change by a single physician. Clinical evaluation was performed. Patients provided written consent prior to their inclusion in the study.

The study was approved by the ethics committee of our institution and was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

III. RESULTS

Five Caucasian patients (three female and two male, 42–72 years old, mean age 71 years, three wound dehiscence after abdominal surgery, one inguinal wound dehiscence, one ischial decubitus) admitted to our department were treated with NPWT and Curity dressings, after passing the inclusion criteria; chronic moderate/highly exuding wounds with high presence of slough. The patients compliance to surgical debridement was low. Their clinical health conditions were precarious. Comorbidity of cardiovascular disease, hypertension, diabetes and chronic kidney insufficiency were present.

In all the patients, we observed slough reduction. In three of them (abdominal dehiscence, Fig. 3) after two dressing changes the wound bed appeared cleansed with a presence of granulation tissue (Fig. 4). A skin graft was needed to complete wound healing (Fig. 5). In the other two patients, four dressing changes were needed to gain a cleansed wound bed. Wound healing occurred without other surgical procedures and healed by secondary intention.

IV. DISCUSSION

When a large amount of slough⁴⁻⁶ is present and obscures the wound bed, the wound is difficult to treat and wound healing becomes a hard, slow process. There are several wound debridement techniques available to the surgeon: enzymatic, autolytic, mechanical, biological and osmotic debridement.⁷ Surgical debridement by the excision of the necrotic tissue is the gold standard and it is an essential part of treating a wound before considering any reconstructive surgery option.



Figure 3. 73 years old patient. Wound dehiscence after abdominal surgery. Two weeks after NPWT application with gauze.

There are also other mechanical forms of debridement, such as pulsed lavage, ultrasound, and VERSAJET debridement.⁸ However, not all patients are eligible for surgery because of ASA (American Society of Anesthesiologists) criteria and do not always benefit from enzymatic and autolytic debridement.

In the patients included in this study, clinical health conditions were precarious. We needed a rapid wound healing not to further compromise their health condition. NPWT⁸⁻¹² is a valid solution but in wounds where slough is prolific its efficiency is low. We added Curity dressing to resolve this issue. The hypertonic solution controls heavily exuding wounds and helps to control the infection. It is pre-moistened to work immediately and promotes osmotic action to help naturally cleanse the wound. Its application on the lesions provides wound debridement and facilitates the natural healing process. This combination helped us to achieve a good wound debridement.

In our study we used NPWT with gauze, however, foam or other fillers can also be used. We have to underline that the



Figure 4. Same patient after a combination of NPWT with gauze and Curity™. One week after application.



Figure 5. Skin grafting and local anesthesia. 2 months after surgery.

pressure applied to the wound bed has to be 100–120 mmHg. This range of pressure maintains the Curity dressing *in loco* and well manages the exudate.

As wound debridement has been achieved, coverage is necessary if the patient's clinical conditions permit it. A surgical skin graft is the gold standard and often possible to conduct in local anesthesia.

This treatment proved beneficial for the patient, the surgeons, and the National Health Service. Accelerating wound healing reduced hospitalization time and thereby the patients achieved a risks reduction of acquiring nosocomial infections and minimized physical as well as psychological distress.

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