

MEDICAL SCIENCES

VACUUM-ASSISTED CLOSURE AS ALTERNATIVE METHOD OF WOUND MANAGEMENT

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Introductions. The problem of prolonged wound healing is often found in the elderly or in those who have comorbidities such as diabetes, atherosclerosis or varicose veins. This causes ongoing discomfort, needs extensive medical care, and necessitates substantial reconstructive surgery, requiring significant financial and social commitments. Negative-pressure wound therapy (NPWT), also known as vacuum-assisted closure (VAC), is an alternate type of wound management that uses negative pressure to clean the wound surface, speed up healing, and prepare the wound for plastic closure.

Aim. To consider the perspectives and relevance of VAC in managing patients with wounds of different aetiologies, its benefits and drawbacks, VAC technique.

Materials and methods. We performed a systematic review and comprehensive analysis in the following databases: The Cochrane, EMBASE, PubMed and Ovid.

Results and discussion. VAC is used when it is impossible to suture or repair the damage in a traditional way; in the presence of gunshot wounds; in the treatment of large burn injuries; with existing concomitant diseases (atherosclerosis, diabetes); in the presence of ulcers, purulent lesions, bedsores; for fixation of skin grafts; after the use of fasciotomy in compartment syndrome. Contraindications of local negative

pressure: patients with malignant diseases, untreated osteomyelitis, fistulas in organs or body cavities. Vacuum therapy is relatively contraindicated for patients who are taking anticoagulants or with actively bleeding wounds. The VAC application technique consists in using the principles of local negative pressure (topical negative pressure - TNP), that is, in creating a stable vacuum in the wound cavity by establishing a system for active aspiration, which in turn decreases wound exudation, aids in the maintenance of a moderately moist wound environment, which is necessary for the normal course of reparative and regenerative processes. The system's formation is accomplished through placing a polyurethane sponge in the surgical wound and sealing the wound with a transparent adhesive film. It is glued to the outer side of the sponge and to the skin edges of the wound. Then, a drainage tube with an applicator film is installed on this dressing, which hermetically connects this dressing to the device that provides negative pressure on the dressing and wound. Due to a reduction in perfusion carried on by tissue exposure to negative pressure, angiogenesis is stimulated and local vasodilation is brought on by the nitric oxide production. This happens when receiving VAC treatment during the suction phases. As a result, intermittent VAC is more effective than continuous VAC. It has been demonstrated by exposure to various negative pressure levels (10–175 mmHg) in various wound types that the degree of negative pressure should be customised for each kind of wound. The recommended pressure for a chronic venous ulcer is 50 mmHg, but acute traumatic wounds require a negative pressure of 125 mmHg. Negative pressure reduces local oedema with the evacuation of wound exudate, lowers microbial contamination, enhances local blood circulation (allowing to speed up the process of tissue regeneration), promotes microdeformation of cells - it releases growth factors. It is also possible to see the phenomenon of "tissue expansion," which is explained by the pressure reduction in the tissues after negative pressure is applied. While the pressure outside the cells and beneath the dressing is negative, the pressure inside the cells is positive. As a result, the wound may get smaller due to cell growth, granulation tissue proliferation, and convergence of the wound margins. Recent research has revealed successful use of this method during

the primary surgical debridement of wounds received in hostilities, until their initial healing. This is especially relevant nowadays. VAC reduces wound closure time, the risk of infection, as well as reducing the time spent on dressings.

Conclusions. Local treatment with negative pressure is currently a well-developed, reliable and effective way to heal wounds of different etiologies. Further implementation of this technique will significantly improve outcomes of difficult cases such as burns, chronic wounds, extensive traumatic or purulent tissue lesions, as well reduce the time and cost of treatment.