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GENERAL CHARACTERISTICS OF ODONTOGENIC PURULENT-INFLAMMATORY DISEASES OF THE MAXILLOFACIAL REGION

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Abstract: Currently, standards have been developed and put into practice for the treatment of patients with purulent-inflammatory diseases of the throat and neck, including adequate surgical autopsy and drainage of the purulent focus, antibacterial, detoxifying, anti-inflammatory therapy, correction of homeostasis systems. Despite this, the number of patients with this type of pathology does not tend to decrease. About half of the patients undergoing inpatient treatment in the departments of maxillofacial surgery, and 10-20% seeking outpatient care in the offices of dental clinics are patients with inflammatory diseases of the face and neck.

Key words: purulent-inflammatory diseases, odontogenic infection, maxillofacial region, immune system, antibiotic resistance of microorganisms, antibacterial drugs.

It is safe to say that the issue of pathogenetic processes occurring in a purulent wound and their treatment belongs to one of the old branches of medicine and has its own centuries-old history. There are a huge number of different methods and methods of influencing a purulent wound, but, unfortunately, none of them fully satisfies modern surgeons. Every year, new techniques for the management of purulent wounds appear, both in the maxillofacial region and in other anatomical areas [1, 4, 18, 20].

More and more authors are inclined to the fact that routine methods of treating purulent processes both in maxillofacial region and other anatomical areas are losing their effectiveness. This is due to the increased antibiotic resistance of microorganisms, their virulence and variability [9, 14, 17, 21, 24].

Purulent-inflammatory maxillofacial region have their own characteristic differences from purulent-inflammatory processes of other anatomical areas. According to the literature, in 80-95% of cases, the infection has an odontogenic etiology. The spread occurs from apical foci in the presence of an exacerbation of chronic periodontitis, pericoronitis, alveolitis, suppurated radicular cysts in the patient.

Along with the above sources, the causes of inflammation may be diseases of the oral mucosa, nose, maxillary sinuses, as well as the skin of the face, neck, and in rare cases, conjunctiva of the eye. Do not forget that the throat and neck are complex zones in anatomical and topographic terms, this is due to the proximity of such vital organs as the trachea, esophagus, thyroid gland, neurovascular bundles, and there are also immunobiological features of the injury zone: branching of the lymphatic apparatus, proximity of the brain, the presence of cellular spaces. The dissemination of microorganisms during the localization of an inflammatory focus in the face and neck is due to the fact that the veins of the face and neck do not have valves and form numerous anastomoses with intracranial vessels. Thus, a violation of the natural outflow of blood from the inflammatory focus, due to compression of the diverting vessels, leads to the fact that toxins through anastomoses enter directly into the brain, bypassing the hepatic barrier [2, 13].

According to the literature, the causative agents of odontogenic inflammatory processes of the throat and neck are usually microorganisms that are part of the microflora of the oral cavity: streptococci, staphylococci, diplococci, enterococci, gram-positive and gram-negative rods.

Oral infection is divided into the following types depending on the anatomical localization [1]:

• odontogenic, associated with damage to tooth tissues (caries, pulpitis);

• periodontal, including periodontal (periodontitis) and gums (gingivitis, pericoronitis), surrounding soft and bone tissues.

The main causative agents of odontogenic infections are microorganisms that are constantly present in the oral cavity: mainly green streptococci (Streptococcus mutans, Streptococcus milleri), non-spore-forming anaerobes (Peptostreptococcus spp., Fusobacterium spp., Actinomyces spp.).

In periodontal infection, five main pathogens are most often isolated: Porphyromonasgingivalis, Prevotellaintermedia, Eikenellacorrodens, Fusobacteriumnucleatum, Aggregatibacteractinomycetemcomitans, less often – Capnocytophaga spp. [20, 21]. Depending on the localization and severity of the infection, the patient's age and concomitant pathology, changes in the microbial spectrum of pathogens are possible.

Thus, severe purulent lesions are associated with facultative gram-negative flora (Enterobacteriaceae spp.) and Staphylococcus Aureus. Enterobacteriaceae spp also predominate in patients with diabetes mellitus, the elderly and patients hospitalized in the hospital. [22].

Studies by Yu.V. Alekseeva (2005) demonstrated that Staphylococcus spp. (15%), Streptococcus spp. (6%) and obligate anaerobic bacteria (79%) are isolated in odontogenic inflammatory diseases. Anaerobes are represented by gram–positive microorganisms - Bacteroides spp., Fusobacterium spp., gram-positive cocci. Resident flora is sown in 86%, pathogenic strains in 7%.

In the studies of L. Chavez de Paz, G. Svensater, G. Dalen, G. Bergenholtz (2004), it was revealed that Streptococcus gordonii, Streptococcus anginosus,

Streptococcusoralis, as well as Enterococcusspp., Lactobacillusparacasei were most often isolated from the root canals of teeth with chronic destructive periodontitis.

The development of odontogenic periostitis and osteomyelitis in 50% of cases is caused by S. aureus and Streptococcus spp., but, as a rule, anaerobic flora prevails: Peptococcus niger, Peptostreptococcus spp., Bacteroides spp. [25].

In neodontogenic osteomyelitis, the key pathogens are methicillin-sensitive staphylococci - 52%, coagulase-negative staphylococci - 14%, methicillin-resistant staphylococci - 2% and Pseudomonas aeruginosa (4.4%) [2]. Traumatic osteomyelitis is more often caused by the presence of S. aureus, as well as Enterobacteriacea Spp., P. aeruginosa [6].

The causative agents of odontogenic maxillary sinusitis are non–spore-forming anaerobes - Peptostreptococcusspp., Bacteroidesspp., as well as Haemophilusinfluenzae, Streptococcusintermedius, Streptococcuspneumoniae, Moraxellacatarrhalis, Streptococcus pyogenes. The isolation of S. aureus from the sinus is characteristic of nosocomial sinusitis [8].

Purulent odontogenic infection of the soft tissues of the face and neck is associated with the release of polymicrobial flora: Streptococcus spp., Staphylococcus spp., Peptostreptococcusspp., Bacteroidesspp., F. nucleatum, Enterobacteriaceaespp., Veillonellaspp., Eikenellaspp. The causative agents of abscesses and phlegmon of non-ontogenic origin, more often caused by skin damage, are S. aureus, S. pyogenes. In 50.9% of patients with phlegmon of the face and neck, anaerobic bacteria Peptostreptococcus spp., Bacteroides spp., Veillonellaspp.; Staphylococcusspp are isolated. - in 23.7% of observations, Streptococcusspp. - in 18.6% [5].

With putrefactive necrotic phlegmon of the face and neck, polymicrobial flora is isolated, including F. nucleatum, Bacteroidesspp., Peptostreptococcusspp., Streptococcusspp., Actinomycesspp. In addition to the above-mentioned microorganisms, gram-negative bacteria and S. aureus are often isolated in patients with severe course [25]. An important role in patients with diabetes mellitus is played by Klebsiella spp., Enterococcusspp., S. aureus, P. aeruginosa, and the presence of P. aeruginosa is accompanied by the most unfavorable prognosis [9, 10].

With the development of lymphadenitis of the face and neck, beta-hemolytic streptococcus of group A and S. aureus are isolated in 70-80%. Anaerobic pathogens, such as Bacteroides spp., Peptostreptococcus spp., Peptococcus spp., F. nucleatum, Propionibacteriumacnes, can cause the development of odontogenic lymphadenitis [22].

Before the introduction of antibacterial drugs into clinical practice, the main causative agents of purulent wounds were streptococci, which were presented both in the form of monocultures and in associations with staphylococcus and proteus. With the advent of antibiotics, staphylococcal flora has become the leading one, entering into associations with conditionally pathogenic microorganisms, which plays a major role in the development of antibiotic resistance. The greatest danger is the presence of anaerobes in the purulent wound of the maxillofacial region; their presence significantly worsens the course of inflammatory processes. Based on the literature

data, it is safe to say that in 90% of cases, when studying the microflora of odontogenic phlegmon, non-spore-forming anaerobes are determined, which often form associations with aerobic bacteria. The most dangerous are non-spore-forming gram-negative microorganisms, their detection in the wound increases the risk of infectious and toxic shock and multiple organ failure [3, 10, 11, 17].

The development of a prolonged and chronic course of purulent-inflammatory diseases mainly depends on such factors of the immune system as the phenomenon of delayed hypersensitivity and autoimmune reactions. A low phagocytic number is combined with a reduced total percentage of the final stages of phagocytosis, which indicates the depletion of reserve oxygen-dependent mechanisms of bactericidal activity of neutrophil granulocytes at the beginning of the odontogenic purulent-inflammatory process, insufficient killing and antigen cleavage. Inflammation acquires a long, sluggish chronic course if the antigen is not completely removed or the immune system does not recognize its own proteins, as well as when the secretion of anti-inflammatory cytokines is impaired. In this case, inflammation tends to spread and cause massive tissue damage, which aggravates the severity of clinical manifestations and contributes to the development of more severe complications [11,13].

An imbalance of immunoglobulins leads to a decrease in the effectiveness of antimicrobial protection, as a result of which the susceptibility to infections increases with age. The course of any inflammatory process, in addition to immune mechanisms, determines the state of hematopoiesis, expression of molecules, their adhesion, synthesis of chemokines, the ability of cells to pass through the vascular wall and accumulate in the focus of acute inflammation. The trigger point for the chain of events in the focus of acute inflammation is an increase in the level of proinflammatory cytokines, which is determined by the functional activity of inflammatory effector cells (granulocytes, monocytes, lymphocytes) [1, 4,14].

That is why the search for modern effective methods of local treatment of purulent wounds of the throat and neck is relevant, justified and necessary.

The effectiveness of treatment of patients with purulent-inflammatory diseases is largely determined by early diagnosis, which presents significant difficulties, as evidenced by a high percentage of diagnostic errors (30-50%).

The medicinal effect on the wound includes the use of physical, chemical and biochemical antiseptics or a combination thereof [2, 7, 12]. The most widespread in clinical practice is the management of purulent wounds under a bandage using antiseptic and antibacterial agents in the form of ointments, powders and solutions. It is worth remembering that the antiseptic properties of such drugs are rapidly decreasing as a result of the drying of the dressing and dilution of the drugs with wound separable. The drug loses its activity due to contact with the wound discharge and the active substances cannot penetrate to the full depth of the infiltrate. This, of course, does not meet the requirements for the management of purulent wounds, both in the hospital and outpatient [9, 17, 19, 21].

Proteolytic enzymes have been widely used in the treatment of such wounds, due to their necrolytic and decongestant action. Thus, enzymes deprive

microorganisms of a substrate for nutrition and reproduction, which makes them more sensitive to antibacterial effects. The disadvantage of enzymes is the short duration of their action, they quickly split and lose their activity within 15-30 minutes. It is worth noting that all drugs that have a local effect on purulent wounds are unidirectional - either they have an osmotic effect, or antibacterial, or necrolytic [1, 13, 17].

Over the past 10 years, medical ozone has become widespread in the treatment of purulent wounds. However, its effect in the wound is short-lived, inactivation occurs within 20-30 minutes [2, 23].

Among the physical factors that have a positive effect on the course of the wound process are electrical impulses. Electric current improves blood supply to the wound, improves regeneration processes, has an anti-inflammatory effect, reduces antibiotic resistance of microflora. A contraindication to the use of electrical impulses is a tumor process in the body [15, 16].

In general surgery, contact ultrasound treatment of purulent wounds through an intermediate solution is widely used. Ultrasound promotes the resorption of infiltrates, stimulates an increase in the level of nonspecific protection, improves microcirculation, and has a positive effect on the formation of a postoperative scar [1, 3].

Thus, despite the many proposed approaches to the treatment of maxillofacial region of the throat and neck, none of them is universal and has its drawbacks. These were the prerequisites that determined the direction for this study.

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