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LOCAL TREATMENT OF COMPLICATIONS AFTER TOOTH EXTRACTION

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МІСЦЕВЕ ЛІКУВАННЯ УСКЛАДНЕНЬ ПІСЛЯ ОПЕРАЦІЇ ВИДАЛЕННЯ ЗУБА

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ABSTRACT

Polysorb exhibits its therapeutic properties due to its ability to effectively absorb liquids and protein compounds. In addition, a high therapeutic effect is demonstrated by the composition "Lysetox" containing trypsin and ethonium. It provides proteolytic and antibacterial effects. "Lysetox" and Polysorb are found to possess the similar ability to adsorb liquids and proteins. Topical application of "Lysetox" and Polysorb improves the results of treatment of purulent alveolitis compared to traditional methods. At the same time, "Lysetox" demonstrates a more pronounced therapeutic activity than Polysorb, affecting more mechanisms of purulent inflammation.

ІНФОРМАЦІЯ

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Ключові слова: операція вида-
лення зуба, альвеоліт, загоєння
рани, запальний процес, комп-
лексне лікування, профілак-
тика запальних ускладнень,
сорбенти, нижня щелепа.

АНОТАЦІЯ

Полісорб проявляє свої лікувальні властивості завдяки здатності ефек-
тивно поглинати рідини та білкові сполуки. Окрім нього, високий тера-
певтичний ефект демонструє композиція «Лізетокс», яка містить трип-
син та етоній, забезпечуючи протеолітичну й антибактеріальну дію.
Доведено, що «Лізетокс» і полісорб мають однакову здатність адсорбу-
вати рідини та білки. Локальне застосування полісорбу та «Лізетоксу»
покращує результати лікування гнійного альвеоліту порівняно з тра-
диційними методами. При цьому «Лізетокс» виявляє більш виражену
терапевтичну активність, ніж полісорб, впливаючи на більшу кількість
механізмів розвитку гнійного запалення.

Introduction. Prevention of inflammatory complications and treatment of postoperative complications occurring during and after tooth extraction are relevant and indisputable for modern outpatient surgical dentistry and maxillofacial surgery. Alveolitis is the most common complication. It prevents the process of epithelialization and wound healing after tooth extraction [1–3]. Among numerous local and general factors promoting the development of socket inflammation there are traumatic nature and duration of surgery, periapical infection available, which determines the risk of postoperative complications, decreased nonspecific reactivity of the body, blood, inhibited lysozyme activity in the blood serum and saliva, as well as weakening of the skin bactericidal properties. All the above factors play a leading role [1–3; 5; 6].

Clinically alveolitis develops in two forms: acute and chronic. They are considered in choosing and planning treatment. The acute form develops in 2–3 days. It can be accompanied by purulent discharge, swelling, hyperemia, and fever. Chronic alveolitis occurs 3–4 weeks later. Its leading symptom is abundant growth of the granulation tissue from the bottom of the socket. The mucous membrane of the alveolar process becomes cyanotic, and small sequesters are formed [7].

The treatment of purulent forms of alveolitis is especially important, since in case of insufficiently effective therapy they are often complicated by inflammatory processes, sequester formation in the osseous tissue of the alveolar edges, and progressing atrophy of the alveolar process [8; 9]. Therefore, the therapy of alveolitis purulent form should be comprehensive combining surgical methods with pharmacological ones. It should be noted that surgery and medical therapy for purulent-inflammatory processes are not alternative or competitive methods. On the contrary, they closely interact and complement each other ensuring a many-sided approach to a comprehensive treatment of purulent wounds [4].

Most pharmacological methods are aimed at quickly eliminating inflammatory processes in the socket of the tooth extracted by means of antibacterial, anti-inflammatory means and analgesics. Removal of microbes and wound contents from the cavity of a purulent wound is an important element of topical treatment. However, the effect of topical agents is often limited, since they are quickly washed away by saliva or removed by the activity of the muscles of the oral cavity. It makes granulation, epithelialization and repair of tissues slower. In case of complications accompanied by necrotic substrate or thick pus in the wound administration of proteolytic enzymes in order to clean such lesions is reasonable.

Sorbents applied for topical treatment of purulent wounds possess a wide spectrum of action and are

divided into several main groups: selective, draining, biologically active and combined.

Draining sorbents play a key role in providing wound cleaning. Due to a porous structure and capillary drainage mechanism, they promote the outflow of exudate and pathogenic microflora from the wound surface [4].

Silica-based sorbents deserve special attention among local remedies. They are highly effective due to their sorption contents that enables to absorb considerable amounts of toxins, exudate and necrotized tissues. Silica-based sorbents demonstrate a pronounced detoxifying effect providing improvement of the wound condition and promoting its rapid healing.

Objective of the research: to improve the effectiveness of treatment of patients with purulent forms of alveolitis by means of the use of a remedy able to demonstrate sorption, detoxifying and prolonged proteolytic effects. For this purpose, the composition “Lysetox” was chosen containing polysorb, trypsin and ethonium.

Materials and methods. The research studies the composition containing the sorbent polysorb (no less than 96%), crystalline trypsin, additionally acting as a proteolytic activity stabilizer, and ethonium as an antiseptic. Clinical laboratory results allowed assessment of the effectiveness of treatment. The results were statistically analyzed.

The main task of the experiment was to choose the most effective agent among the general amount of sorbents available and their compositions. Considering pathogenic mechanisms of phases of an inflammatory purulent wound, the principle requirements for the medicine administered for quick cleaning and healing of wounds are its dehydration-sorption, proteolytic, antimicrobial, and preferably topical anesthetic effects [4].

First, we have carried out a comparative study of a dehydration-sorption effect of various medical sorbents and drugs created on their base.

A detoxifying effect of the drug is manifested in its ability to absorb water, pathogenic substances of protein nature including the products of tissue breakdown, biologically active substances, immune complexes, bacteria, microorganisms from the inflammatory site.

The experimental part of the research, when we studied protein-sorbent properties and proteolytic activity of the composition, found that an optimal content of trypsin was 1–2%, and ethonium – about 2%. The adsorption of a standard protein drug (serum albumin) by the composition “Lysetox” reaches 450–500 mg/g, which is comparable to the indices of polysorb. “Lysetox” proteolytic activity is inconsiderably lower than of a trypsin aqueous solution of a similar concentration.

The osmotic activity of the composition “Lysetox” was compared with the medicines

“Debrizan” and “Polysorb”. In order to assess it, the kinetics of absorption of 2% albumin solution (wound exudate model) was examined during 24 hours. The results of the experiment showed that the amount of liquid absorbed for “Polysorb” and “Lysetox” was similar. It was about 450%, while “Debrizan” demonstrated its osmotic activity equal 300%. Therefore, by absorbency index “Polysorb” and its derivatives are significantly higher than many other drugs available, which are applied to drain wounds and abscesses. Fig. 1 presents absorption kinetics by various dialyzers with polysorb, “Debrizan” and “Lysetox”.

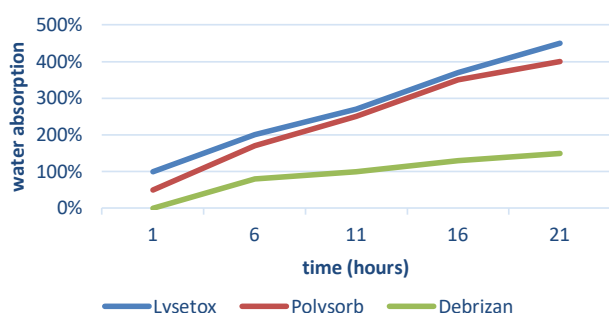


Fig. 1. Absorption kinetics of 2% albumin solution by dialyzers with polysorb, “Debrizan” and “Lysetox”

Clinical effectiveness of “Lysetox” composition was examined in purulent-inflammatory processes in the socket of the tooth extracted from the lower jaw based on voluntary informed consent of patients involved in the research. The study was carried out in strict accordance with current regulations and rules: the Order of the Ministry of Health of Ukraine No. 690 of 23.09.2009, GCP standards, the European Union Convention for the Protection of Human Rights and Biomedicine, and the Declaration of Helsinki of the World Medical Association (WMA).

39 patients aged from 18 to 50 were examined and treated during the research. They received their medical aid at the Department of Maxillofacial Surgery at Chernivtsi Regional Clinical Hospital in the period from 2022 to 2024.

The patients were divided into two groups. The first group (main) included 18 individuals. In addition to the traditional method of treatment “Lysetox” composition was administered. The second (control) group consisting of 21 individuals got therapy based on a traditional approach in the treatment of alveolitis.

After conduction anesthesia, removal of the necrotized tissues from the socket of the tooth extracted, and antiseptic treatment “Lysetox” composition was introduced. Every day the composition was changed during dressings. Therapeutic effectiveness was assessed according to clinical signs and additional methods of examination.

Results and discussion. The analysis of clinical and laboratory indices concerning the effectiveness

of treatment found that administration of the “Lysetox” composition suggested promoted reliably quicker decrease of leukocytosis in the blood count, and lowered indices of general intoxication including average mass molecules and erythrocyte intoxication index.

The analysis of cytological and microbiological examinations of the wound conducted at the beginning of treatment and three days later demonstrated a significant decrease of alveoli infection with aerobic and facultative microflora of the oral cavity due to the effect of the composition suggested. It promoted more effective treatment of the inflammatory process in the socket of the extracted tooth, which was confirmed by clinical examinations.

Patients in the main group experienced a reduced pain the following day after treatment. During examination, inflammatory signs were not found, and the socket was filled with a clot containing “Lysetox” composition soaked with the tissue fluid. Starting from the fifth day, the clot was gradually replaced by granulations, and the onset of epithelialization process was determined on the fifth-sixth day (Fig. 2).

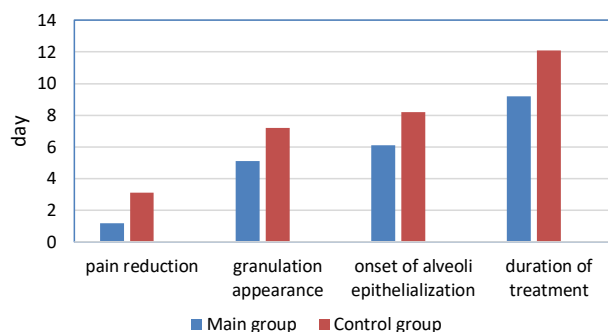


Fig. 2. Dynamics of the clinical indices among the patients from the groups of study

Patients from the control group experienced reduction of pain and inflammation on the third-fourth day only. Cleaning of the sockets occurred on the third-fourth day, first granulations appeared on the sixth-seventh day, and epithelialization process started on the eighth-ninth day.

Therefore, treatment of patients in the main group demonstrated on an average two-three days shorter duration of therapy compared to patients in the control group.

According to the data obtained, leukocyte level in the peripheral blood became normal in patients receiving treatment with “Lysetox” composition on the fifth day. In the control group, this process was later – on the seventh day only.

Conclusions. The results of the experimental and clinical trials are indicative of a high effectiveness of “Lysetox” composition in the treatment of alveolitis and purulent-inflammatory

complications of the maxillofacial area in the hydration phase. The medicine demonstrates detoxifying action, which is confirmed by quick regression of inflammatory symptoms and normal leukocyte level. Necrolytic effect of the drug

stipulated by protease contained in the composition promoted rapid wound cleaning from purulent-necrotic formations. The results of the research obtained justify the use of the "Lysetox" composition in the treatment of patients suffering from alveolitis.

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