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# Treatment of Phlegmon of the Maxillofacial Area by Activation of Nonspecific Immune Factors Using a Bacteriophage

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**Abstract:** The use of complex treatment, which included Bacteriophage, had an anti-inflammatory, immunomodulatory, and therapeutic effect. The bacteriophage effectively eliminated disturbances in the system of nonspecific immunological resistance, it also had a regenerative and reparative effect in patients with diffuse odontogenic phlegmon of the maxilla fasial area. The patients were divided into 2 groups. The results of the two treatments are compared. Traditional treatment did not lead to positive dynamics of the main parameters of nonspecific immunological protection in patients with diffuse odontogenic phlegmon of the maxilla facial area.

**Keywords:** odontogenic phlegmon, nonspecific resistance, maxillofacial area, reparative process.

## Relevance

The literature reports on the use of Bacteriophage in various pathologies in adults and children, however, the effect of the drug in the treatment of patients with odontogenic phlegmon of the maxillary fossa and in the prevention of their complications has not yet been studied. [1,2]

Prevention and treatment of odontogenic inflammatory diseases of the maxillofacial region (MFA) are one of the main problems of surgical dentistry of the present. In recent years, there has been a trend towards an increase in the number of patients with odontogenic phlegmons of the maxillofacial region, their spread to several neighboring anatomical regions, an increase in the frequency of atypical forms, a high percentage of complications and deaths [3]. In this regard, there is a constant search for ways to improve the effectiveness of treatment of patients with odontogenic phlegmons of the maxillofacial region, new technologies for the medical treatment of this nosology are being developed and introduced into practice.[4]

It has been established that in patients with odontogenic phlegmons of the maxillofacial area, especially when they spread and develop complications, there is suppression of immunity, mainly of the T-cell pool. [5,6,7].

In this regard, the inclusion of drugs with an immunomodulatory effect in the complex of therapeutic measures is quite justified [8,9].

In this regard, the purpose of this study was to study the effect of Bacteriophage as part of complex treatment on nonspecific immune reactivity in patients with odontogenic phlegmon of the maxillofacial area. [10].

## Materials and methods of research

We examined 60 patients with odontogenic phlegmon of the maxillofacial area, who were treated in the Department of Maxillofacial Surgery of the Bukhara Regional Multidisciplinary Medical Center at the age of 17-62 years. Of these, 33 were with phlegmon of two regions, 27 - with phlegmon of three regions. The control group for comparison consisted of 21 practically healthy people of identical age, who ranged from 17 to 62 years.

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All patients were hospitalized for emergency reasons. For the diagnosis of odontogenic phlegmons of the maxillofacial area and the choice of the optimal method of treatment, all patients underwent clinical (history, complaints, external examination of the maxillofacial region and oral cavity), neurological, radiological, laboratory methods of research.

Depending on the treatment performed, all patients were divided into 2 groups:

Group I - 22 patients with odontogenic phlegmon of the maxillofacial area, who underwent traditional (drug) treatment;

Group II - 38 patients with odontogenic hlegmons of the maxillofacial area, in which, against the background of traditional treatment, oral administration of the Bacteriophage preparation was additionally prescribed (20 ml 3 times a day for 7 days).

In the treatment of patients with odontogenicphlegmons of the maxillofacial area, we used traditional drug therapy, which included antibiotics, sulfanilamide drugs, the introduction of desensitizing drugs, analgesics.

To study the indicators of nonspecific resistance, we took blood from the cubital vein of patients in a volume of 10 ml, stabilized with a 3.8% sodium citrate solution, then centrifuged at 8000 rpm for 10 minutes. Complement components C3 and ceruloplasmin were studied by immunochemical method on the analyzer "CofasEmira" company "ROSH" (Switzerland). The data obtained were expressed in IU/ml and mg/dl. The reagent kits used in the work were kindly provided by ROSH (Switzerland).

For the study of circulating immune complexes (CIC), a 7.0% solution of polyethylene glycol - 5000 was used. The results were expressed in arbitrary units (Haskova et. al., 1978).

The level of medium-molecular peptides (SPM) in the blood was determined by the method of Gabrielyan A.I., and the values were expressed in arbitrary units.

The obtained digital indicators were subjected to statistical processing using an application package.

**Research results and discussion**

As a result of the traditional treatment (Table 2), it was shown that the level of SMP both before and after treatment significantly exceeded the background level of the control group by more than 2 times. The content of SMP decreased at the end of treatment ($p<0.05$). High levels of SMP indicated an unfavorable development of the pathological process, since they are toxic and thereby reduce local resistance in the body of patients with diffuse odontogenicphlegmon of the maxillofacial area.

It should be emphasized that the system of complement components, in particular C3, plays an important role in the formation of a complex mechanism of non-specific immunological defense of the body against an infectious agent. In patients, inhibition of this parameter from 0.5 to 0.6 times was noted, which, apparently, was due to their “enhanced consumption” of the CEC against the background of a purulent-inflammatory process. The level of the CECon average increased by more than 2 times and did not tend to decrease in the process of traditional treatment.

Low values of C3complement, which is responsible for CEC immune adhesion and chemotaxis, promotes exocytosis of neutrophil granules and secretion of lysosomal hydrolases. The latter probably causes an increase in the content of the CEC and the synthesis of the parameter of the acute phase of inflammation - ceruloplasmin.

Tissue alteration with cell breakdown during inflammation leads to an increase in ceruloplasmin, which enhances the activation of the lysosomal complex of neutrophils. Under the influence of the CEC, the level of which increased by 2 times in patients with odontogenic phlegmon of the maxillofacial area, lysosomal enzymes are released from neutrophils. At the same time, the CEC is also able to activate mediator cells, inducing an acute inflammatory process, which is characterized by a sharp increase in vascular permeability, neutrophil infiltration, damage to the vascular wall up to its fibrinoid necrosis, fibrin prolapse and, as a result, the formation of a thrombus.[5]

Numerous studies conducted over the past decades have clearly shown that the clinical course of an

inflammatory disease and the state of reparative processes are significantly influenced by such mechanisms of regulation of immune responses as the function of immune-competent cells, the production of cytokines, the level of production of pathogenic immune complexes and adhesive molecules. All of these immune effects are successfully controlled by Bacteriophage.

In view of the above, we studied the effect of Bacteriophage in the dynamics of treatment in patients with diffuse odontogenicphlegmon of the maxillofacial area. The data are presented in table 3.

The results obtained testified to the undeniable advantage of using the Bacteriophage preparation as a method that positively affects both the dynamics of the main indicators in patients with diffuse odontogenicphlegmon, and a factor that inhibits the inflammatory process and at the same time accelerates reparative and rehabilitation processes. Comprehensive treatment with the use of Bacteriophage allowed to significantly reduce the concentration of MMP (by 2 times), and the level of the CEC - by 2.3 times. We observed the stabilization of these parameters at the end of treatment. When analyzing the level of C3complement, one can note its steady increase in the dynamics of treatment and the achievement of its maximum value by the end of treatment - 101.6 + 5.62 mg/dl ($p<0.05$).

A low level of PhAN is an important criterion indicating a favorable course of the purulent-inflammatory process in patients with diffuse odontogenicphlegmon, as there is a decrease in necrotic cells in the blood and, in parallel, a decrease in the concentration of ceruloplasmin by 64%.

**Conclusion**

Thus, in patients with diffuse odontogenic phlegmon, there was a deep violation of the nonspecific resistance of the organism. Traditional methods of treatment did not lead to positive dynamics of the main indicators of nonspecific immunological protection in patients with diffuse odontogenic phlegmon. The use of complex therapy with the additional inclusion of Bacteriophage in its composition was highly effective, as it contributed to the normalization of the main indicators of nonspecific resistance, enhanced regenerative and repair processes, and had an immunomodulatory and therapeutic effect in patients with diffuse odontogenic phlegmon of the maxillofacial area.

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