

# GEORGIAN MEDICAL NEWS

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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии  
საქართველოს სამედიცინო სიახლენი

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## MODERN TREATMENT METHODS OF PHLEGMON IN THE MAXILLO-FACIAL AREA AND NECK

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The lymphatic system enters the human blood system and is actively involved in ensuring the immune response of the body. It duplicates the vasculature, consisting from lymphatic capillaries, blood vessels, and evenly distributed lymphoid tissue, which is a part of the structure of the lymph nodes and group lymphatic follicles of the small intestine (Peyer's patches) and others. According to the evidence of the world's lymphologists, the lymphatic system is the main organ of the human immune system, most of the lymphocytes are located in it [3,4,11]. The lymphatic system is involved in all pathological processes in the macroorganism [2,5,7] since the division and further adherence of bacteria and toxins occurs through the lymphatic vessels and lymph nodes and creates so-called accumulation of toxins, therefore the endolymphatic injection of antibacterial agents of immunocorrective is pathogenetically justified [1,9]. Antibacterial saturation by the lymphotropic way creates high concentrations of anti-inflammatory and other drugs on the path of movement of microorganisms and bacteroids, contributing to a rapid immune response and movement of antibacterial drugs to meet microorganisms.

One of the many distinguishing features of odontogenic infection is that the patient's body cannot cope on its own, without remedial measures, to stop the flow of microorganisms from the source of infection. And it means it is useless to hope on the self-healing and the complete elimination of the infectious focus. At best, the process is chronicized, a center of odontogenic infection is in a state of equilibrium with the patient's body [6,8,10].

Objective: to increase the effectiveness of treatment of phlegmon of the maxillofacial area and neck with the influence on pathogenic factors, complementing the main treatment plan with the injection of the second antibiotic in a regional lymphatic way.

**Material and methods.** All procedures carried out in the study with the participation of patients corresponded to the ethical standards of the institutional and national research committee, as well as the Helsinki Declaration (1975) and its revision, 1983. We have carried out the diagnostics and complex treatment of 100 patients with odontogenic phlegmons who were hospitalized in the department of maxillofacial surgery at the Department of Surgical and Therapeutic Dentistry of the State Establishment "Zaporizhzhya Medical Academy of Postgraduate Education of the Ministry of Health of Ukraine" in City Clinical Hospital for Emergency and Medical Care, Zaporizhzhya during 2016-2017. Patients were divided into 2 groups: 1 gr - 45 patients were treated with intramuscular injection of "ceftriaxone". 2 gr. - 55 patients whose treatment consisted of both the traditional method and the lymphatic injection of "Lincomycin" (antibiotic).

All patients got a complete examination upon admission to the hospital. Surgery was performed according to the generally accepted technique under the local or general anesthesia depending on the prevalence of the inflammatory process and it deals with a wide dissection and drainage of the purulent focus.

Patients received common antibacterial and anti-inflammatory therapy; the correction of water and electrolyte balance was carried out.



Fig. 1. Inflammatory process targeting

From the very first hospital stay, all hospitalized patients received antibacterial therapy, regardless of the location and extent of the infectious-inflammatory process. Choosing places for lymphotropic injection of antibacterial drugs, we proceeded from the regional principle on the basis of available literature data about the structure of the lymphatic system of the maxillofacial area, taking into account the anatomical and physiological principle of lymphatic drainage.

For directional exposure on the inflammatory process in the lower jaw body, as well as adjacent sublingual, submandibular, pterygomaxillary and chewing cellular tissue spaces, the antibacterial drug was injected strictly hypodermically 1 cm below and laterally to the mastoid of the temporal bone on the side of inflammation.

In the submental area, drugs were injected into submucosally in the area of the mandibular nerve exit from the lower jaw on both sides using the subperiosteal anesthesia method. We have injected lymphotropic antibacterial drugs intracutaneously in the nasolabial fold on the side of inflammation to influence on the infectious inflammatory process in the upper jaw, upper lip, infraorbital, zygomatic, cheek areas.

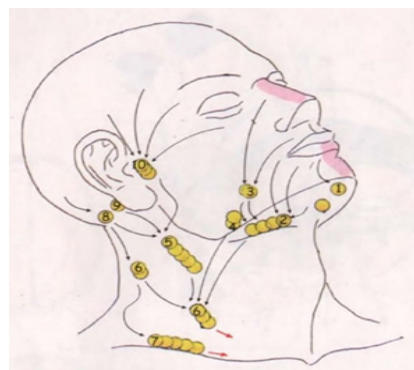


Fig. 2. The location of the lymph nodes of the maxillofacial region

With the spread of the inflammatory process in the parotid-masticatory area or the parenchyma of the parotid salivary gland, the

Table 1. The distribution of patients with phlegmons of the maxillofacial area and neck depending on the age and sex corresponds

Sex	Age (years)				Total
	15-20	21-40	41-60	61 and older	
Men	6	43	9	2	60
Women	7	22	10	1	40

Table 2. Indicators of the general blood test, which were taken upon admission to the hospital, convincingly show the development of inflammatory processes in patients

Location area	Number
Chin	4
Submandibular	35
Mandibular	2
Cheekbone	2
Wing maxillary	12
Parotid-chewing	10
Pharyngeal	15
Infraorbital	5
Neck	4
Floor of the mouth	10
TOTAL	100

lymphotropic antibiotic drugs were injected intracutaneously under the base of the ear tragus. It is possible to do the simultaneous injection of an antibacterial drug from several points based on the severity of inflammatory process (Fig. 2). The course of lymphotropic antibiotic therapy lasted 5-7-10 days.

For the treatment of patients with phlegmon of the maxillofacial area and neck, regionarny antibacterial lymphotropic therapy was used as an additional way of injecting drugs to the basic principle of treatment. Ceftriaxone, an antibiotic of the 3rd generation of cephalosporins group, was chosen as the main antibacterial drug. In addition, Lincomycin 30%, an antimicrobial medicine of the lincosamide group, was injected lymphotropically as a second antibacterial drug.

The distribution of patients was carried out taking into account sex and age, as it is shown Table 1. The most common hospital patients - are people of working age, from 20 to 40 years (90.9%). All 100 patients included in the comparison group of the etiological factor of the purulent-inflammatory process of the maxillofacial area the teeth were affected by complicated caries.

In particular, from the topographic classification of phlegmon of the maxillofacial area, a purulent-inflammatory process can spread to one, two and more areas. The distribution of inflammatory process by anatomical cellular spaces corresponds to the Table 2.

According to the Table 2, purulent-inflammatory diseases of the maxillofacial area are often localized in the submandibular, parotid-chewing and pharyngeal areas and the floor of the mouth. In 63 patients, the spread of acute purulent-inflammatory process was observed in two or more anatomical cellular spaces.

At the time of hospitalization of various indicators of white blood hemogram any comparison was not observed between the groups. In 86 (86%) patients, red blood cells did not exceed normal values and only in 14 (14%) patients their value

was  $4 \times 10^{12}/l$ . Hemoglobin in 24 (24%) patients was less than 120 g/l, while the remaining 76 (76%) patients were within the normal range. Changes in leukogram values were different. In 35 (35%) patients, the number of leukocytes was within the normal range, in 7 (7%) patients leukopenia was observed less than  $4 \times 10^9/l$  and only in 58 (58%) patients leukocytosis more than  $11 \times 10^9/l$  was observed according to the analysis. An increase in the number of rod neutrophils to 7-8%, and segmented neutrophils accounted for up to 70%, also was noticed only in 45 (45.5%) patients. At the same time, there was a decrease as for lymphocyte content in all patients: severe lymphopenia (5-15%) in 41 (40.5%) patients, in 14 (14.1%) patients a decrease in their number (to 20-30%) was noticed. In 20 (20.3%) patients, the number of lymphocytes did not pass their lower limit of the rate (from 15 to 20%), and only in 25 (25%) patients the level of lymphocytes was within the physiological limits. A decrease in the number of lymphocytes with a low number of leukocytes proves that this is one of the signs of the torpid course of the disease. Hematological parameters among practically healthy individuals and patients of the 1st and 2nd groups with phlegmon during hospitalization correspond to Table 3.

Thus, 40.5% of hematological signs of impaired immune response took place. It indicates on the development of inflammation which is not favorable for a quick recovery of the patient. The evidence of low clinical activity of the inflammatory process were indicators of ESR, which did not rise 20 mm/hour in 33 (33.5%) patients, in 45 (53.2%) patients their values were in the range of 20-40 mm/hour, and only in 22 (22.2%) patients the indicators were higher than 40 mm / hour of the physiological norm.

**Results and their discussion.** As a result, it was found that among 17.3% of patients with odontogenic phlegmons of the maxillofacial area a torpid stage of the disease with blurred clinical signs was observed.

Table 3. Hematological parameters among practically healthy individuals and patients of the 1st and 2nd groups with phlegmon during hospitalization

Index	Healthy faces (n=20)	I group (n=45)	II group (n=55)
Red blood cells, (10 <sup>12</sup> /l)	4,64±0,06	4,31±0,08*	4,27±0,08*
Hemoglobin, (g/l)	141,0±1,7	132,6±2,8*	134,7±2,1*
Color indicator, (c.u.)	0,91±0,01	0,89±0,01	0,89± 0,01
White blood cells, (10 <sup>9</sup> )	5,88±0,14	11,02±0,4*	12,48±0,4*
Rod neutrophils, (%)	3,05±0,29	8,53 0,74*	9,69±0,61*
Segmented neutrophils, (%)	61,18±0,74	64,48±1,65*	66,09±1,44*
Lymphocytes, (%)	28,09±0,6	18,82±1,4*	16,72±1,2*
Monocytes, (%)	5,45±0,38	6,04±0,4	5,03±0,2
Erythrocyte sedimentation rate mm/h	6,0±0,6	29,2±1,7*	28,2±1,5*

\* – significant differences from the group of healthy individuals ( $p < 0.05$ )

Table 4. Comparative characteristics of clinical indicators in patients with phlegmon of the maxillofacial area and neck

Indicators	I group (n=45)	II group (n=55)
General improvement, (day)	4,7±0,6	2,4±0,7
Pain Relief, (day)	3,2±0,4	2,5±0,8
Reduction of purulent discharge, (da)	6,2±0,7	3,4±0,6*
Appearance of granulations, (day)	8,5±0,9	4,2±0,5*
Wound cleansing, (day)	11,2±0,8	6,2±0,7*
Bed day (day)	15,7±1,2	9,5±0,6*

\* - statistically significant differences from the control group ( $p < 0.05$ )

In 58 (58.3%) patients, accompanying somatic diseases, such as chronic diseases of the digestive system and the bronchopulmonary system, as well, were presented.

Before hospitalization, 57 (57%) patients did not seek any medical help from a doctor, they did self-medicated, used antibacterial drugs without a doctor's prescription. 43 (43%) patients were at the outpatient appointment with a dental surgeon before referral to hospital. They were carried out anti-inflammatory therapy with antibiotics, sulfonamides, analgesics, UHF, compresses. Many patients took these drugs in full dosages and in an incomplete course. The course of the inflammatory process from the first clinical symptoms to hospitalization in the majority of patients (87%) was more than 3 days. In these patients, lymphotropic therapy accelerated the result of the inflammatory process and led to the recovery of the body in shorter periods. The results of the observation showed a positive dynamic as for the treatment of patients of the second group with regionarny injection of lincomycin in addition to the main method of treatment; their length of stay in the hospital decreased, compared with patients of the first group.

On the 4th day, there was noticed a positive dynamic in the results of blood tests (an increase in the number of red blood cells, a decrease of the ESR indicator, a decrease in the number of leukocytes, etc.), a decrease in symptoms of general intoxication of the body and a decrease in local signs of inflammation. The wound was cleansed and granulations appeared in it three days earlier. Normalization of body temperature in patients of the second group took place 3-4 days earlier, in patients of 1<sup>st</sup> group, a decrease in body temperature was

accompanied by its periodic rises. In the second group of patients simultaneously with the normalization of body temperature, the general condition improved, sleep and appetite returned to normal. In group 1, the same indicators appeared later for 2-4 days. It was also established that with the regionarny injection of the antibiotic Lincomycin, its concentration in the exudation lasted up to 24 hours, and was higher than with the traditional method of antibacterial drug injection.

With the injection of the drug by the regionarny method, it penetrates into the blood from the lymphatic system. Associated it with the fact that the movement of the lymph through the vessels is not large and amounts to 0.4-0.5 m/s, the antibacterial drug entering the blood from the lymphatic system periodically, in small doses, keeps a positive concentration of the antibiotic in the lymphatic system and stay longer in blood. This explains the preservation of a high concentration of the antibiotic in soft tissues in the area of the inflammatory process in comparison with the similar injection by the intramuscular method.

The maximum concentration of Linkomicin in the blood after endolyphatic injection is slightly lower than the concentration of the drug injected intramuscularly. However, if we consider that the maximum intramuscularly injected ceftriaxone concentration occurs on the 2<sup>nd</sup> hour after application and quickly decreases (by 93 % by 12 hours), while the maximum amount of Linkomicin injected endolyphatically is found in the blood 4 hours later and decreases on the 12<sup>th</sup> hour, it is only 79.5 %. A day later, regardless of the presence of pathways, lincomycin is not detected in the blood.



Using this method of injection of antibacterial drugs, three types of complications were identified: the formation of infiltrates, skin necrosis, allergic reactions.

The data obtained by us testified about significant changes in the immune status of (17.3%) patients with phlegmon of maxillofacial and neck. In the process of traditional antibacterial therapy in the first group, stabilization of the general condition in 40 (88%) patients was noticed on 4th-5th days after surgery, in 5 (12%) patients - on 4th-5th days after the wound repair and elimination of streaks in hidden checkered spaces. Reducing of the pain occurred on the 5th day. Observing the mild inflammatory reaction and the treatment, there was no evidence as for a restriction of the process in patients of the first group. In 17 (37.7%) patients, the decrease in suppuration occurred on 6th - 7th day, scanty, sluggish granulations were formed in the wound on 8th-9th day. The average number of days in the hospital for patients of the first group was  $13.21 \pm 1.3$  days.

In 5 (12 %) patients, recovery took a longer time, since several interfascial spaces and anatomical areas were involved Table 4. Serious-purulent discharge was maintained on the background of the already formed granulation tissue; up to 6th-7th day soft tissue infiltration along the periphery of the wound did not diverge until 8-9th day. A decrease in the number of suppuration in 4 (8.8%) patients was observed on the 8th day, fine-grained granulations appeared on the 9th day, a complete cleansing of the wound and the convergence of the edges were noted on the 13th day. The average hospital stay of these patients was  $15.34 \pm 1.1$  days, since these patients had an accompanying diagnosis of diabetes. The dynamics of clinical signs in patients of the first group was more marked.

Improvement of the clinical picture and stabilization of the general condition in 53 (96.4 %) patients of the second group was on the third day after surgery, in 43 (95.6 %) patients of the first group - on 5th-6th day, the intensity of the pain syndrome decreased on average on 4th-5th day. In 48 (87.3 %) patients of the second group suppuration was already absent on 2nd-3rd day, the formation of granulations - on 3rd-5th day, and complete cleansing and drawing closer of the wound edges - on 6th-8th day. In 4 patients of the first and second groups, the healing time of the post-operative wound was longer: the cessation of suppuration was noticed by 6th-7th day, the appearance of granulations - by 7th-8th day, complete cleansing and boundary wound closeness - by 10th-12th day.

**Conclusions.** 1. Regionary lymphatic injection of the antibiotic in the treatment of phlegmon of the maxillofacial area and neck leads to an accelerated appearance of the second phase of the wound process, more rapid detoxification of the body, reducing the number of complications in patients and the prevalence of the marked positive dynamics in the lymphogram.

2. Studies have shown that a low-molecular antibiotic, regionary injected into the lymphatic system, accumulates at higher concentrations in various organs and tissues compared to the main broad-spectrum antibacterial drug when injected intramuscularly.

3. When comparing the results of treatment of patients with localized forms of purulent-inflammatory diseases of the maxillofacial area and neck, the groups showed a reduction in the course of the disease and the patient's recovery at least twice.

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## SUMMARY

### MODERN TREATMENT METHODS OF PHLEGMON IN THE MAXILLO-FACIAL AREA AND NECK

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Objective of the investigation - to increase the effectiveness of treatment of phlegmon of the maxillo-facial area and neck with the influence onto the pathogenic factors, complementing the main treatment plan with the injection of a second antibiotic in a regionary lymphatic way.

100 patients with acute inflammatory odontogenic diseases of the maxillofacial area were examined. Patients received both traditional medical treatment and regional lymphotropic antibiotic therapy added to the main method of treatment as well.

Regional lymphotropic antibiotic injection in the treatment of phlegmon of the maxillofacial area and neck leads to an accelerated onset of the second phase of the development of the wound process, more rapid detoxification of the body. Key

words: acute inflammatory odontogenic diseases, maxillofacial area, lymphatic system.

**Keywords:** phlegmon of the maxillofacial area and neck, lymphatic system.

## РЕЗЮМЕ

### СОВРЕМЕННЫЕ МЕТОДЫ ЛЕЧЕНИЯ ФЛЕГМОН ЧЕЛЮСТНО-ЛИЦЕВОЙ ОБЛАСТИ И ШЕИ

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Лимфатическая система – входит в единую кровеностную систему человека и активно участвует в обеспечении иммунного ответа организма.

Цель исследования - повысить эффективность лечения флегмон челюстно-лицевой области и шеи влиянием на патогенические факторы, дополняя основной план лечения введением второго антибиотика регионарным лимфатическим путем.

Обследовано 100 пациентов с острыми воспалительными

одонтогенными заболеваниями челюстно-лицевой области. Больные получали как традиционное медикаментозное лечение, так и к основному методу лечения включали регионарную лимфотропно антибактериальную терапию. Заключение. Регионарное лимфатропное введение антибиотика при лечении флегмон челюстно-лицевой области и шеи приводит к ускоренному наступлению второй фазы развития раневого процесса, более быстрой дезинтоксикации организма.

## რეზიუმე

ყბა-სახის და კისრის მიდამოების ფლეგმონების მკურნალობის თანამედროვე მეთოდები

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კვლევის მიზანს წარმოადგენდა ყბა-სახის და კისრის მიდამოების ფლეგმონების მკურნალობის ეფექტურობის გაზრდა პათოგენურ ფაქტორებზე ზემოქმედებით, მკურნალობის ძირითად სქემაში რეგიონული ლიმფური გზით მეორე ანტიბიოტიკის დამატებითი შემოყვანით.

გამოკვლეულია 100 პაციენტი ყბა-სახის მიდამო მწვავე ანთებითი ოდონტოგენური დაავადებით. ავადმყოფები

ტრადიციულ მედიკამენტურ მკურნალობასთან ერთად დამატებითად დებულობდნენ რეგიონულ ლიმფურ ანტიბიოტიკულ თერაპიას. ანტიბიოტიკის რეგიონული ლიმფოტროპული გზით შეყვანა ყბა-სახის და კისრის მიდამოებში ფლეგმონების მკურნალობის დროს იწვევს ჭრილობითი პროცესის მეორე ფაზის განვითარებას და უზრუნველყოფს ორგანიზმის სწრაფ დეტოქსიკაციას.