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Modern aspects of chronic rhinosinusitis treatment

M. Lomaia[1,2], Sh. Tsiklauri[3,4], T. Khechinashvili[4], M. Tsabadze[5], N. Nakudashvili[3]

[1]TSMU G. Zhvania Pediatric Academic Clinic, Tbilisi, Georgia
[2]Tbilisi JSC "Curatio", Tbilisi, Georgia
[3]European University, Tbilisi, Georgia
[4]LTD "Aversi Clinic", Tbilisi, Georgia
[5]National Center of Otorinolaringology, Japaridze-Kevanishvili Clinic, Tbilisi, Georgia

Abstract

In this work, we discuss the development of a new method of immunogenesis and treatment of infectious and infectious-allergic chronic sinusitis and its effectivness, based on new targeted methods of immunocorrection, taking into account the severity of the inflammatory process, current complaints and duration. 52 patients were under observation. The results of treatment with an aerosol of recombinant interferon αa-2b (in the form of Gripferon drops) in different types of chronic rhinosinusitis were studied. It has been shown that aerosol therapy with Gripferon gives promising results – subjective condition of patients and rhinoscopic and endoscopic data, as well as improvement of nasal olfactory function and regulation of mucociliary clearance, which indicates the effectiveness of this method of treatment.

KEY WORDS: rhinosinusitis; gripferon; aerosol therapy; neutrophils; eosinophils

Introduction

In the last ten years, a significant increase in the number of patients with nose and sinus pathologies, first of all, chronic rhinosinusitis, has been observed, at the same time, the tendency of these pathologies to worsen is noted [1,2,3,4,5,6,7,8].

Chronic rhinosinusitis is a chronic inflammatory disease of the upper respiratory tract, the treatment methods of which include drug treatment or surgical intervention. Surgical treatment in many cases does not exclude the relapse of the disease that is why the main goal of our research was to combine conservative treatment and physiotherapeutic methods and search for efficient methods of treatment of the mentioned nosology.

The aim of the study was to study the effect of Gripferon intranasal aerosol therapy on clinical, functional and laboratory parameters of patients with chronic infectious rhinosinusitis and chronic allergic-infectious rhinosinusitis.

Materials and Methods

52 patients between the ages of 17 and 60 were examined, 30 of them had chronic infectious rhinosinusitis (CIRS), and 22 had chronic allergic-infectious rhinosinusitis (CAIRS).

All patients participating in the study were subjected to general clinical examinations against the background of studying the anamnesis of the disease and living conditions.

When studying the complaints of these patients, special attention was paid to the nature of nasal discharge, the function of smell and the state of nasal breathing, rhinoscopy was performed with the Medical 5W LED (ENT) Head Light and the Flexible Nasopharyngolaryngoscope Pentax FNL-10RP3, while we evaluated the condition of the mucous membrane of the nasal cavity and the nature of nasal discharge.

To determine the state of the nasal olfactory function, we used odorous solutions of various increasing strengths, namely, 0.5% acetic acid solution (weak odor), wine alcohol (medium odor), and valerian tincture (strong odor).

If the patient could not smell the weak acetic acid solution, he was considered to have olfactory function disorder I degree (hyposmia I degree), if the patient could not

smell the acetic acid solution, but could smell the alcohol of wine, he was considered to have hyposmia II degree. If the patient could smell only valerian tincture from the above-mentioned odorous substances, it was considered that he had hyposmia of the III degree.

Absence of olfaction to odorous solutions of acetic acid, alcohol, and valerian indicated anosmia.

We were investigating mucociliary clearance in G.I. Markov's [9] method, when charcoal powder based on starch-agar gel was used as an indicator (starch 0.2 g, agar-agar 0.60 g, charcoal powder – 1 g, water – 10 ml).

At the beginning of the study, a gel was prepared to which indicator powder was added, and we applied the obtained compound to the surface of the lower turbinate and controlled its entry into the nasopharynx. We evaluated the driving function of the ciliated epithelium with the following parameters: norm – 15 minutes; First degree violation – 16-30 minutes; II-degree violation – 31-45 minutes; III-degree violation – 46-50 min.

Before treatment, all patients participating in the study underwent Radiography of the paranasal sinuses in the frontal-nasal and lateral projections. Cytological and Bacteriological examination of nasal discharge, F.I. Chumakov's recommendations [10] and microscope ″Biolam-P" (LoMo, Russia).

During the performed cytological examination, the number of neutrophils and eosinophils with phagocytic bacteria was determined. To determine the number of neutrophils and eosinophils, we used criteria provided by A. Yalovaiski and R. Zeiger [11] with our modification. In particular, if the average number of neutrophils and eosinophils in 10 fields of vision at 1000 times magnification did not exceed one, it was evaluated as 1 point. The average number of neutrophils and eosinophils in 10 fields of view under conditions of 1000 times magnification from 1.1 to 5 was evaluated as 2 points, from 5.1 to 15 as 3 points, from 15.1 to 20 as 4 points and more than 20 – as 5 points.

During the bacteriological examination, special attention was paid to the size (diameter) of colonies of homogeneous cultures of microbes. Colonies whose diameter did not exceed 2 mm were considered as small colonies, and colonies whose diameter ranged from 2.1 to 4 mm were considered medium. Colonies greater than 4 mm in diameter were considered large colonies.

Treatment of patients included 15 procedures of intranasal aerosol therapy.

As an aerosol, a 10 ml solution of Gripferol 10,000 IU/ml was used in the form of 1 ml diluted with 3 ml of distilled water. Procedures were carried out every day, except Sunday. The duration of a separate procedure was 15 minutes. We used the ″OMRON C102″ device (Italy) to conduct aerosol therapy.

Results and Discussion

It was revealed that before the treatment, patients' complaints, their frequency and nature depended on the form of rhinosinusitis. Complaints were more diverse in chronic allergic-infectious rhinosinusitis.

Gripferon intranasal aerosol therapy led to a reduction, sometimes even disappearance, of the complaints present before the start of the study. These positive processes were more detected during CIRS.

During rhinoscopy, the nasal mucosa of 23 practically healthy persons examined by us was moist, pink, with a smooth surface. Blood vessels located on the surface can be seen anywhere.

Patients with chronic infectious rhinosinusitis, before the start of treatment, during the previous rhinoscopy, showed irregular thickening and swelling of the nasal mucosa, especially in the area of the lower nasal turbinate, which caused narrowing of the common nasal passage. The surface of the nasal turbinate was smooth. There was also hyperemia and cyanosis of the nasal mucosa. Against this background, 16 (53.33%) examined had single, initiated, superficially located blood vessels. Thick and viscous white serous discharge was also observed in the lower part of the nasal cavity.

In the case of allergic-infectious rhinosinusitis, before the intranasal aerosol therapy of Gripferon, rhinoscopy revealed a whitish-gray coloration of the mucous membrane of the nasal cavity in 4 (18.18%) patients, 12 (54.54%) had pale pink, 5 (22.72%) pink and 3 (13.63%) – red.

19 (86.36%) patients had swelling of the nasal mucosa, 5 (22.72%) – its hyperemia and cyanosis, and 4 (18.18%) – it’s bumpy. All subjects with CAIRS had narrowing of the nasal passages and liquid-mucous discharge from the nose.

Intranasal aerosol therapy with Gripferon led to improvement of the condition of the nasal mucosa, in some cases to complete normalization. This positive process was more pronounced – during CIRS.

It should be noted that after intranasal aerosol therapy with Gripferon, 17 (56.66%) patients with chronic infectious rhinosinusitis completely improved their rhinoscopic data: the thickening and swelling of the nasal mucosa disappeared, cyanosis and hyperemia, which returned pink; the nasal passages were widened. The discharge from the nose stopped. In 13 (43.33%) of the subjects examined by CIRS, after intranasal aerosol therapy with Gripferon, the condition of the nasal mucosa improved; thickening of discharge and swelling of the mucous membrane; The hyperemia and cyanosis of the nasal mucosa decreased, the discharge from the nose decreased, and the nasal passages expanded to some extent.

In the case of allergic-infectious rhinosinusitis, after treatment with Gripferon aerosol, 16 (72.72%) patients had pink mucous membrane in the nasal cavity, 18 (81.81%) patients had smooth nasal cavity mucosa. Mucosal thickness decreased in 4 (18.18%) patients and did not change in 2 (9.09%) patients. Swelling of the nasal mucosa disappeared in 8 (36.36%) and decreased in 10 (45.45%) subjects with CAIRS. 15 (68.18%) patients were diagnosed with enlargement of the nasal passages. After treatment with Gripferon aerosol, none of the patients with CAIRS had cyanosis and hyperemia of the mucous membrane of the nasal cavity. At the same time, intranasal aerosol therapy with Gripferon did not cause any changes in rhinoscopic data in 2 (9.09%) patients with CAIRS.

The mentioned intranasal aerosol therapy method at the same time led to the improvement of the nasal olfactory function and the mucociliary clearance of the ciliated epithelium of its mucous membrane, almost even to normalization. These positive changes were more pronounced during chronic infectious rhinosinusitis.

For example, absence of smell (anosmia) was detected in 6 (17.64%) patients with CIRS and 9 (40.90%) patients with CAIRS; violation of the olfactory function of the first degree, according to the forms of the pathology, 2 (6.66%) and 1 (4.54); 2nd degree violation of olfactory function – 5 (16.66%) and 2 (9.09%); 3rd degree violation of olfactory function – 5 (16.66%) and 8 (36.36%) examined.

4 (13.33%) patients with chronic infectious rhinosinusitis and 2 (9.09%) patients with allergic-infectious rhinosinusitis had no olfactory dysfunction before treatment.

After treatment with Gripferon intranasal aerosol, olfactory dysfunction degree I was detected in 7 (23.33%) patients with CIRS and 5 (22.72%) patients with CAIRS; violations of the olfactory function of the II degree respectively were detected in 2 (6.66%) and 4 (18.18%) cases; III-degree violation of olfactory function – 1 (3.33%) and 3 (13.63%) examinees.

Before treatment, 14 (46.66%) patients with CIRS and 6 (27.27%) patients with CAIRS had first-degree mucociliary clearance disorders. 9 (30%) and 11 (50%) had second-degree mucociliary clearance violation, according to the pathology forms; Level III disturbance of mucociliary clearance – 1 (3.33%) and 3 (13.63%) examinees.

6 (20%) patients with CIRS and 2 (9.09%) patients with CAIRS had normal mucociliary clearance before treatment.

Cytological examination, which was performed on the nasal mucosa, revealed a significant number of neutrophils with phagocytic neutrophils was in the smear in patients with CIRS and a significant number of eosinophils was CAIRS, and after treatment with Gripferon intranasal aerosol, a decrease in the number of these cells were noted. The positive process was more pronounced during CIRS. In particular, the positive impact of Gripferon intranasal aerosol treatment was more pronounced in chronic infectious rhinosinusitis.

It should be noted that before treatment with Gripferol intranasal aerosol, the content of neutrophils with phagocytosed microbes in the nasal discharge smear in case of CIRS was averaged 3.883 points ± 0.1177 points (N-1.00 points), the number of eosinophils in the same smear – 1.00 points (N-1.00 points). The values of the mentioned indicators during the CAIRS, after intranasal aerosol therapy with Gripferon, were respectively – 1.144 points ± 0.3565 points and 4.466 points ± 0.9599 points.

After conducting intranasal aerosol therapy with Gripferon, the content of neutrophils with phagocytosed microbes in the nasal discharge smear during CIRS was already 1.589 points ± 0.1345 points ($P<0.001$), and the number of eosinophils in the same smear was equal to – 1.00 points. In the case of CAIRS after Gripferon aerosol treatment, the values of the indicators were equal to 1.00 points ($P<0.05$) and 2.144 points ± 0.2452 points ($P<0.001$).

Bacteriological examinations of nasal discharge showed that all patients with chronic rhinosinusitis were carriers of bacteria. Staphylococcus aureus was the most frequently cultured, which was detected in all patients with CRS: epidermal staphylococcus, 16 (47.05%) in CIRS and 12 (42.85%) CAIRS, diphtheria corynebacterium respectively 10 (29.41%) and 8 (28.57%).

Treatment with Gripferon intranasal aerosol had a bacteriostatic effect, which was revealed by a decrease in the diameter of the colonies of microbial cultures sown in the majority of patients.

In particular, before treatment, small colonies of seeded microbes were detected in 3 (10%) patients with CIRS and 1 (4.54%) patient with CAIRS; Colonies of medium size, according to the forms of pathology – 12 (40%) and 9 (40.9%); Large colonies – 15 (50%) and 12 (54.5%) examined.

After treatment with Gripferon intranasal aerosol, small colonies were detected in 18 (60%) patients with CIRS and 11 (50%) patients with CAIRS; Colonies of medium size, according to the forms of pathology – 12 (40%) and 11 (50%) of the examined.

From the obtained studies, it was determined that Gripferon intranasal aerosol therapy in patients with the mentioned forms of chronic rhinosinusitis leads to a marked improvement of both subjective condition and rhinoscopic data, nasal olfactory function and mycociliary clearance condition, in some cases even to complete normalization; reduction or complete disappearance of neutrophils and eosinophils in the mucous discharge of the nasal cavity; It causes a bacteriostatic effect, which is manifested in the reduction of the size of the colonies of the sown infected cultures.

References

1. Krutikhina SB, Yablokova EA. Acute respiratory viral infections in children: current possibilities for the use of homeopathic medicines. 2016; 18:1191-1195 [in Russ]
2. Osidak LV, Golovacheva EG, Afanasiev OI, Gorelov AV, Geppe NA, Yanina MA. Evaluation of the therapeutic effectiveness of two domestic preparations of recombinant interferon α-2b for intranasal introduction (genferon® light and grippferon®) for sars in infants and young children. J Drugs in pediatrics, 2017 [in Russ]
3. Yushchuk ND, Khadartsev OS. The use of interferons in the prevention and treatment of respiratory viral infections in adults and children. Medical scientific and practical journal attending physician 2018; 3. – 67 [in Russ]
4. Kozlov MN. Clinical and immunological characteristics of some forms of chronic rhinitis. Abstracts Book. Science.– M.: 1998; – 21 [in Russ]
5. Osidak LV, Golovacheva EG, Afanasyeva OI, Gorelov AV, Geppe NA, Yanina MA. Evaluation of the therapeutic efficacy of two domestic preparations of recombinant interferon α-2b for intranasal administration (Genferon® Light and Grippferon®) in ARVI in infants and young children. Journal of Pediatrics named after G.N. Speransky, 2017; 96(2) [in Russ]
6. Anon JB, Jacobs MR, Poole MD. Sinus and allergy health partnership. Antimicrobial treatment guidelines for acute bacterial rhinosinusitis. Otolaryngol. Head Neck Surg. 2004; 130(1):1-45
7. Druce HM. Chronic sinusitis, rhinitis and asthma. Rhinitis and asthma. Similarities and differences. – Copenhagen: Mlunksgaart. 1990; 150-155
8. Chow AW, Benninger MS, Brook I. Infectious Diseases Society of America. IDSA clinical practice guideline for acute bacterial rhinosinusitis in children and adults. Clin. Infect. Dis. 2012; 54(8):e72-e112
9. Markov G. Differential diagnosis and sparing methods of treatment of inflammatory diseases of the nose and paranasal sinuses: Abstract of the thesis. diss. Dr. med. Sciences. – M.: 1987. – 31 [in Russ]
10. Chumakov FI. Diagnostic and therapeutic methods in the clinic of diseases of the ear throat and nose. – St. Petersburg: Peter. 2000; – 218 [in Russ]
11. Yalovaisky A, Zeiger R. The study of scrapings from the nasal mucosa and conjunctiva. Clinical Immunology and Allergology (translated from English). M.: Practice. 2000; 682-683 [in Russ]