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Short Commentary

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The effectiveness of "Mexidol" dressings with immobilized enzymes for the treatment of deep burn wounds

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Introduction

The problem of burns has remained relevant for many decades, despite significant recent advances in the fundamental study and clinical understanding of the pathogenesis of burn injury, the use of new effective medical technologies for its diagnosis and treatment on this basis [1].

The relevance of the problem is confirmed by a number of obvious facts. The first of them is the mass nature of burn injuries, the second fact is lethality and the third fact is disability [2,3].

A large number of new protective wound coverings have been introduced into practical healthcare [4,5]. The task of obtaining a universal wound coating suitable for all possible situations has not yet been solved. However, wound treatment using traditional dressings has become less effective in recent years. This is due to the fact that the effect of many of them does not meet the requirements of modern medicine. One of the reasons that reduce the effectiveness of wound dressings is the unidirectionality of their action in the wound-only sorption, antimicrobial, proteolytic, etc. This disadvantage can be overcome by creating wound coatings of complex action, having several properties at the same time [6].

According to a number of authors, an ideal wound coating should have the following properties: do not have pyrogenic, toxic and irritating effects on surrounding tissues, have biocompatibility, create an optimal microenvironment for wound regeneration, have an absorption capacity for wound exudate, prevent the penetration and development of microorganisms, be permeable to water and air vapor, but not dry the bottom of the wound, be elastic, simulate a surface with a complex relief [7-9].

According to S. Thomas 1990, a wound dressing should: effectively remove excess wound exudate and its toxic components; contribute to the creation of optimal moisture of the wound surface; ensure adequate gas exchange between the wound and the atmosphere; prevent heat loss; prevent secondary infection of the wound and contamination of environmental objects; do not contain toxic compounds; have anti-adhesive

properties in relation to wound surface, drape well; have a PDF created with Factory Pro trial version www.pdffactory.com sufficient mechanical strength; not to be easily flammable; to be stored for a long time. An adequately selected wound coating for the treatment of burn wounds will reduce the influence of factors contributing to the deepening of necrosis, such as tissue ischemia, wound infection, and create optimal conditions for their regeneration [10,11].

It is possible to accelerate the cleansing of wounds from necrosis by using proteolytic enzymes. Under the influence of enzyme preparations, the cleavage and decomposition of denatured protein occurs, the wet scab melts and the purulent fibrinous overlays dissolve, which leads to a quick and painless cleansing of the wound from the remnants of non-viable tissues. Therefore, enzymes are called a "biological scalpel".

Material and methods

We conducted a study of the effectiveness of Proteox-TM trypsin and mexidol dressings for the treatment of burn wounds in 27 patients aged 15 to 62 years with grade III-IV burns from 30% to 60% of the body surface who were treated at the burn department of the RSCUMA, Samarkand, Uzbekistan. Since all the bandages contained enzymes, during the study they were all combined under the general name "enzyme-containing bandages". All bandages before applying to wounds required preliminary preparation in the form of moistening by immersion in a tray with a solution or placing the solution directly with a bag with a bandage. Bandages with bandages replacement were performed daily or every other day. Enzyme-containing dressings were usually used for 4-6 days (2-4 dressings). A clinical, including comparative, assessment of the results of treatment of burn wounds using various dressings was carried out.

The results of the study

A positive effect was observed when using wet wipes and daily bandages in patients for the treatment of grade III-IV burns only after removal of the burn scab. At the same time, softening and cleansing of wounds from foci of necrosis, fibrin plaque and their granulation were noted, thereby accelerating the transition to the second stage of the wound process.

After applying bandages to the wounds, patients noted a slight burning sensation, which passed within 5 minutes after dressing. After dressing, the bandages were quickly soaked with the detachable and dried, and therefore, according to the instructions, periodic (up to 3 times a day) moistening of the bandages directly on the wound was required, which technologically complicated treatment. At the same time, multilayer bandages with a sorbing layer were poorly moistened-liquid flowed from the bandages.

Allergic reactions and irritating effects on the surrounding intact skin were not observed when using enzyme-containing dressings. On bandages, when removing "dried" bandages, injury to the surface of wounds was noted. At the same time, while maintaining bandages on wounds in a wet state, they became slimy, and therefore were a traumatically and painlessly removed from the wound surface along with dissolved necrosis and wound discharge. However, the bandages themselves melted, and fibers remained on the wounds when they were removed.

The above bandages have both necrolytic and bactericidal effects. As a result, the burn surfaces in the joint area are prepared faster for the final stage of complex therapy-skin grafting.

This combination made it possible to accelerate the rejection of necrotic masses, stimulate the cleansing of burn wounds, and prepare wounds for surgical closure faster.

As a result, the burn surfaces in the joint area are prepared faster for the final stage of complex therapy - skin grafting.

To increase the possibilities of skin grafting with limited skin resources in the joint area, so-called non-perforated grafts were used, and with extensive deep burns, mesh grafts were used, which resulted from the application of a special dermatome incisions on skin flaps taken in the usual way, as a result of which they took the form of a mesh.

Of the 27 patients with deep burns, 21 patients had no graft lysis, the duration of inpatient treatment was 26.5±3.3 bed days, 6 patients had partial graft lysis, the duration of inpatient treatment was 32.7±5.5 bed days. The first dressing was performed 2 days after autodermoplasty, since a longer non-ligation period can lead to melting of the skin grafts on an infected wound. Subsequent dressings were performed daily, or every other day, until complete epithelialization.

In the postoperative period, to prevent the growth of keloid scars along the edges of transplanted grafts and excessive growth of connective tissue under them, patients were prescribed massage and physical therapy, pyrogenal therapy, as well as treatment with hydrogen sulfide baths.

Discussion

In our studies, the use of gauze dressings soaked in a solution of native enzyme preparations showed their clinical effectiveness - these dressings helped cleanse wounds from necrosis, accelerate the transition to the second stage of the wound process and, consequently, reduce treatment time. For optimal results, it was necessary to constantly keep the dressings moist and carry out daily dressings, replacing the dressings with new ones.

Despite the fact that by creating dressings with immobilized enzyme preparations, it was possible to overcome some of the disadvantages of using native enzymes, which are not stable enough, undergo autolysis, are inactivated by blood and tissue inhibitors, are quickly eliminated from the body, and also have antigenicity, indications for the use of enzymes in the treatment of wounds remained the same. The main mechanism of local therapeutic action of proteolytic enzymes placed in the wound is the hydrolysis of non-viable tissues and high-molecular proteins of wound exudates [3]. Therefore, the main indication for the use of enzyme-containing dressings is the cleansing of acute and chronic wounds from necrotic tissue and fibro purulent plaque, which determines the advisability of their use mainly in the first and during the transition to the second stage of the wound process. It should also be noted that during the first stage, the wound usually has an excess of its proteolytic enzymes, released from leukocytes, damaged tissues and microbes [12]. Therefore, proteolytic enzymes are more appropriate to use for secondary necrosis at the end of the first stage of healing, including chronic wounds [14,15]. The use of enzymes,

starting from the second stage of the wound process, is not indicated, because proteolytic enzymes destroy the protective granulation barrier in the wound and create conditions for the generalization of the infectious process.

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