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OPTIMIZATION OF COMPLEX TREATMENT OF ACUTE PURULENT PERIOSTITIS OF THE JAWS THROUGH RATIONAL USE OF NONSTEROIDAL ANTI-INFLAMMATORY DRUGS

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Abstract

Objective. To develop and substantiate an optimized approach to the treatment of acute purulent periostitis of the jaws through differentiated prescription of nonsteroidal anti-inflammatory drugs (NSAIDs) based on the severity of pain syndrome and indicators of local immune response.

Materials and Methods. The study involved patients with clinically diagnosed acute purulent periostitis of the jaws and a group of healthy volunteers for reference evaluation of immunological parameters of oral fluid. Patients were allocated into clinical groups according to therapeutic strategy: administration of nimesulide; sequential therapy with ketorolac tromethamine followed by nimesulide; and treatment without NSAIDs. All participants received standard surgical management and local antiseptic therapy. Treatment efficacy was assessed by the dynamics of pain intensity, regression of inflammatory manifestations, and changes in immunological markers of oral fluid, including secretory immunoglobulin A, pro-inflammatory interleukins, and total protein content. Statistical analysis was performed using nonparametric methods.

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Results. Sequential administration of ketorolac tromethamine followed by nimesulide demonstrated superior analgesic and anti-inflammatory efficacy, contributing to more rapid resolution of clinical symptoms and normalization of local immune parameters compared with NSAID monotherapy or treatment without NSAIDs.

Conclusion. A differentiated, pathogenetically justified approach to NSAID prescription based on pain intensity significantly enhances the effectiveness and safety of treatment of acute purulent periostitis of the jaws.

Keywords: Acute purulent periostitis, pain syndrome, NSAIDs, ketorolac, nimesulide, oral fluid, local immunity.

Introduction

Acute purulent periostitis of the jaws constitutes one of the most prevalent odontogenic inflammatory conditions encountered in dental and maxillofacial practice. The disease is characterized by rapid progression, pronounced local inflammatory response, and severe pain syndrome, which often necessitates urgent medical intervention. Despite advances in dental therapeutics, management of this pathology remains a challenging clinical task due to the complexity of its pathogenesis and the risk of severe complications.

Pain represents the dominant clinical manifestation of acute purulent periostitis and serves as the primary determinant of patient discomfort and functional impairment. Contemporary understanding of pain pathophysiology emphasizes the crucial role of inflammatory mediators, particularly prostaglandins, bradykinin, serotonin, and pro-inflammatory cytokines, in the initiation and maintenance of nociceptive signaling. These mediators induce peripheral sensitization of nociceptors, enhance vascular permeability, and amplify the inflammatory cascade.

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Nonsteroidal anti-inflammatory drugs are widely recognized as first-line agents for the management of inflammatory pain in dental practice. Their therapeutic effect is mediated through inhibition of cyclooxygenase enzymes and subsequent suppression of prostaglandin synthesis. Nevertheless, in routine clinical settings, the choice and regimen of NSAIDs are frequently empirical and insufficiently individualized. This often results in suboptimal analgesia, prolonged inflammatory response, and increased risk of adverse reactions.

In recent years, increasing attention has been directed toward the role of local immune mechanisms in the pathogenesis of odontogenic inflammatory diseases. The composition of oral fluid reflects the state of mucosal immunity and can serve as an objective indicator of inflammatory activity and treatment efficacy. Evaluation of immunological parameters such as secretory immunoglobulin A and pro-inflammatory cytokines provides valuable insights into the biological effects of therapeutic interventions.

Given these considerations, the development of an evidence-based, differentiated algorithm for NSAID use in the treatment of acute purulent periostitis of the jaws represents a scientifically and clinically relevant objective.

The aim of the study is to optimize комплекс treatment of acute purulent periostitis of the jaws by elaborating a rational strategy for NSAID administration based on clinical and immunological criteria.

Materials and Methods

The study is conducted in accordance with the principles of biomedical ethics and the requirements of good clinical practice. All participants were informed about the objectives and procedures of the study and provided voluntary informed consent.

Patients with a clinically established diagnosis of acute purulent periostitis of the jaws were enrolled in the study. Diagnosis was based on characteristic clinical

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signs, including acute pain, soft tissue swelling, hyperemia, impaired function, and radiographic findings consistent with periosteal inflammation. A group of healthy volunteers without inflammatory or systemic diseases served as a control for immunological assessment.

Participants were stratified into clinical groups depending on the selected therapeutic approach. In the first group, NSAID therapy consisted of administration of nimesulide as the primary anti-inflammatory and analgesic agent. In the second group, a sequential regimen was implemented: ketorolac tromethamine was prescribed during the initial phase of treatment to achieve rapid and potent analgesia, followed by transition to nimesulide for sustained anti-inflammatory management. In the third group, NSAIDs were not included in the treatment protocol.

All patients, irrespective of group allocation, underwent standardized surgical intervention appropriate for acute purulent periostitis, including incision and drainage of the purulent focus, antiseptic irrigation, and local therapeutic measures. Antibacterial therapy was prescribed in accordance with current clinical guidelines.

Clinical effectiveness of treatment was evaluated using a set of criteria. Pain intensity was measured daily utilizing a visual analogue scale. Additional clinical parameters included the degree of soft tissue edema, local hyperemia, body temperature, and overall functional status.

To objectively assess the biological impact of therapy, laboratory examination of oral fluid was performed. The concentrations of secretory immunoglobulin A, interleukins IL-1β and IL-6, and total protein were determined using standardized methods. Oral fluid samples were collected prior to initiation of treatment and during the course of therapy at predefined intervals.

Data were subjected to statistical analysis using nonparametric methods appropriate for the distribution of variables. Comparative evaluation was performed both between groups and within groups over time.

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Results

Initial clinical assessment revealed that all patients presented with severe inflammatory pain and typical manifestations of acute purulent periostitis. Baseline pain intensity was high and comparable across the study groups.

Implementation of NSAID therapy resulted in significant differences in clinical outcomes. Patients receiving nonsteroidal anti-inflammatory drugs demonstrated more rapid alleviation of pain and regression of inflammatory symptoms compared with those treated without NSAIDs.

The most pronounced therapeutic effect was observed in the group treated according to the sequential regimen. Administration of ketorolac tromethamine during the acute phase provided prompt and substantial analgesia, which was subsequently maintained by nimesulide therapy. This approach led to earlier restoration of masticatory function and improvement of general well-being.

Monotherapy with nimesulide also produced positive clinical results; however, the onset of analgesia and reduction of inflammatory signs were comparatively slower than with the sequential protocol.

In contrast, patients who did not receive NSAIDs exhibited prolonged persistence of pain syndrome and inflammatory manifestations, often requiring additional symptomatic measures.

Analysis of immunological parameters of oral fluid confirmed that acute purulent periostitis is associated with marked disturbances of local immune homeostasis. Prior to treatment, decreased levels of secretory immunoglobulin A and elevated concentrations of pro-inflammatory interleukins were detected, reflecting active inflammatory processes.

During therapy, normalization of these indicators occurred predominantly in groups receiving NSAIDs, with the most favorable dynamics registered in the sequential treatment group. These findings suggest that adequate anti-inflammatory therapy facilitates restoration of local immune balance in addition to providing symptomatic relief.

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Discussion

The obtained results corroborate the concept that pain syndrome in acute purulent periostitis is primarily inflammatory in nature and is mediated by prostaglandin-dependent mechanisms. Consequently, suppression of cyclooxygenase activity by NSAIDs constitutes a pathogenetically sound therapeutic strategy.

The superior effectiveness of the sequential ketorolac–nimesulide regimen can be explained by pharmacodynamic characteristics of these agents. Ketorolac possesses a rapid and powerful analgesic action, which is crucial during the acute stage of the disease, whereas nimesulide provides sustained anti-inflammatory activity with a favorable safety profile. Their rational combination allows for optimal control of both pain and inflammation.

An important aspect of the study is the demonstrated influence of NSAID therapy on local immune parameters. Reduction of pro-inflammatory cytokine levels and restoration of secretory immunoglobulin A indicate that appropriate anti-inflammatory treatment contributes to normalization of mucosal immunity and may reduce the risk of chronicity and complications.

These findings emphasize the necessity of an individualized approach to NSAID prescription in dental practice, taking into account the severity of pain syndrome and biological markers of inflammation.

Conclusion

The study has demonstrated that optimization of treatment for acute purulent periostitis of the jaws requires a differentiated and evidence-based approach to the use of nonsteroidal anti-inflammatory drugs.

Sequential administration of ketorolac tromethamine followed by nimesulide provides the most effective control of pain and inflammatory response and promotes favorable normalization of immunological parameters of oral fluid.

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In cases of less intense pain, monotherapy with nimesulide represents an adequate therapeutic option. Treatment protocols that exclude NSAIDs are associated with slower clinical recovery and less favorable biological dynamics.

Therefore, the selection of NSAID therapy should be guided by the intensity of pain and individual clinical characteristics, which enables enhancement of both effectiveness and safety of management of acute purulent periostitis of the jaws.

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