



MICROBIOLOGICAL LANDSCAPE IN PATIENTS WITH OSTEONECROSIS OF THE JAW BONES COMPLICATED WITH COVID-19

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Abstract

The article is devoted to the clinical symptoms of inflammatory-destructive lesions of the bones of the facial skeleton as a distant complication of the transferred COVID-19. The most common symptom of coronavirus infection is thrombosis. Many scientists have noted that the main target for COVID-19 is the lungs with pneumonia of varying severity. Clinically, patients with COVID-19 were recorded as obvious thrombotic complications with the identification of large blood clots.

Keywords: COVID-19, osteonecrosis, microflora, antibiotic therapy, opportunistic oral microorganisms, thrombosis.

Relevance

Osteonecrosis of the jaw is understood as the syndrome of destruction of the jawbone, that is, the actual death of bone tissue. This disease is quite rare, but is accompanied by very serious consequences. Osteonecrosis of the jaw, or aseptic necrosis as it is also called, causes significant disturbances in the blood supply to the bone, which as a result can lead to its significant weakening and damage, as well as to tooth loss. The problem of studying osteonecrosis of the jaws is associated with an increase in the number of cases of their occurrence, as well as a high frequency of complications and relapses of COVID-19 disease [3.11.12].

Effective methods of treatment have not yet been developed, a higher prognosis of cure is available only in the initial stages of the disease.

An erroneous diagnosis of "odontogenic osteomyelitis" in such cases often leads to the choice of the wrong treatment tactics, causing severe complications of the disease [4,9]. The reasons for the formation of osteonecrosis, despite the development of modern medicine, are not fully understood. There are cases when the disease occurs due to non-healing of the jaw after an injury, when the bone is exposed. But there are



some so-called risk factors that can provoke or increase the likelihood of developing the disease.

These factors include: Numbness; high mobility and loosening of teeth; incurable inflammation of the gums; jaw abscess; exposure of the jawbone.

It should be noted that toxic (desomorphine) osteonecrosis of the jaw in drug addicted patients is the most severe, characterized by a high risk of developing septic conditions and death [1.7.10]. Numerous results of the study of the clinical picture [2.5.8] and radiodiagnosis [4.9] of toxic osteonecrosis indicate the presence of symptoms, both similar to those of odontogenic osteomyelitis, and different from it [6]. But there are still no reasonable criteria for the differential diagnosis of these nosologies.

The purpose of the study was to study the composition of the microflora and the susceptibility of them to antibacterial drugs in COVID-19 disease with complications of thrombosis of the jaws of the region.

Materials and Methods

In the Department of Maxillofacial Surgery of the TMA Clinical Hospital carried out diagnostics, treatment and follow-up of patients with COVID-19 and complications that occurred in the maxillofacial region. The patients were diagnosed at admission with chronic osteomyelitis of the upper jaw, chronic right-sided maxillary ethmoiditis, a defect in the mucous membrane of the hard palate, oroantral anastomosis, keratitis of the right eye.

In accordance with the established goal and objectives, an in-depth clinical and laboratory study was carried out in 70 patients of different sexes, aged from 21 to 45 years. The main group consisted of 25 people with osteonecrosis of the jaws, the comparison group included 25 patients with inflammatory diseases of the jaws of odontogenic etiology (chronic odontogenic osteomyelitis). The composition of the compared groups by age, gender and localization of the process had no significant differences. An assessment was made of 12 groups of facultative and obligate anaerobic microorganisms.

The assessment of the qualitative and quantitative composition of the oral microbiota in patients was carried out by bacteriological and bacterioscopic methods. To take the material, a sterile disposable probe was used - a swab made of plastic and viscose 15 cm long. The collected material was introduced into a test tube. The sampling was carried out on the first day of hospitalization before the appointment of antibiotic therapy in compliance with the rules of asepsis. In the acute phase of the inflammatory



process, samples of wound contents (purulent exudate collected from the wall of the wound channel) were used.

In the phase of the chronic process, swabs using physiological sodium chloride solution from areas of exposed necrotic bone tissue served as the material for the study. Test tubes with the test material were sent to the bacteriological laboratory for inoculation on nutrient media and determination of the susceptibility of the detected microorganisms to antibacterial drugs. In the bacteriological laboratory of TMA, the nutrient media for the received material were blood agar, egg yolk agar, Endo medium (agar, lactose, basic fuchsin) for cultivating bacteria, and Sabouraud medium for cultivating fungal microflora.

Further, using paper discs, microorganisms were studied for susceptibility to various antibiotics. These included both traditional and new drugs: penicillins (oxacillin, ampicillin, amoxicillin with clavulanic acid); cephalosporins (cefazolin, cefotaxime, ceftriaxone, ceftazidime, cefoperazone with sulbactam); aminoglycosides (gentamicin, amikacin); fluoroquinolones (ciprofloxacin, levofloxacin); macrolides (clarithromycin, erythromycin); carbapenems (imipenem, meropenem); lincosamides (lincomycin, clindomycin), as well as chloramphenicol and linezolid. In the case of growth of fungal microflora, a study was carried out for sensitivity to nystatin, fluconazole, amphotericin B, ketoconazole. The results of bacteriological examination were obtained 3-4 days after the start of inpatient treatment, after which the antibiotic therapy was adjusted.

Results

The indicators of the composition of the aerobic-anaerobic microbiota in patients with osteonecrosis of the jaws in the oral fluid and discharge from the fistula were determined. The indicators of the total bacterial mass (TBM) and all anaerobic microorganisms in the oral fluid of patients before treatment were 1-3 orders of magnitude higher than in healthy individuals. Differences were also revealed in bacteriological examination. In the group of patients with osteonecrosis, it revealed a more variegated composition and higher resistance of the microflora compared to the comparison group, which clearly depended on the phase of the inflammatory process (Table 1).



Table 1 - Relative distribution of identified microorganisms in study groups depending on the phase of the inflammatory process

Groups of microorganisms	Toxic osteonecrosis		Odontogenic osteomyelitis	
	Chronic	Acute	Chronic	Acute
Staphylococci	37%	15%	47%	39%
Streptococci	23%	53%	41%	47%
Enterococci	20%	-	6%	3%
Acinetobacter	13%	-	-	-
Bacilli	-	10%	6%	8%
Entrobacter	7%	5%	-	-
Candida	-	17%	-	3%

In the zone of jaw necrosis, these indicators were 2-4 orders of magnitude higher than in the oral fluid. The primary course of antibiotic therapy was carried out for 7 days. Cefazolin was more effective than lincomycin. 1 year after surgical treatment, the MBP and anaerobic microorganisms did not differ from those in healthy individuals.

Antibacterial therapy should be carried out both in the acute phase of the disease, and in the chr

onic stage. During the acute phase of the disease - antibacterial drugs of first-line - levofloxacin and gentamicin, in the chronic stage, a combination with antifungal drugs is indicated.

Conclusion Patients with osteonecrosis of the jaw revealed a high level of anaerobic pathogens in the microbiota of the oral cavity. A course of antibiotic therapy and surgical intervention are effective methods of treatment, as they lead to effective sanitation and allow further arthroplasty.

Based on the results of studying the bacteriological composition of the microflora in osteonecrosis and its susceptibility to antimicrobial drugs, the groups of antibacterial drugs that are most effective for use in the chronic stage of the disease and in the acute phase have been identified.

Conducted clinical observations indicate that the course of COVID-19 is characterized by late complications in the maxillofacial region in the form of damage to the vessels extending from the trunk a. maxillaris in the region of the pterygopalatine fossa. Trophic disturbance was slowly progressive and irreversible.



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