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INFECTIOUS COMPLICATIONS DURING INFILTRATION ANESTHESIA AND METHODS OF THEIR PREVENTION

Telmonov Islomjon Khairullayevich
Asia International University
telmonovislomjon@gmail.com

Abstract: Infectious processes during local anesthesia remain an urgent problem in modern dentistry. International studies show a complication rate of 4.5% in the general population and 5.7% among patients at risk. The use of chlorhexidine bigluconate 0.05% for preprocedural antiseptic treatment significantly reduces the risk of post-injection infectious processes and is an effective method of prevention.

Keywords: local anesthesia, post-injection infection, antiseptic treatment, chlorhexidine, prevention of complications, dental practice.

According to the PMC study, the overall complication rate of local anesthesia is 4.5%, and in patients at risk, this figure reaches 5.7% versus 3.5% in healthy patients. In my clinical practice, infectious complications account for a significant proportion of all adverse events. According to the Wiley Online Library, in 75% of cases, systemic complications are associated with local anesthesia. The main route of infection is the mechanical transfer of microorganisms by a needle. The oral cavity contains more than 700 species of microorganisms with a concentration of up to 10^8 microbial cells per 1 mm2 of mucosa. In my practice, the most common pathogens are Streptococcus viridans, Staphylococcus aureus and anaerobic bacteria. In the practice of our colleagues, it is especially dangerous to inject an anesthetic into an area of active inflammation. Post-injection abscesses develop after 2-4 days and are manifested by swelling, hyperemia, increasing soreness and fever. In my practice, this complication is associated with a violation of technique and insufficient antiseptic treatment. Phlegmons represent a more severe form with diffuse spread of the process.

In the practice of our colleagues, such cases require hospitalization and intensive antibacterial therapy. Osteomyelitis of the jawbones is a rare complication that develops in patients with immunodeficiency disorders and decompensated diabetes mellitus. The condition of the oral cavity plays a critical role. The presence of cavities, dental deposits, and periodontal diseases significantly increases the risk. In my practice, pre-rehabilitation reduces the incidence of complications several times. The technique of anesthesia is of paramount importance. Multiple injections with a single needle, traumatic injection, and the use of non-sterile instruments create conditions for infection. In the practice of our colleagues, strict adherence to aseptic protocols is mandatory. The patient's immune status determines the ability to resist infection. Patients with diabetes mellitus receiving immunosuppressive therapy are at high risk. Chlorhexidine bigluconate in the prevention of infections. Chlorhexidine bigluconate is one of the most effective antiseptics in dentistry. According to PMC, chlorhexidine has a wide range of antimicrobial activity against Gram-positive and Gram-negative bacteria, yeast-like fungi. The

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concentration of 0.05% is optimal for preprocedural treatment, providing effective protection with minimal side effects. In the practice of our colleagues, higher concentrations (0.12-0.2%) are used to treat periodontal diseases, but 0.05% is sufficient for prevention. An important advantage is the prolonged action. The drug is adsorbed on the surface of the mucosa, providing an antimicrobial effect for several hours. In my practice, this supports protection throughout the procedure. The BMC Oral Health study showed a significant reduction in bacterial contamination after the use of chlorhexidine. In my practice, the following protocol is used: The first stage is rinsing 15 ml of a 0.05% chlorhexidine bigluconate solution for 30-60 seconds to mechanically remove saliva and initially reduce microbial contamination. The second stage is the application treatment of the injection area with a sterile swab soaked in 0.05% chlorhexidine, in circular movements for 15-20 seconds. The third stage is an exposure of 1-2 minutes to achieve maximum effect. In the practice of our colleagues, the observance of exposure time is critically important. The fourth stage is repeated local treatment immediately before the injection of the needle. The use of only disposable sterile needles is mandatory.

Each patient is provided with a new needle in an individual package. In my practice, repeated use is unacceptable even for one patient. The sterility of carpules is ensured by proper storage. The rubber membrane is treated with 70% alcohol before installation. In the practice of our colleagues, this is a standard procedure.

The treatment of the doctor's hands and the use of sterile gloves are mandatory. Before the procedure, the gloves are additionally treated with an antiseptic. Professional hygiene with the removal of dental deposits significantly reduces microbial contamination. In my practice, rehabilitation is carried out a few days before the planned intervention. Treatment of caries and periodontal diseases eliminates the sources of infection. In the practice of our colleagues, patients with multiple caries are recommended to undergo step-by-step sanitation. Minimization of injury is achieved by using thin needles (27G-30G) and smooth insertion. In my practice, slow administration at a rate of no more than 1 ml per minute reduces injury. The correct choice of the injection site eliminates a puncture through areas with inflammation. In the practice of our colleagues, if anesthesia is necessary, intensive treatment is carried out in the area of inflammation. The inadmissibility of multiple injections with one needle is fundamental. In my practice, if additional anesthesia is needed, a new needle is used. Patients are recommended to rinse with 0.05% chlorhexidine bigluconate two to three times a day for 3-5 days. In the practice of our colleagues, this reduces the incidence of complications and accelerates healing. Hygiene, avoiding injury to the injection site, and avoiding harsh and hot food on the first day promote healing. In my practice, patients are instructed about the need for immediate treatment for inflammation. Glucose monitoring, anesthesia in the compensation stage, and enhanced treatment are necessary for patients with diabetes mellitus. In the practice of our colleagues, preventive antibacterial therapy can be prescribed. Patients on immunosuppressive therapy require special attention. In my practice, consultation with the attending physician is mandatory, the most atraumatic technique, dynamic observation. Patients with periodontal diseases are at increased risk. In the practice of our colleagues, pre-treatment of periodontitis and intensive treatment is recommended. Early diagnosis allows you to start treatment in a timely manner. The first signs appear after 24-72 hours: swelling, increasing pain, redness, fever. In my practice, patients with these symptoms are immediately invited for examination.

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Treatment includes topical therapy with chlorhexidine rinses every 2-3 hours, systemic antibacterial therapy, and anti-inflammatory therapy. In the practice of our colleagues, surgical autopsy and drainage are performed for an abscess.

Conclusions:

Infectious complications of infiltration anesthesia are a significant problem that requires a systematic approach to prevention. International data confirm the complication rate of 4.5% in the general population, with an increase to 5.7% in patients at risk. The use of chlorhexidine bigluconate 0.05% for preprocedural antiseptic treatment has proven highly effective in reducing microbial contamination and preventing post-injection infections. In the practice of our colleagues, this protocol has become the standard for the quality of dental care. Comprehensive prevention includes: mandatory two-stage use of chlorhexidine bigluconate 0.05%, the use of exclusively sterile disposable needles, preliminary sanitation of the oral cavity, atraumatic technique of anesthetic administration. In my practice, the integration of these principles has made it possible to minimize the risk of infectious complications and ensure the safety of dental treatment for all categories of patients.

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