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ANTIBIOTIC PROPHYLAXIS IN DENTAL SURGERY

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Abstract: Briefly formulating modern ideas about the preventive use of antibiotics, it is necessary to proceed from three general cases of antibiotic prophylaxis: 1) to prevent infection with exogenous pathogens; 2) to prevent the spread of resident microflora from some parts of the body to others, normally sterile; 3) to prevent the development of diseases with latent infections. Antibiotic prophylaxis in surgery is usually justified only when postoperative infection in the wound is highly likely or may have severe consequences. First of all, such conditions can occur when the mucous membrane is dissected, in particular in the oral cavity, which limits the numerous populations of resident bacteria, which cause contamination of the wound [1, 4, 5, 10]. This article presents up-to-date information on antibiotic prophylaxis of the development of postoperative infection, discusses effective schemes for the preventive use of inhibitor-protected aminopenicillin using the example of a combination of amoxicillin with clavulanic acid for the removal of retarded dystopian third lower molars, dental implantation, sinus lifting with anthropoplasty to reduce the risk of postoperative infectious complications.

Key words: antibiotic prophylaxis, amoxicillin/clavulanic acid combination.

Definition and purpose of antibiotic prophylaxis Antibiotic prophylaxis in surgery is the preventive use of antibiotics to provide antimicrobial protection of an operating wound in case of its possible contamination by resident microorganisms, which, falling into

atypical conditions of existence, may exhibit the properties of pathogens and cause an infectious process in the area of surgery. Microbial contamination of the surgical wound is almost inevitable even with perfect observance of the rules of asepsis and antiseptics. The available generalized data indicate that by the end of the operation, in 80-90% of cases, wounds are seeded with various bacterial microflora. From the point of view of pharmacology, namely pharmacokinetics, the goal of surgical antibiotic prophylaxis is to achieve effective concentrations of antibiotics in tissues even before their microbial contamination, maintain the therapeutic level of drug activity throughout the operation and the next 3-4 hours. This period of time is crucial for triggering the mechanisms of the inflammatory and infectious process in the wound. Antibiotic prophylaxis initiated after this period is delayed, and its continuation after the end of the operation is considered unnecessary in most cases, since the preventive role of the antibiotic is to reduce the threshold concentration of microorganisms (below 105-6 microbial bodies per 1 g of tissue) and prevent the adhesion of pathogens [2, 6, 7, 9].

Characteristics of the drug for antibiotic prophylaxis on the example of a combination of amoxicillin with clavulanic acid. The choice of a drug for antibiotic prophylaxis is due to its mandatory bactericidal action against the most significant microorganisms, good tissue permeability, tolerability, and an optimal efficiency—safety—cost ratio. In this regard, the most successful group, along with cephalosparins of the I—II generation, are inhibitor-protected penicillins. Preparations of this group are a combination of semi-synthetic penicillin amoxicillin and clavulanic acid as a competitive irreversible beta-lactamase inhibitor, which prevents enzymatic degradation of amoxicillin and provides a guaranteed possibility of its bactericidal action by inhibiting bacterial wall synthesis. The greatest antimicrobial activity is manifested against gram—positive and gram-negative cocci, hemophilic bacilli, moraxella, representatives of anaerobes - actinomycetes, bacteroids, prevotella, peptostreptococci. The above-mentioned microorganisms are one of the main representatives of the resident microflora of the oral cavity, upper respiratory tract,

including the maxillary sinuses. The ability of resident microorganisms to cause a pathological process is associated with the possibility of their going beyond their ecological niche and the subsequent realization of pathogenicity properties due to the processes of adhesion, invasion, as well as through toxins. Modern dosage forms of inhibitor-protected penicillins suggest a high bioequivalence of enteral and parenteral doses of drugs. Therapeutic concentrations of the antibiotic are achieved, including in the tissues of the respiratory tract and jaw bones; the half-life is 1 hour, which theoretically determines the need for a repeated dose at an interval that is 2 times longer than the half-life. In practice, the interval between repeated administration of enhanced amoxicillin, used for preventive purposes, is 8-12 hours. The highest single dose of the drug for oral administration is 1000 mg 30-40 minutes before surgery, for slow intravenous injection — 1200 mg 30 minutes before surgery [3]. Thus, drugs from the group of inhibitor-protected penicillins as a means of antibiotic prophylaxis during surgical dental interventions will be the drugs of choice, i.e. the first row; their main component amoxicillin, which determines the dose of the drug, is included in the model list of antibiotics for surgical prevention [8].

Postoperative infection (infection in the area of surgical intervention) Postoperative infection, otherwise infection in the field of surgical intervention, is a special case of wound infection, i.e. the infectious process that develops due to external microbial contamination in the presence of damage to the integumentary tissues and more or less pronounced primary traumatic destruction of the tissues that make up the deep layers of the wound, as an open injury. Surgical intervention is an invasive action carried out for therapeutic purposes, but inevitably associated with a more or less pronounced injury. In this case, natural barriers that separate the areas of internal biocenoses are often subjected to mechanical destruction. The destruction of barriers leads to microbial invasion into living tissues, which can become the object of pathogenic effects of microflora. This determines the need for preventive measures that reduce the risk of postoperative infectious complications. Among such measures, the following can be distinguished: the maximum

reduction in the traumatism (aggressiveness) of interventions and the rational use of antibacterial agents in the perioperative period, i.e. before, if necessary, during and after surgery.

Antibiotic prophylaxis regimens using the combination of amoxicillin/ clavulanic acid

The analysis of general and local risk factors for the development of postoperative infection during the removal of retinated dystopian third lower molars, dental implantation, sinus lifting with anthropoplasty based on ideas about various types of surgery allows us to determine the most rational approach to reducing the number of possible complications through antibiotic prophylaxis using a combination of amoxicillin/clavulanic acid. Scheme 1. Preoperative antibiotic prophylaxis Single use of an antibiotic. Administration of the drug 30-40 minutes before surgery: per os — 625-1000 mg or intravenously slowly 600-1200 mg. Indications: — removal of the retented dystopian lower third molar in patients without pronounced concomitant pathology; — dental implantation using a small number (1-3) implants under standard conditions (sufficient volume of bone tissue, absence of pronounced concomitant pathology). Scheme 2. Perioperative antibiotic prophylaxis The use of an antibiotic before surgery, intraoperatively and after surgery. Administration of the first dose of the drug 30-40 minutes before surgery: per os — 625 mg or intravenously slowly 600 mg, with a duration of operation of more than 3 hours intraoperative administration of the second dose: per os — 625 mg if the operation is completed or will be intermediate if the operation continues. The third dose should be administered 8 hours after the completion of the operation: per os — 625 mg. Indications: — removal of the retented dystopian third lower molar in patients with concomitant pathology; — removal of two retentive dystopian third lower molars in patients without pronounced concomitant pathology; — dental implantation using a small number of implants (1-3) with compromised local and/or general status; — dental implantation using an average number of implants (4-8) under standard conditions; — unilateral sinus lifting with anthropoplasty

in patients without severe concomitant pathology. Scheme 3. Antibiotic prophylaxis + antibiotic therapy (pseudoantibiotic prophylaxis) The use of an antibiotic according to one of the two above—mentioned prevention regimens, followed by the appointment of a therapeutic course lasting up to 7-14 days: per os - 625 mg 3 times a day or 1000 mg 2 times a day. Indications: — removal of two retentive dystopian third lower molars in patients with local chronic inflammatory process and/or concomitant pathology; — dental implantation using an average number (4-8) implants with compromised local and/or general status; — dental implantation using a large number (9-10 or more) of implants under standard conditions; — unilateral sinus lifting with anthropoplasty with autosteous material in patients without pronounced concomitant pathology; - unilateral sinus lifting with anthropoplasty with compromised local and/or general status; — bilateral sinus lifting with anthropoplasty in patients without pronounced concomitant pathology.

Conclusion. Antibiotic prophylaxis is one of the most effective measures to prevent the development of infection in the area of an operating wound. Experimental and clinical data obtained as a result of multicenter randomized trials convincingly prove that the rational preventive use of antibiotics in surgical practice, including during surgical dental interventions, using a combination of amoxicillin/clavulanic acid according to the described schemes, allows us to state a decrease in the number of postoperative infectious complications from 10-20% to 1.5—5%.

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