

THE EFFECTIVENESS OF ULTRASOUND NON-PUNCTURE TECHNOLOGY WITH ENDONASAL INTRADERMAL ANTIBIOTIC THERAPY IN THE TREATMENT OF CHRONIC PURULENT POLYSINUSITIS

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Abstract. *The relevance of the study is due to the observed increase in chronic purulent polysinusitis and antibiotic resistance of the main pathogens. The effectiveness of low-frequency ultrasound in combination with endonasal intradermal antibiotic therapy was assessed. The study included 40 patients diagnosed with chronic purulent semi-sinusitis and a history of periodic exacerbations throughout the year. Patients of the 1st group received antibiotic therapy, the sinuses were washed with a 0.9% sodium chloride solution, and low-frequency ultrasound was used in the treatment of patients of the 2nd group. A comparative analysis showed the safety and high efficiency of low-frequency ultrasound, and the absence of its effect on the growth of antibiotic resistance allows its use in the treatment of chronic purulent polysinusitis.*

Keywords: *chronic purulent polysinusitis, endoscopy, low-frequency ultrasound, antibiotic resistance.*

Relevance. Chronic rhinosinusitis (CRS) is a chronic inflammatory disease of the mucous membrane of the nasal cavity and paranasal sinuses. The relevance of the study is due to the observed increase in CRS, both in outpatient and inpatient practice, leading to significant economic losses, which determines not only medical but also social significance. From an epidemiological point of view, the average prevalence of CRS in the world is 6%. The administration of multiple courses of antibacterial therapy gives particular significance to this problem due to the possibility of developing antibiotic resistance of microorganisms associated with exacerbation of CRS. In light of this situation, an interesting direction in modern treatment is the study of the effect of low-frequency ultrasound (LFUS) on inflammatory diseases of the paranasal sinuses (PS).

Purpose of the study: To evaluate the effectiveness of low-frequency ultrasound in combination with endonasal intradermal antibacterial therapy in patients with exacerbations of chronic purulent diseases of the paranasal sinuses.

Material and methods: The study involved 40 patients (21 men, 19 women) aged 7 to 18 years with a diagnosis of chronic purulent polysinusitis. The duration of the disease varied from 1 year to 3 years. 24 patients were inpatient treatment, 16 received outpatient treatment. All patients were divided into two groups: main (20 people) and control (20 people). The groups were comparable in gender and age composition. The clinical examination was carried out in the ENT office of the consultative clinic and in the otorhinolaryngology department of the Otorhinolaryngology Center. The diagnosis was established based on complaints, anamnestic data, results of bacteriological, radiological, and computed tomography (CT), as well as data from

endoscopic sinusoscopy of the ED. To determine sensitivity to antibacterial drugs, the obtained material from the nasal cavity and SNP was used. The main group received, after preliminary sinus evacuation, the antibacterial drug ceftriaxone endo-nasally intradermally against the background of low-frequency ultrasound and second-generation oral antihistamines. NUS do not have any negative side effects. Moreover, NUS is successfully combined with antibacterial drugs, enhancing the isotropic effect, which makes it possible to use it in the treatment of inflammatory processes of the nose and SNP. The control group received the antibacterial drug ceftriaxone 1000 mg intramuscularly once a day in combination with punctures of the paranasal sinuses, physiotherapeutic procedures, and second-generation oral antihistamines. The duration of observation after treatment was 10 days. The endpoint of the patient study was the improvement of the rhinoscopic and clinical picture, as well as the sanitation of the ED.

When analyzing the results of placentometry, a morphological study of the structural components of the placenta was carried out and the following morphological indicators were taken into account: diameter (mm), thickness (mm), weight (g), volume (cm³), maternal surface area (cm³), placental-fetal mass index, intervillous fibrinoid (%), fetal fibrinoid (%), intervillous space (%), the number of capillaries in the villus, the diameter of the capillaries in the villus (μm), the thickness of the placental barrier (μm), the presence of calcifications, hemorrhages, features of umbilical cord attachment, its length. The study of morphological features in placentas was carried out using the histological method. Histological examination was carried out after preliminary staining with hematoxylin and eosin.

Results: In patients in the control group who received an antibacterial drug in comparison with patients in the main group who received antibiotic therapy endo-nasally intradermally against the background of NUS, a higher frequency of favorable outcomes was observed - 95% and 76%, respectively. A satisfactory effect was observed in 5% of patients in the main group and 24% of patients in the control group. The study showed that the most common complaints upon admission among patients were nasal congestion, runny nose, facial pain, headache, hyposmia, sore throat, and finally cough and general malaise. After treatment, the most important complaints for patients remained: difficulty in nasal breathing and decreased sense of smell. It was revealed that the use of low-frequency ultrasound helps to mobilize nonspecific protective factors and functional reserves of the body, and regional antibacterial therapy reduces the drug burden. Side effects of treatment were not noted in patients of both study groups consolidate the positive results of treatment.

After treatment in the main group, *S. Epidermidis* gave growth to all patients. No growth was observed in the remaining strains. In patients in the control group, growth was observed in almost all strains. Analyzing the data obtained, it can be noted that the dynamics of the involution of pathological symptoms of exacerbation of sinusitis in both groups was approximately the same during the first week of treatment, in the main group it was more pronounced. However, by the 30th day of observation, all signs of the inflammatory process in the main group were two times less pronounced than in the control group.

Insufficient effectiveness of the therapy by the 10th day of treatment was noted in 1 patient (3.03%) of the main group and 6 in the control group (22.2%). Recurrence of the pathological process by the 30th day of observation was noted in 4 (14.8%) patients in the control group; there were no relapses in the main group.

Table 1

Results of a bacteriological study of exudate from the maxillary sinus in patients with purulent-hyperplastic sinusitis

Main group		Control group	
Before antibiotic therapy	After antibiotic therapy	Before antibiotic therapy	After antibiotic therapy
S. epidermidis	no growth	S. epidermidis	S. epidermidis
Str. pneumoniae	no growth	Str. Pneumoniae	St. saprofiticus,
St. aureus	S. epidermidis	St. Aureus	S. epidermidis
St. varidans	no growth	St. Varidans	Pseud, maltofilia
H. influenzae	no growth	H. influenzae	H. influenzae
Pseudomonas aeruginosa	no growth	Pseudomonas aeruginosa	Pseudomonas cepacia
E. Coli	no growth	E. Coli	no growth
Pr. vulgaris	no growth	Pr. Vulgaris	no growth

Thus, analysis of the results of treatment of bacterial sinusitis in the immediate and long-term periods showed that the treatment was effective in 3 (11.1%) patients in the control group and 30 (90.9%) patients in the main group.

During the control (after 1 year) computed tomography of the paranasal sinuses in patients who did not have relapses of bacterial inflammation, no negative dynamics of the X-ray picture were noted, except 2 (6%) patients of the main group against the background of a polypous process and 6 (22.2%) patients control group in which there was an increase in the severity of the polyposis process.

The most common pathogens of bacterial recurrent sinusitis are represented by Pseudomonas aeruginosa - 18%, E. Coli - 10%, Str. pneumonia - 13%, Gram-positive flora occurs only in 26% of cases: Staphylococcus aureus - 15%, Streptococcus epidermidis - 12%, Streptococcus viridans - 2%. In 4% of cases, fungi (Candida albicans) are sown.

After obtaining a larger volume of confirmatory data, it was established that the dynamics of pathological symptoms of exacerbation of sinusitis in both groups were the same, but by the 15th day of observation, all signs of the inflammatory process in the main group were 1.5 times less pronounced than in the control group. Bacteriological efficiency was also high in the main group by 2 times. The use of antibiotic therapy in combination with topical steroids should be recognized as an effective comprehensive method of conservative treatment of recurrent bacterial sinusitis.

Conclusion. A comparative analysis showed the safety and effectiveness of regional antibacterial therapy against the background of low-frequency ultrasound in the treatment of exacerbations of chronic purulent polysinusitis. The advantage of this approach is to minimize the increase in antibiotic resistance of pathogens associated with the exacerbation of this disease.

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