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IMPROVING THE PREVENTION OF POSTOPERATIVE INFLAMMATORY COMPLICATIONS AFTER URANOPLASTY IN CHILDREN

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Abstract
This study is devoted to improving the prevention of inflammatory complications in children after uranoplasty. Congenital cleft palate is one of the most common congenital anomalies of the maxillofacial region, and uranoplasty remains the main surgical method of treatment. In the postoperative period, inflammatory reactions, delayed wound healing, and suture dehiscence may occur, formation of a hematoma in the wound area. The study involved 30 patients who underwent uranoplasty. The patients were divided into two groups: a control group (15 patients) and a main group (15 patients). In addition to standard postoperative treatment, patients in the main group received magnetotherapy sessions. The results showed that the use of magnetotherapy reduced postoperative edema and hyperemia, accelerated wound healing, and significantly decreased the incidence of postoperative complications. The findings indicate that magnetotherapy can be considered an effective adjunct method for preventing inflammatory complications after uranoplasty in children.

Keywords: Uranoplasty, congenital cleft palate, pediatric surgeon dentistry, postoperative complications, magnetotherapy, inflammation prevention.

Introduction

Congenital cleft lip and palate represent one of the most prevalent congenital anomalies of the maxillofacial region. According to various epidemiological data, this pathology occurs in approximately one in every 700–1,000 newborns. Congenital cleft palate negatively impacts feeding, speech development, respiration, and social adaptation processes in children. Consequently, the complex treatment of this pathology remains one of the pressing challenges in modern medicine.

Uranoplasty is the primary surgical method for treating cleft palate. The fundamental objectives of this procedure are to restore the anatomical integrity of the palate, normalize velopharyngeal function, and establish the necessary anatomical conditions for speech development. However, the

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postoperative period may be characterized by various complications, including inflammatory processes, delayed wound healing, wound dehiscence (suture separation), and cicatricial (scar) deformities.

Scientific literature indicates that the frequency of complications following uranoplasty can reach 10–30%. Postoperative inflammatory processes adversely affect the healing process and, in certain instances, may necessitate secondary surgical interventions. Therefore, preventing inflammatory complications and accelerating wound healing during the postoperative period is of paramount importance.

In recent years, significant attention has been directed toward the use of physiotherapeutic methods in postoperative rehabilitation. One such method is magnetotherapy, which acts on body tissues through a low-intensity magnetic field. Magnetotherapy improves microcirculation in tissues, activates metabolism, reduces edema and inflammation, and accelerates regenerative processes.

Thus, the application of magnetotherapy in the period following uranoplasty may serve as an effective method for accelerating wound healing and preventing inflammatory complications.

Literature Review

The literature utilized in this study serves to scientifically substantiate the effectiveness of magnetotherapy and the reduction of inflammatory complications in the post-uranoplasty period. The work of **Abramyan and Arzhantsev (2019)** covers the theoretical foundations and postoperative practices of maxillofacial surgery, serving as a reliable source for explaining the postoperative phase. **Kuznetsova (2018)** presents the outcomes of uranoplasty in children and the frequency of postoperative complications in percentages, which provided a basis for comparing inflammatory indicators in this study. **Mitropanova (2019)** elucidates the immune system's response to uranoplasty in children and the mechanisms of inflammation, thereby strengthening the biological rationale for magnetotherapy.

Chuykin and Bilak (2024) provide recent recommendations on the prevention of postoperative complications, which were applied in the analysis of indicators between the control and primary groups. **Amanullaev and Ikramov (2022)** perform a morphological analysis of the wound healing process, utilized here to validate the study's findings. The positive impact of magnetotherapy on wound recovery is demonstrated by **Kamalova and Rakhimov (2021)**, reinforcing the innovative component of this research—the application of magnetotherapy.

The works of **Dusmukhamedov M.Z. (2017, 2019)** present local clinical experience regarding the treatment and rehabilitation of congenital clefts in children, adding local context and practical significance to the article. Furthermore, **Peterson et al. (2019)** highlight modern surgical and dental protocols, while **Mossey et al. (2009)** provide data on the epidemiology of congenital clefts. **Shaw et al. (2001)** facilitate the inter-center comparison of treatment outcomes, and **Dixon et al. (2011)** analyze the relevant genetic and environmental factors. Consequently, this body of literature scientifically enriches the introduction, methodology, results, and discussion sections of the study, proving the efficacy of magnetotherapy and its importance in improving the postoperative period.

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Materials and Methods

The study was conducted between 2025 and 2026 among children treated for congenital cleft palate. A total of 30 children who underwent uranoplasty were included in the research. The patients ranged in age from 2.5 to 5 years, with a gender distribution as follows: 17 boys (56.7%) and 13 girls (43.3%). For the purpose of the study, the patients were divided into two groups:

- **Group 1 (Control Group):** Consisting of 15 patients who received standard postoperative treatment, including:
- Antibacterial therapy
- Analgesics (pain relief)
- Antiseptic treatment
- Hygienic recommendations
- **Group 2 (Primary Group):** Consisting of 15 patients who received magnetotherapy in addition to the standard treatment protocol.

The magnetotherapy was administered according to the following regimen: starting from the second postoperative day for a duration of 3 to 5 days, once daily, with each session lasting 10 minutes. The magnetic field was applied to the projection of the surgical site.

Throughout the study, the following clinical parameters were evaluated:

- Degree of perifocal edema (swelling around the wound)
- Presence of hyperemia (redness)
- Pain intensity
- Presence of hematoma
- Wound healing time
- Postoperative complications

Statistical analysis was performed using **Student's t-test**, and differences were considered statistically significant at $\mathbf{p < 0.05}$.

Results and Discussion

The dynamics of inflammatory markers in patients during the postoperative period were analyzed. On the third postoperative day, edema was observed in 9 patients (60%) in the control group, compared to 5 patients (33.3%) in the primary group. By the seventh day, these figures reached 6 patients (40%) and 2 patients (13.3%), respectively.

Hyperemia was identified in 10 patients (66.7%) in the control group on the fifth postoperative day, whereas in the primary group where magnetotherapy was applied, this indicator was recorded in 4 patients (30%).

According to the patients' subjective assessments, the average duration of pain syndrome was 4.6 ± 0.8 days in the control group and 2.9 ±0.6 days in the primary group. On the third postoperative day, hematoma formation in the soft palate and uvula region was observed in 6 patients (40%) in the control group and 2 patients (13.3%) in the primary group.

Evaluation of the wound healing process revealed that complete epithelialization of the tissues lasted 12.4 ±1.3 days in the control group and 9.1 ±1.1 days in the primary group. This indicates that the wound healing process occurred 26–28% faster in patients who received magnetotherapy.

Postoperative complications were more frequent in the control group: partial wound dehiscence was recorded in 3 patients (10%) and inflammatory infiltration in 5 patients (16.7%). In the primary group, wound dehiscence was identified in only 1 patient (3.3%) and inflammatory infiltration in 2 patients (6.7%).

The results obtained demonstrate that with the application of magnetotherapy, edema occurred 1.5 times less frequently, hyperemia 2 times less frequently, and postoperative complications were reduced by 2–2.5 times. This is attributed to the improvement of microcirculation under the influence of the magnetic field, increased oxygen supply to the tissues, and the activation of reparative processes.

Conclusion

The results of this study demonstrate that the application of magnetotherapy during the postoperative period following uranoplasty in children is effective in reducing inflammatory complications. In the primary group receiving magnetotherapy, edema, hyperemia, and pain syndrome were significantly less prevalent compared to the control group. Furthermore, the wound healing process was accelerated, with complete tissue epithelialization occurring on average 26–28% faster.

Postoperative complications, including partial wound dehiscence and inflammatory infiltration, were recorded 2–2.5 times less frequently in patients treated with magnetotherapy. This is attributed to the improvement of microcirculation, increased oxygen supply to the tissues, and the activation of reparative processes under the influence of the magnetic field.

In conclusion, magnetotherapy represents an effective and pathogenetically substantiated adjunctive treatment method for the prevention of inflammatory complications following uranoplasty. Implementing this method in clinical practice contributes to shortening the rehabilitation period and improving the overall outcomes of surgical treatment for patients.

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