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STUDY OF MICROBIAL LANDSCAPE IN PATIENTS WITH CHRONIC POLYPOSIS RHINOSINUSITIS

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Abstract
170 patients of different age with chronic polypous sinusitis have undergone sur-gical and medicamentous sanation of the nasal cavity and paranasal sinuses. In al! the cases microflora of the middle nasal passage was studied as well as pathogenic properties of the causative agents, their sensitivity to antibiotics, lysis by phages, and data were correlated to the clinical data. Obtained results suggested a considerable staphylococcal dissemination of the nasal mucosa in presence of polypous sinusitis that increased in the early postoperative period and somewhat decreased in 6—12 months postsurgically. Pathogenic chromogenic staphylococcus (especially of phage group I) was associated with more serious course of disease with frequent recurrences of nasal polyposis. Microbial associations in suppurative-and-polypous sinusitis were isolated 2 times more often than in polypous one.

Keywords: chronic polypous sinusitis, microflora, antibiotics pathogenic chromogenic staphylococcus.

Introduction

Relevance of the work

In recent years polyposis sinusitis is often encountered in chronic rhinogenic pathology both in adults and children. The majority of authors recognize infectious-allergic nature of this disease (4,5) and the leading role in the development of the process is given to the allergic background, therefore with the removal of polyps from the nasal cavity and paranasal sinuses of great importance is acquired anti-allergic treatment. Since the microbiological factor is given a minor role in the pathogenesis of the disease, the data available in the literature on the bacteriology of chronic polyposis processes in the nasal cavity and paranasal sinuses are very scarce.(1,3,10) Presence of opportunistic microorganisms in the area of upper and lower respiratory tracts in chronic sinusitis, bronchitis, pneumonia against the background of decrease of factors of local immunological antibacterial defense influences the occurrence and dynamics of development

of infectious-allergic process (6,7). All the above-mentioned confirms the necessity of microbiological studies in dynamics taking into account the severity of the clinical course of chronic polyposis sinusitis

The aim of the study was to determine the species composition of bacterial flora in the nasal cavity in chronic polyposis rhinosinusitis, to study the relationship between the nature of the flora, the level of its pathogenicity and the severity of the disease course. The task of the study was to determine the duration of detection of microbial populations isolated from the nasal cavity in a number of patients.

Methods and Sources of Research

Material for sowing was taken with a cotton swab from deep parts of the middle nasal passage due to the fact that in the majority of observed patients polyposis and inflammatory changes of the mucous membrane were more sharply expressed in this area, as well as in order to exclude transient microflora of the upper respiratory tract, which comes to the mucous membrane during breathing and is quickly eliminated from the body (2,9). Nasal secretions were seeded on a Petri dish with 5% blood agar and Kitt-Tarozzi medium with 0.1% agar-agar. The cultures were incubated in a thermostat at 37 °C for 24 hours. The next day the presence and character of growth on solid and liquid nutrient media were determined, microscopy of Gram stained smears was performed. Further pure cultures of possible pathogens were isolated, identified to species, morphological, culture, enzymatic and toxigenic properties were studied. To identify staphylococci, a number of common tests were used (determination of plasma coagulase, DNA-ase, lecithinase, hemotoxins, phosphatase, ability to ferment mannitol and glucose under aerobic and anaerobic conditions). With regard to Staphylococcus aureus strains, in addition to determining the phage variant using the International Set of Standard Phages, we additionally assessed their phagolysisability by titration according to the Appelman method.(7,9)

Results of the Examination

There were 170 patients with polyposis and purulent-polyposis sinusitis under our observation in the department of otorhinolaryngology of Samarkand State Medical University. At the age from 18 to 30 years-21, from 31 to 40-29, from 41 to 50-53, from 51 to 60-34, from 61 to 70-30, older than 70 years-3. Purulent-polyposis form of chronic sinusitis was determined in 70 patients, polyposis form - in 100 patients. It should be noted that in young people (from 18 to 44 years) purulent-polyposis sinusitis was observed more often. The majority of patients had polysinusitis. Only in 16 persons the inflammatory process took place in one sinus (in the sinuses of the lattice bone - in 11, in the maxillary sinuses - in 5).

The duration of the disease was from several months to 10-25 years. In adults polyposis process, as a rule, had recurrent character. Only 4 children had frequent recurrences of polyposis (with an interval from 4 months to 1.5 years), the rest of the children had primary polyposis of the nose and sinus of the lattice bone with the process duration from 1 to 3 years. The main complaints on admission to the hospital were nasal breathing difficulties, mucous, purulent-mucous or watery discharge, hypo- or anosmia.

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The character of the isolated microflora is presented in Table1.

Staphylococcal flora was isolated at admission in 77.7% of patients, and in purulent-polyposis sinusitis - in 70.7 and 81.5% (P<0.05). Staphylococcus aureus strains in purulent form of polyposis process were found in more cases than in polyposis sinusitis (respectively in 39,7 and 30,1%; P>0,05). Staphylococcus epidermidis, Staph, saprophyticus were isolated almost 2 times more often in persons with polyposis form than Staph, aureus (51,4 and 31,0%). Consequently, the predominance of staphylococcal microflora in polyposis sinusitis in contrast to purulent-polyposis form was observed mainly due to the predominant detection of conditionally pathogenic strains. Streptococcal flora was detected in 13.7% of observations. It was represented mainly by green streptococcus and was found with almost equal frequency in polyposis and purulent-polyposis forms of sinusitis. Escherichia coli was isolated in the nasal discharge in 10.5% of cases. The results of 10 bacteriologic analyses showed the presence of Micrococcus catarrhalis, Bact. diphtheroides (5.5%).

In single observations Klebsiella ozaenae (2), Hemo¬philus influenzae (4), Enterococcus (2) were found. Seeding of nasal secretions in 14 patients showed absence of microflora growth, which, apparently, was associated with prolonged local application of various antibacterial drugs before admission to the hospital (antibiotics, silver nitrate, etc.). Bacteriologic studies after surgical treatment and application of antihistamines showed that the majority of them (94%) also had staphylococcal flora vegetating in the nasal cavity.

Staphylococcus aureus was isolated in 97.2% of patients with purulent-polyposis form. Epidermal staphylococcus was found in patients with both purulent-polyposis form and polyposis form.

In purely polyposis form of sinusitis, in which the main importance in the pathogenesis of the disease are local and general allergic reactions, epidermal staphylococcus a little more often was detected in contrast to purulent form of sinusitis (respectively 41,6 and 32,6%).

Nasal cavity microflora in chronic polyposis sinusitis

A form of sinusitis	Microflora													
	Staphelococcus			Streptococcus			Proteus vylgarls	Bact.coli	Enterococcus	Hemophilus influenzae	Micrococcus catarrhalls	Bact. diphtheroides Klepslella ozenae		Rocta
	Aereus	Epidermis	Saprophiticus	Haemoliticus	Viridans	Anhaemolitic uc								
	Number of observations													
Purulent-polyposis	23	11	7	4	5	-	2	9	1	2	2	3	1	5
n = 58	39.7%	31%												
polyposis	31	35	18	-	9	4	4	3	1	2	3	2	1	9
n=103	30.1%	51.4%												
Total	54	46	25	4	14	4	6	17	2	4	5	5	2	14
n=161	77.7%			13.7%		3.7		10.5%		5.5%			8.7%	

Thus, taking into account the dynamics of microbial landscape, it is possible to conclude with a sufficient degree of reliability that as a result of surgical treatment of patients, the staphylococcal infestation of the mucous membrane of the middle nasal passage increases on average by 16.3%, and a little more at purulent-polyposis sinusitis - 18.3% and less at polyposis

- 15.7%. It is of interest that the growth of nasal cavity infection is due to pathogenic strains of Staph, aureus: in polyposis form - by 25.6%, in purulent-polyposis - by 16.8% (on average by 21.2%; P>0.05). This seemingly paradoxical fact can be explained by the damaging effect of surgical trauma on the mucosa and violation of its protective function. High frequency and stability of staphylococcal flora isolation from the pathologic focus can indirectly testify to its etiologic role not only in purulent-polyposis form of sinusitis, which corresponds to the literature data, but also in allergic rhinogenic pathology, in which bacterial infection is assigned only a secondary role.

Streptococcal flora was isolated at discharge in 30 patients (25.4%), and 2 times more often in the group of persons with polyposis form of the disease. Green streptococcus was isolated in 12 people, non-hemolytic - in 12, hemolytic - in 6. Escherichia coli was found in 22 patients (16,8%), almost 3 times more often in polyposis form.

Proteus vulgaris (6), Micrococcus cafarrhalis (2), Klebsiella ozaenae (1) were isolated in single observations.

Before surgical intervention, the main part of isolated microorganisms was obtained in pure culture (77%): more often in polyposis form (82.5%), less often in purulent-polyposis form (67.2%). Microbial associations were obtained in 33% of observations and 2 times more often in purulent inflammatory process.

Strepto-staphylococcal associations were the most frequent in 66% of cases (more often golden or epidermal staphylococcus + green streptococcus). Greening streptococcus and Escherichia coli (18), staphylococcus and Escherichia coli (11) were isolated somewhat less frequently.

In the nearest terms after the operation in 61,9% in polyposis and in 50% in purulent-polyposis sinusitis there was a replacement of less pathogenic microbial species by more pathogenic ones. More often it was expressed in replacement of epidermal staphylococcus aureus by golden staphylococcus (66,8%).

Only in 33,3% of observations at discharge the patients were isolated non-pathogenic flora or negative result of cultures was obtained. In 54% of cases of bacteriologic analyses in polyposis and in 50% - in purulent-polyposis forms of sinusitis Staphylococcus aureus was isolated. Epidermal Staphylococcus aureus was isolated in a number of persons with polyposis form of the process and negative results of preoperative cultures in the postoperative period. Epidermal staphylococcus aureus was isolated in 33.3% of the examined in the next days after the intervention, but not the golden staphylococcus, as before the operation.

During bacteriological studies in 1-2 years after treatment in 104 patients the change of microbial landscape and isolation of pathogenic microorganisms was determined in 59,8% of cases in comparison with less pathogenic strains before the operation, and in polyposis form of the disease much more often than in purulent-polyposis form (51,6 and 21,4%). The change of Staphylococcus aureus to epidermal was noted in 40,2% of patients. In 30.8% of patients the microflora did not change, and more than a half of them were isolated plasma-coagulating staphylococcus aureus.

In 31 patients (88.5%) with long-term persistence of Staphylococcus aureus in the nasal cavity, recurrences of polyposis were observed within 6 months to 1 year. At phagotyping of 87 strains of Staphylococcus aureus isolated, it was established that more often (26%) they belonged to I lytic group (phagovars 80, 52A, 79). All persons, in whom these phagovars were isolated,

suffered from frequently recurrent nasal polyposis. In 8 persons in whom staphylococci were isolated, the course of the inflammatory process was severe (recurrences in 1-3 months) with pronounced clinical symptoms. 14% of isolated strains belonged to phagogroup II, to phagogroup III and I - 22%. Patients of this group also suffered from repeated relapses, but the course of the disease was less severe. Staphylococcus strains, which were lysed by phages 729, 413, 81, 13 676, more often vegetated in the nasal cavity in patients with favorable course of polyposis process. In 11 people of this group no recurrence of polyposis was observed for 1-2 years. In 8 patients the same phagovar was repeatedly isolated during 6-11 months of observation. This indicates the possibility of prolonged presence of a certain population of staphylococcus on the mucous membrane of the nasal cavity even after surgical sanation of the inflammatory focus and drug anti-inflammatory therapy.

Conclusion

1. In polyposis sinusitis there is a significant mucosal contamination of the nasal cavity by Staphylococcus aureus, which increases in the immediate postoperative period (77.7% and 94%) and slightly decreases 6-12 months after the intervention (59.6%).
2. In a number of patients there is a long-term persistence of the population of Staphylococcus aureus or epidermal staphylococcus on the mucous membrane of deep parts of the nasal cavity even after surgical and drug sanation of the inflammatory focus.
3. Staphylococcus aureus (especially phagogroup I) contributes to a more severe course of the disease with the development of frequent recurrences of polyposis.
4. Microbial associations were isolated 2 times more often in purulent-polyposis form of sinusitis than in polyposis form.

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