NPWT Sentenced to Success

Tomasz Banasiewicz, MD, PhD*

Abstract – Negative pressure wound therapy (NPWT) is very fast developing method of the wounds treatment. This method seems to be very affective, as well as simple from technical point of view. NPWT can be recommended in wide spectrum of clinical indications. In the future, further popularize this method can be expected, as well as the development of equipment and applied dressings

Keywords — negative pressure wound therapy – vacuum therapy – wound treatment.

I. INTRODUCTION

It is with great pleasure and honor that I invite you to read, as well as co-create, a new journal devoted to vacuum therapy. This method has swiftly conquered the world to become a “minor revolution” in the treatment of wounds. Today it is hard to imagine a modern operating department without the knowledge of this indispensable method. The development of negative pressure wound therapy (NPWT) is a well-known fact, in last few years numerous indication for this therapy, as well as the number of physicians utilizing this therapy, is increasing progressively. This type of treatment has ceased to be treated as a new, uncertain method and has become one of the essential elements for the modern and comprehensive treatment of wounds. The efficacy of NPWT was initially described by Morykwas [1,2].

II. MAIN REASONS FOR THE DEVELOPMENT OF NPWT

At present (18th January 2014), the resource PubMed contains more than 6600 articles with the keywords NPWT or vacuum therapy. Knowledge of this form of treatment is becoming more and more common, both in small and large clinical surgical wards. There are of course many reasons for the continued development of NPWT, in my opinion, the most important reasons for the success of vacuum therapy are presented below

A. Acceleration of wound healing

Negative pressure, apart from its mechanical drainage ability is also a factor activating several physiological mechanisms thereby accelerating wound healing. The dilatation of the arteries increases the oxygen saturation of peripheral tissues, which positively influences wound granulation [3]. Changes which take place in the capillaries correlate with the increase in their diameter and volume, furthermore increased blood flow facilitates the migration of inflammatory cells (especially macrophages and granulocytes) towards the lumen of the wound, which has been proved by means of experimental studies [4]. The activation of factors stimulating angiogenesis has also been demonstrated, both in experimental [5] and clinical studies [6]. This phenomenon is extremely important in case with difficult to heal wounds such as in the case of immunosuppression or in diabetic patients [7]. Clinical observations of leg wound healing confirmed the above-mentioned details, where in case of hypobaric therapy one observed a significantly faster reduction in the size of the wound when compared to patients subjected to traditional therapy [8].

B. Antibacterial effect

The antibacterial effect of the NPWT leads to a decrease in the incidence of infections associated with various types of wounds, such as in elective surgery, and acute ones [9,10]. Antibacterial effects can also be enhanced by the use of additional forms of therapy, such as flushing the wound with the help of previously inserted drains or sets of vacuum therapy with the possibility of applying constant flushing [11]. NPWT also seems to be effective in the treatment the wounds complicated by the resistant bacteria’s, such as methicillin-resistant Staphylococcus aureus (MRSA) [12].

C. Helps to keep the wound and its surroundings clean

One of the main quantifiable and measurable aspects of vacuum therapy is the possibility of full control of wound excretion. Exudation is completely drained in a closed system into sealed containers. Liquid exudate from the wound is typically infected, often making the skin and surrounding tissues prone to irritation. In the case of intestinal, pancreatic or bile fistula exudation this can lead to necrosis of the skin and edges of the wound. Another issue is a problem in maintaining cleanliness and hygiene of the infected wounds using standard dressings. Patients often complain of an unpleasant smell, feeling the moisture content from wound leakages, and frequent dressing changes. Control of the exudation helps to reduce the frequency of dressing changes and other treatments. [13]
D. Improve the condition of the tissues filling the wound, stimulate proliferation of fibroblasts and the creation of a network of blood vessels within the wound

The healing of wounds associated with extensive large tissue defects is very important to the quality of newly formed tissue throughout the healing process. Newly established tissue has influence on the strength of wounds and susceptibility to secondary injuries. Its impact also correlates with better functional results, for example in the case of extensive wounds of the limbs. Another factor influencing faster healing, especially the reduction of the size of the wound is the experimentally proven increased production of collagen and the subsequent filling of the tissue defect [14].

E. Economic efficiency and cost-effectiveness

Currently in the literature no large prospective, randomized studies evaluating the cost-effectiveness of NPWT is present. Many retrospective studies and reviews by physicians using this form of therapy confirms its profitability [15]. The heterogeneity of such patients treated with NPWT makes it difficult to compare between different studies and make meta-analysis, which is a principal method of cost-effectiveness analysis [16]. In investigated trials NPWT was at least as effective and in some cases more effective than the controlled treatment using standard methods and wound dressings [17].

F. Is versatile and permits treatment of wounds of various kinds

The number of uses for vacuum therapy is growing steadily. Among those present in the literature, indications for its use can be identified as: wounds after sternotomy, hard to heal orthopaedics wounds, diabetic foot, pressure ulcer, infected by-pass or graft, wounds after fasciotomy, gunshot wounds, open abdomen, open abdomen with fistulae, spiders bite, infected mesh, burns, scrotum wounds, perianal wounds, pyoderma gangrenosa, plastic surgery with skin grafts, hand surgery, abscesses of mediastinum, pilonidal cyst, peristomal problems and others. This of course does not exhaust all the potential uses of vacuum therapy. In generally the treatment of all types of complicated wounds can be considered for vacuum therapy. It should also be emphasized that there are promising reports of using vacuum therapy prophylactically to reduce the incidence of wound infections and hence improve outcomes.

G. Is technically easy and simple to use

Despite the operation of various vacuum therapy systems based on different kinds of equipment, their use is quite intuitive and simple. Usually, after previous experience with one type of equipment, it’s easy to use devices from other companies [18]. Changing a dressing for vacuum treatment is easy, it can generally be performed on the patient's bed or in an outpatient clinic [19]. Dressing changes and conducting therapies can be performed by nurses or residents. In many cases, the vacuum therapy can be carried out with a simple outpatient device (“pocket”) which may be carried out independently by the patient. They can easily change and fit the dressings and replace the canisters while periodically contacting the specialist for inspection.

H. Is safe and has few side effects

Analysis of the available publications on the use of NPWT, in a variety of indications, demonstrated a very high safety profile [20]. The limited number of complications and side-effects reported in acute and chronic wounds is certainly one of the reasons for the prevalence of this form of therapy [21-24]. The most common problems associated with its daily use include bleeding from the wound, and allergic reactions to the foils used. In the first case, be sure to careful bleeding control of the wound. In the second instance, frequently change the foil to one from another manufacturer will in most cases lead to a resolution or reduction in skin reactions.

In the literature there are, without a doubt, description of more serious complications. An example can be a devastating complication associated with negative-pressure wound therapy (NPWT) after cardiac surgical intervention - heart rupture resulting in serious bleeding. This very rare complication can be prevented by using special protective devices [25]. Similar situation can be observed in open abdomen, where there is a risk of contact the intestine with the sponge from NPWT wound dressing kit, which can cause the formation of fistulas. To prevent this difficult to treat complication special barriers such as an antiadhesion foil, polyvinyl alcohol foam [26] or special protective discs should be utilized [27].

I. Improves patient comfort

Studies on the impact of NPWT on the quality of life are difficult to establish. Decide on the diversity of applications and, above all, a very large individual variability of therapy. Studies comparing the quality of life in patients treated with standard therapy and NPWT indicate a comparable quality of life, but NPWT did have an effect on social life: during the first 2 weeks of the application of therapy, patients in the NPWT group reported an increase in the social life domain [28]. In the literature the predominate observations suggest benefits of NPWT in terms of healing, patient independence and improved quality of life [29]. Education of patients on this therapy, both indications and technical aspects, increases their acceptance of the treatment, as well as their quality of life [30]. Another factor that could improve the quality of life of patients is the use of lighter and quieter devices [31].

J. Because it works

Often it is very difficult to objectify a subjective evaluation on effectiveness of treatment methods. There are some methods which we like and hence consider as an effective mean for therapy, others however are not used by us. Effectiveness is not always apparent when using a strictly objective criteria, guidelines and meta-analysis.

III. Conclusions

NPWT appears to be a method that evaluates the effectiveness of the wound treatment in everyday practice. The opinion of
numerous individuals who have used it, both experienced and novice residents are consistent - NPWT is effective and works. Many doctors who had known NPWT introduced this method in their daily practice. It seems to me that the reverse situation did not happen - I do not know of doctors who for some reason have declared that they will never again be using NPWT. If you have quit using NPWT or know this type of a situation - write to us. If you are a staunch supporter of NPWT - send us your article.

References


