EURASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES
Innovative Academy Research Support Center
UIF = 8.3 | SJIF = 5.995 www.in-academy.uz

VACUUM THERAPY OF POSTOPERATIVE WOUNDS

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https://doi.org/10.5281/zenodo.7202794

ARTICLE INFO

Received: 27th September 2022
Accepted: 01st October 2022
Online: 15th October 2022

KEY WORDS

wound treatment, vacuum therapy, vacuum wound therapy, wound infection, postoperative period, pathological.

ABSTRACT

The mechanisms of action of negative pressure wound therapy (vacuum therapy) are described -one of the latest techniques used in the treatment of wounds of various etiologies. Negative pressure ensures continuous fluid evacuation, stimulates the proliferation of granulation tissue tissues and effectively cleans the surface of the wound. This article provides information about vacuum therapy of postoperative wounds.

One of the most common postoperative complications in the surgical treatment of diseases of various etiologies is the development of purulent infection, accounting for 15–25% of all causes of nosocomial infection. The frequency of infection depends on the type of operation: with clean wounds - 1.5-6.9%, conditionally clean - 7.8-11.7%, contaminated - 12.9-17% and purulent - 10-40%. The predominant causative agent is S. aureus.

The presence of a wound infection as a complication of the postoperative period increases the duration of the patient's treatment. The treatment of such wounds is one of the most difficult problems of the surgical specialty, since the course of the wound process is pathological in nature and traditional methods of treatment are ineffective. In addition, the upward trend in the incidence of antibiotic-resistant microflora persists.

Modern wound treatment is aimed at minimizing the phases of the wound process by optimizing tactics, in connection with which many methods of medical and physical effects on the wound have been proposed. One of the modern methods of treatment of long-term non-healing wounds is vacuum therapy. The principle of operation of vacuum therapy is based on the use of a closed drainage system that maintains a controlled negative pressure in the wound area. Vacuum therapy promotes certain changes in the area of wound damage. First, there is an active removal of exudate, which contains, among other things, inflammatory cells that produce high concentrations of inflammatory mediators that prevent regeneration processes. Secondly, VAC therapy helps to create a moist wound environment and maintain its optimality, which stimulates the proliferation of keratinocytes and fibroblasts, which produce collagen fibers

that promote vascular proliferation. Thirdly, it accelerates bacterial decontamination of wound tissues due to active drainage and increasing the effectiveness of drug therapy. Fourthly, it locally enhances hemodynamics in the wound, including due to local hypoxia, and reduces edema in the interstitial space. Fifth, vacuum therapy helps to reduce the area of the wound due to macrodeformation of the wound edges and their contraction under the influence of constant negative pressure. Sixthly, vacuum therapy protects the wound from the external environment and significantly reduces the risk of secondary infection of the wound surface. Seventh, it enhances the effect of drug treatment by enhancing local blood and lymph circulation and increasing the concentration of drugs in wound tissues. Eighth, vacuum therapy reduces the cost of treatment and improves the quality of life of patients. VAC dressings are applied permanently for a long period (even with intense wound exudation), which saves consumables, medicines, as well as the strength and time of medical workers. Thus, the cost of treating patients and the total duration of the patient's stay in the hospital are reduced.

Purpose of the study

To improve the results of treatment of long-term non-healing wounds of various etiologies in a multidisciplinary hospital using vacuum therapy.

Material and research methods

From 2019 to 2021 In the clinic, the method of treating wounds with controlled negative pressure (vacuum therapy) was used in 68 patients with wounds of various etiologies undergoing treatment in the surgical, traumatological and gynecological departments. Among the surveyed, men predominated - 46 (67.6%), women were 22 (32.4%), the age of patients in the study group averaged 50.6 ± 2.1 years.

Manifestations of a systemic inflammatory reaction were noted in 16 (23.5%) patients, comorbidities were detected in 28 (41.2%) patients. The microbial landscape of postoperative wounds was represented mainly by polyvalent microflora with a contamination level of 103 to 108 CFU/ml.

Patients underwent vacuum therapy using certified equipment: Suprasorb CNP 1 (Lohmann & Rauscher, Germany), VACFreedom (KCI, USA) and ATMOS S042 VivanoTec (Medicine Technik, Germany) devices. The protocol for treating patients included: surgical debridement of the focus of infection, performed in 61 (89.7%) patients, correction of metabolic disorders and broad-spectrum antibiotic therapy with the transition to etiotropic after receiving the result of sowing the wound discharge on the microflora with the determination of antibiotic sensitivity. In 14 (20.6%) cases, complex treatment was performed followed by surgical closure of the soft tissue defect (imposition of secondary sutures) or skin plasty after the transition of the wound process to the reparative stage.

To assess the results of treatment, a control group of the study was formed, represented by a retrospective analysis of 61 case histories in the period from 2013 to 2019. The control group was comparable with patients who used vacuum therapy: there were 43 men (70.5%), women - 18 (29.5%), the average age of patients was 49.2±2.4 years (p>0, 05). The structure of diseases in the study group included: postoperative purulent sternomediastinitis (n=2), wound complications after mammoplasty (n=1), esophageal fistulas

(n=2), hernioplasty with an implant (n=3), complicated wounds after laparotomy (n=13), complicated wounds after excision of the epithelial coccygeal passage (n=35), bedsores of various localization (n=2), wound complications in traumatology and orthopedics (n=3) (>0.05).

To achieve the goal of the study, the following indicators were analyzed: clinical wound healing parameters, planimetric parameters (wound healing rate, wound area), number of dressings, patient compliance with the treatment; a cytological study of smears-imprints from the surface of wounds was carried out.

Statistical data analysis was carried out using Microsoft Excel 2016 and "R" programs (version 3.2, Vienna, Austria). The study used descriptive statistics, the Shapiro-Wilk test for the normality of distributions, the Fisher test for comparing the frequencies of occurrence of signs, the questionnaire "Compliance Level"; parametric measures are reported as mean and standard error (M±m), and significance was assessed using Student's t-test. Differences were considered significant at $p<0.05$.

Research results and discussion

Vacuum therapy began on the 2nd day after surgical treatment of wounds in 36 (52.9%) patients, on the 3rd–7th day - in 21 (30.9%), and in the remaining 11 (16.2%) patients - in the later stages of postoperative treatment. The duration of vacuum therapy ranged from 7 to 20 days. All patients of this study underwent round-the-clock treatment according to the original developed scheme in a variable vacuum mode with a differentiated choice of the level of negative pressure depending on the wound phase (RF patent No. 2559936): in the first phase of healing (the first 8 days) with a negative pressure of 50 mm Hg. Art. duration of 2 minutes and with a negative pressure of 125 mm Hg. Art. with an interval of 5 minutes. In the next 12 days, after the transition of the wound process to the second phase of healing, VAC-therapy was carried out according to the scheme: with a negative pressure of 75 mm Hg. Art. with an interval of 7 minutes and with a negative pressure of 125 mm Hg. Art. with an interval of 2 minutes. Dressings were performed every 3–4 days; on average, 4 to 5 dressings were required.

Conclusions

The presented experience of using controlled negative pressure in the treatment of wounds of various etiologies highlights an important problem at the intersection of surgery, proctology, gynecology, traumatology, thoracic and plastic surgery.

An earlier transition of the wound process to the reparative stage is noted than when using other methods of local treatment. It should be noted that this method of physical impact on the wound is not independent, but represents a stage of the multimodal treatment protocol, which allows preparing the wound for plastic closure as soon as possible. At the same time, primary intention after wound closure in the second phase of the wound process is possible in most patients and is not associated with complications.

Thus, the use of vacuum therapy within a multidisciplinary medical institution is justified, as it reduces the time for complete healing of complicated postoperative wounds and temporary disability for this group of patients, as well as reduces the number of dressings and is accompanied by good compliance.

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