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## **TREATMENT OF CHRONIC PERIODONTITIS WITH ANTIBACTERIAL DRUGS**

**Resume:** Most studies of this pathology are devoted to the use of moxifloxacin, azithromycin, as well as a combination of amoxicillin and metronidazole.

In modern periodontology, there is significant interest in the problem of antibiotic therapy of various forms of periodontitis, various modes of taking antibacterial drugs are being studied.

The additional use of antibiotics leads to improved treatment outcomes for various forms of periodontitis.

**Key words:** periodontitis, periodontium, bacterial periodontal topopathogens, periodontal pathogenic microorganisms, antibacterial therapy.

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## **ЛЕЧЕНИЕ ХРОНИЧЕСКОГО ПАРОДОНТИТА С ПОМОЩЬЮ АНТИБАКТЕРИАЛЬНЫХ ПРЕПАРАТОВ**

### ***Резюме:***

Большинство исследований данной патологии посвящено использованию моксифлоксацина, азитромицина, а также комбинации амоксициллина и метронидазола.

В современной пародонтологии наблюдается значительный интерес к проблеме антибиотикотерапии разных форм пародонтита, изучаются различные режимы приема антибактериальных препаратов.

Дополнительное применение антибиотиков приводит к улучшению результатов лечения разных форм пародонтита.

**Ключевые слова:** пародонтит, пародонт, бактериальные пародонтопатогены, пародонто-патогенные микроорганизмы, антибактериальная терапия.

**Relevance.** Parodontitis is a serious disease that has a systemic nature. It is difficult to treat. Antibiotics are considered the most effective for periodontitis, but therapy should be systemic. Without complex treatment, any means are powerless, since there is currently no universal cure for periodontitis [4,6].

Recent data indicate that inflammatory periodontal diseases arise as a result of a complex interaction between the commensal microflora of the oral cavity, the system of protective factors of the macroorganism and environmental factors such as diet and smoking. Of these factors, microbial is recognized as the most significant.

Despite the fact that periodontitis is not an infectious disease in the classical sense, at the same time, there are a number of microorganisms responsible for the development of inflammation and destruction of the periodontal complex [1,7].

An increase in the content of pathogenic types of microorganisms in relation to the periodontal complex is considered as a violation of the biocenosis of the oral cavity, indicating a decrease in the protective factors of nonspecific and specific protection of the body[8].

Microorganisms of the oral cavity exist both in a planktonic state and as part of organized communities associated with organic and inorganic substrates – the so-called biofilms. The existence in the biofilm is a way to protect the microorganisms present in it from adverse environmental factors, creates conditions for nutrition and reproduction, increases the resistance of individual species to hygienic and therapeutic measures [2,5].

An antibiotic usually becomes the main treatment. If the patient has a weak immune system, gum disease may be complicated by another infection, so it is necessary to prescribe antibiotic treatment as the main treatment. It is indicated that antibiotics are prescribed for periodontitis in adults if gum disease is complicated by a secondary bacterial or fungal infection.

Mechanical and surgical treatment combined with proper oral hygiene measures can stop or prevent further loss of clinical attachment in most people by reducing the total supra- and subgingival bacterial mass.

However, despite conscientious dental therapy, periodontal destruction continues in some people, possibly due to the ability of large periodontal pathogens, such as *Porphyromonas gingivalis*, *Aggregatibacter actinomycetemcomitans*, *Fusobacterium nucleatum*, *Treponemadenticola* bacteroids, to invade periodontal tissues or be in furcations or other structures of the tooth beyond the reach of periodontal instruments or from -for the weak protection mechanisms of the hosts. In addition, the suspected periodontal pathogens (the "red complex") are usually found in biofilms attached to the epithelial surface of the periodontal pocket, and the patient cannot reach this place during oral hygiene measures[1,4].

The first candidates for systemic antimicrobial therapy are those patients who exhibit attachment loss after seemingly adequate conventional therapy or patients with aggressive forms of periodontitis who have diseases predisposing to the development of periodontitis[3].

Patients with acute or severe periodontal infections (periodontal abscess, acute ulcerative necrotic gingivitis / periodontitis) may also benefit from the use of antibiotics. Systemic periodontal antibiotic therapy is aimed at strengthening mechanical periodontal treatment and supporting the host protection system in overcoming infection by destroying subgingival pathogens that remain after conventional mechanical periodontal therapy. The susceptibility of bacteria to

antibiotics may be the key to the effectiveness of systemic antibiotics in the treatment of periodontal diseases[6,8].

Other chemotherapeutic agents can also reduce the destruction of collagen and bone due to their ability to inhibit collagenase fermentation.

Patients with gingivitis or stable adult periodontitis usually respond well to mechanical periodontal therapy and practically receive no additional effect from antibacterial therapy.

**The aim of the study** is to identify and analyze the most effective methods of antibiotic therapy in patients with different forms of periodontitis.

**Materials and methods of research.** The work is based on the results of dental examination of 62 patients (32 men and 30 women) aged 18-45 years, who had 78 teeth cured with a diagnosis of periodontitis.

The results of the study. Moxifloxacin was used at a dosage of 400 mg 1 time per day with a course of administration for 7 days. Azithromycin was prescribed at a dosage of 500 mg 1 time per day with a course of 3 days. The dosage and course of antibiotics in combination with amoxicillin and metronidazole varied: both drugs at a dosage of 500 mg 3 times a day with a course of administration for 7 days, amoxicillin at a dosage of 500 mg and metronidazole at a dosage of 250 mg 3 times a day with a course of administration for 7 or 10 days, amoxicillin at a dosage of 875 mg and metronidazole at a dosage of 500 mg 2 times a day with a course of administration for 10 days, amoxicillin at a dosage of 375 mg and metronidazole at a dosage of 250 mg 3 times a day with a course of administration for 7 days.

The activity of moxifloxacin and azithromycin against suspected periodontopathogenic microorganisms such as *Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis* and *Tannerella forsythia* was mentioned, as well as the fact that the concentration of azithromycin in mixed saliva significantly exceeds its content in blood plasma. Moxifloxacin is

able to accumulate in the focus of infection, penetrating into polymorphonuclear granulocytes and epithelial cells.

The use of moxifloxacin or azithromycin may be preferable due to a single dose per day (1 tablet, 400 mg once a day or 500 mg once a day, respectively). At the same time, a shorter duration of the course of taking antibiotics (3- and 7-, rather than a 14-day course) avoids possible side effects. A feature of azithromycin is its accumulation in the contents of the periodontal pocket (gingival fluid) and areas of pronounced periodontal inflammation (its concentration is significantly higher than in "normal" gum tissues). It has been suggested that azithromycin penetrates phagocytes and fibroblasts, its concentration in them is 100-200 times greater than in extracellular spaces, and it is actively transported by phagocytes to areas of inflammation, where a significant amount of azithromycin is released - when phagocytes are destroyed during phagocytosis.

The combination of amoxicillin and metranidzole in the treatment of aggressive periodontitis has been recognized mainly due to its effectiveness against *Aggregatibacter actinomycetemcomitans*, a pathogen closely related to the etiology of this infectious disease. This combination is also active against *Treponema denticola*, *Tannerella forsythia*, *Porphyromonas gingivalis*, *Fusobacterium nucleatum* and *Prevotella intermedia*.

Amoxicillin is a semi-synthetic penicillin with an expanded antimicrobial spectrum, which includes gram-negative and gram-positive cocci, spirochetes and anaerobes, and is effective against representatives of the subgingival microbiota (located inside the epithelial cells of the gum) - *Parvimonas micra* and *Aggregatibacter actinomycetemcomitans*. In combination with clavulanic acid, amoxicillin can also be used to suppress bacteria capable of producing beta-lactamases. However, penicillin-type drugs have many side effects.

The advantage of using a combination of amoc-sicillin and metranidzole is the ability to restore the imbalance between matrix metalloproteinases and

their tissue inhibitors, as well as the fact that the combination of these drugs has a greater spectrum of action compared to monotherapy, each drug separately or other antimicrobial drugs. Metronidazole is not effective against *Aggregatibacter actinomycetemcomitans*, but has activity against periodontal pathogens such as *Porphyromonas gingivalis* and *Prevotella intermedia*.

According to the data obtained from the studied articles, currently azithromycin has the greatest effect on the depth of periodontal pockets (PD), to a lesser extent — a combination of amoxicillin and metronidazole, which proved to be more effective in temporary bite and demonstrated better results in the long term. Moxifloxacin showed almost similar results to this combination.

Based on the values of the CAL indicator, it can be noted that in patients taking azithromycin and a combination of amoxicillin and metronidazole, relatively identical results were determined, whereas in groups where moxifloxacin was used as an antibacterial drug, changes in this indicator were significantly lower.

However, it should be remembered that periodontopathogenic microorganisms can vary in different populations and ethnic groups, so combinations or specific antibiotic regimens may not "work" in all cases.

Therefore, it is necessary to determine the sensitivity / resistance to the antibiotic.

The main factors affecting the effectiveness of antibacterial therapy were recognized: the form of the disease, the antibiotic used (dosage, compliance with the antibiotic regimen by the patient, resistance of the microbiota to the drug, possible side effects of the drug), localization of lesions, the presence of visible plaque and the initial level of the PD index.

Complete destruction of microorganisms can be difficult as a result of reinfection of treated areas. The presence of *Porphyromonas gingivalis* in the periodontal pocket may also be a risk factor for unsuccessful treatment or relapse of the disease.

A more detailed study of this problem requires long follow-up periods, large sample sizes, as well as a larger number of studies comparing various antibacterial drugs in AFP.

Analysis of the data available to us in the literature allowed us to identify some of the advantages and disadvantages of certain antibacterial drugs used in AFP.

**Conclusion.** In the algorithm of conservative treatment of mild chronic periodontitis, along with antibacterial drugs, it is necessary to include drugs that stimulate blood flow in the periodontium, since the restoration of microcirculation in the affected tissues under the action of antibacterial drugs does not occur completely.

Thus, periodontal disease is a multifaceted and very interesting area of our body, it requires deep study and a scrupulous attitude to oneself. The timing of the onset of clinical well-being and the duration of the remission period are individual and depend on many factors: age, the presence of general somatic pathology, the severity of the disease, unfavorable local factors, the gum biotype, which should be taken into account by the dentist in clinical practice.

Most modern studies of this pathology are devoted to the use of moxifloxacin, azithromycin and a combination of amoxicillin and metronidazole. There is an increased interest of scientists from different countries in auxiliary antibacterial therapy of various forms of periodontitis, while various regimens of taking antibiotics are being studied.

The additional use of antibiotics leads to a better result in the treatment of aggressive forms of periodontitis. The most reasonable is the use of azithromycin at a dosage of 500 mg 1 time per day with a course of 3 days. However, periodontopathogenic microorganisms may vary in different populations and ethnic groups, as a result of which it may be necessary to determine their sensitivity to antibacterial drugs in case of ineffectiveness of the therapy.

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