Комбінація техніки дерматотракції та терапії ран негативним тиском при лікуванні дефектів після фасціотомії нижньої кінцівки

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Combination of dermatotraction procedure and of the wound therapy, using negative pressure, in treatment of defects after the lower extremity fasciotomy

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Acute compartment syndrome (ACS) is an urgent surgical pathology when delaying medical care leads to serious damage to the limb, such as dysfunction or even loss [1]. The reason is an increase of intrafascial pressure as a result of swelling of the muscle tissue due to extravasation or systemic response to reperfusion of the ischemic area [2].

Bilateral fasciotomy is widely used for surgical treatment of the lower extremity (LE) ACS with a goal to decompress four bone-fascial compartments [3, 4]. This method is associated with complications, such as surgical infection and long-term hospitalization of the patient [5]. Rapidly closure of the skin defects is one of the main tasks to prevent them. Surgeons of various specialties are discussing the choice of the optimal method to solve this problem. Negative pres-

sure wound therapy (NPWT), or Vacuum Assisted Closure (VAC), is one of the alternatives. Vacuum therapy is relatively widely used in practice since the 90s of the last century.

This method is based on the application of negative pressure (from 75 to 125 mm Hg) on polyurethane foam in contact with the wound surface and hermetically sealed with a special dressing, which prevents contact of the wound with the environment. The mechanism is to reduce the wound area, stimulate granulation, the continuous effect of wound cleansing, secretion and to diminish the edema. Another option for treating of the post-fasciotomy defects is the shoe-lace technique. The principle is to use an elastic ligature as a lacing, which is applied to the edges of the wound with a skin stapler to bring them together [6].

*Fig. 1.
Defects on the surface of the left NC after fasciotomy: A - outer side, B - inner side.*

Fig. 2.
The first application by VAC-therapy to defects of the left NC after fasciotomy:
A - inner side, B - outer side.

Fig. 3.
Elastic ligatures were applied by lacing for dermatotraction:
A - the outer side, B - the inner side.

In this publication, we share our experience in the treatment of the wounds as a result of surgery for LE ACS. Here is the case report.

Patient K, 71 yrs old, has been abusing tobacco for a long time, has a history of the coronary artery bypass grafting, complained of pain and a feeling of cold in the left LE, which lasts for two days. Physical examination have revealed a decreased sensitivity and impaired motor function of the left ankle joint. Magnetic resonance angiography was performed immediately. Thrombosis of the popliteal artery aneurysm and obstruction of the anterior and posterior tibial arteries of the left LE was diagnosed. A stent-graft was urgently endovascularly implanted into the popliteal artery of the left LE, and the blood supply was restored. The course of post-operative period was complicated by development of the left leg compartment syndrome. For therapeutic purposes, a bilateral dermato-fasciotomy was performed, which led to development of significant defects on the surface of the tibia: 70×320 mm – laterally, and 90×270 mm – medially, ie 224 and 243 cm², respectively (Fig. 1). The local condition of the tissues after the procedure was partially hypovital, the function of the ankle joint was not restored. In discussions

on treatment strategy, which were limited to choosing between the limb amputation and negative pressure therapy, it was collectively decided to start with conservative treatment. A total of 8 dressings were performed using VAC therapy (Fig. 2). Because of slow reduction of the wound surface 14 days after the onset of NPWT, the treatment was supplemented by the technique of the skin edges traction by lacing (Fig. 3). As a result, the area of the wound have decreased by 25% on the outside and by 23% - on the inside. During hospitalization, the patient have shown no symptoms of infection. The total length of hospital stay was 51 days, including 49 days after fasciotomy. The patient was transferred to outpatient treatment. Autotransplantation of the skin for both defects was performed, followed by achievement of good cosmetic result, and the limb preservation (Fig. 4).

A negative pressure wounds treatment is a safe alternative to the standard dressing method, which has significant advantages if the indications criteria are followed, such as a shorter healing time, and faster reduction of the wound area and edema [7]. The range of pathologies for which it is advisable to use the NPWT method is expanding every year, but the number of qualitative studies with a large sam-

Рис. 4.
Результат загоєння ран після аутотрансплантації шкіри на дефекти після фасціотомії:
А – зовнішня сторона, Б – внутрішня сторона.

ple of patients conducted without a conflict of interests remains insignificant.

In our observation, the patient wanted to save the injured limb anyway. Thanks to the teamwork of the surgeons and patients, good cosmetic and satisfactory functional results were achieved. In our work, we relied on the experience of colleagues from Japan, who successfully use a combination of dermatotraction and VAC therapy in the treatment of defects after fasciotomy of the lower extremities [8].

With this publication, we would like to draw attention to the fact, that VAC therapy in the treatment of defects after fasciotomy can be effectively supplemented by other wound healing methods. Choice and combination of the treatment methods with rational strategy can lead to reduction of the hospital stay terms as well as the number of complications, caused by surgical infection.

Funding. No source of funding has been received for this work.

Authors' contribution. All authors made the same contribution to this article.

Competing interests. The authors have no conflict of interest.

Consent for publication. All authors approved the paper to be published. **Acknowledgements.** I would like to thank Maria Zhydkova, a doctor of internal medicine, and Vadym Vus, a family doctor, for their assistance in creating the publication and its correction.

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Received: 11.01.2021