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THE RESULTS OF APPLYING A LYSOZYME IN THE COMPLEX THERAPY OF CHRONIC HIGHMORITES

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Foreign Technology Division
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Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere. When written as ё in Russian, transliterate as yë or ë. The use of diacritical marks is preferred, but such marks may be omitted when expediency dictates.

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RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English
sin	sin
cos	cos
tg	tan
ctg	cot
sec	sec
cosec	csc
sh	sinh
ch	cosh
th	tanh
cth	coth
sch	sech
csch	csch
arc sin	$\sin^{-1}$
arc cos	$\cos^{-1}$
arc tg	$\tan^{-1}$
arc ctg	$\cot^{-1}$
arc sec	$\sec^{-1}$
arc cosec	$\csc^{-1}$
arc sh	$\sinh^{-1}$
arc ch	$\cosh^{-1}$
arc th	$\tanh^{-1}$
arc cth	$\coth^{-1}$
arc sch	sech^{-1}
arc csch	csch^{-1}
—	
rot	curl
lg	log

THE RESULTS OF APPLYING A LYSOZYME IN THE COMPLEX THERAPY OF CHRONIC HIGHMORITES

S. I. Mostovoy, Professor and
N. I. Gleyevoy

From the ENT Clinic (Chief - honored worker in Science, Prof. S. I. Mostovoy) of the Kiev Institute for the Advanced Training of Physicians (rector - Prof. M. N. Umovist), from the laboratory of microbiology and immunology (Chief - doctor of med. sciences A. Ye. Vershigona) of the Kiev Scientific Research Institute of Otolaryngology (dir. - member of the Academy of Sciences Ukr. SSR, Prof. A. I. Kolomiychenko) and Kiev regional clinical hospital (head physician - honored physician of the Ukr. SSR, B. I. Denisyuk)

Chronic inflammations of the nasal accessory sinuses continue to occupy, even at the present time, a significant place in ENT pathology. The existing methods of treatment, despite their multiplicity and diversity, frequently do not give the desired results.

In recent years we observed a noticeable reduction in the quantity of operations on the nasal accessory sinuses and an increase in the importance of the conservative methods of treatment.

Antibiotics, sulfanilamides, and enzymes are widely used in the therapy of chronic sinusites. However, as numerous investigations showed (Aubry, Cansse, Railer, 1960; Depaere, 1962,

Rerger, Pirson, 1962; Shambaugh, 1963; L. B. Daynyak, 1966; B. S. Preobrazhenskiy, L. B. Daynyak, D. I. Tarasov and M. R. Bogomil'skiy, 1969), the indicated groups of medications, in addition to positive, also have definite negative properties. Frequently there appear antibiotic-resistant strains of microorganisms, preparations capable of having toxic action, suppressing the viability of tissues, depressing immunity, and causing the hypersensitization of the organism and the development of a different severity of allergic reactions.

Therefore, at present investigations are being conducted in search for new, more effective preparations for the treatment of chronic sinusites. One of these substances is synthesized in the Kiev Scientific Research Institute of otolaryngology preparation "deflogin" (A. I. Kolomiychenko, E. V. Gyulling, G. V. Terent'yev, 1971). The preparation is especially effective, according to these authors, in the therapy of chronic exudative highmorites.

In the ENT clinic of the Kiev Institute for the Advanced Training of Physicians, investigations are carried out in research on the activity of lysozyme and its value in patients with chronic allergic rhinosinusites of microbial etiology.

The given literature and the results obtained by us served as the basis for research on the theraputic action of crystalline lysozyme in patients with allergic rhinosinustes of microbial etiology. Subsequently the lysozyme was applied also used in patients with chronic sinusites whose allergic disease nature was not established.

The lysozyme effect differs significantly from all other antibacterial preparations: lysozyme has a distinct antimicrobial and antiphlogistic action, is not toxic, is easily absorbed, not only does it not suppress the viability of tissues, but rather stimulates the strengths of the organism, facilitates the healing and regeneration of tissues. Lysozyme dissolves the cells of both living and dead microbes, acts under conditions of both aerobiosis and anaerobiosis (Wolff, 1927; Z. V. Yermol'yeva,

1938; Florey, Salton, 1957; Z. V. Yermol'yeva et al., 1962, 1963, 1964; V. A. Shenderovich et al., 1964, 1965; N. A. Zhukovskaya, T. P. Anikina, 1966; T. P. Anikina et al., 1966, 1967; A. E. Kol'man, 1967).

The results, previously obtained by us in an experiment with animals, showed that the lysozyme decreases vascular permeability and also, to a considerable degree, safeguards the cells of the blood (leucocyte) from the damage of acetylcholine (N. I. Gleyevoy, 1972; A. D. Momot, N. I. Gleyevoy, 1972).

The extraordinarily important property of lysozyme is that it, unlike other antibacterial substances, does not possess the ability to sensitize the organism and to cause anaphylactic reactions (N. F. Gamaleya, 1932; Z. V. Yermol'yeva, 1938).

Later investigations showed that the lysozyme possesses, in addition to everything, a desensitizing property (Cavalli, Ottolenghi, 1964; Z. V. Yermol'yeva, 1968).

The valuable properties of lysozyme were successfully used in the different fields of practical medicine as long ago as 1931 on the initiative of the Soviet scientists (Z. V. Yermol'yeva and I. S. Buyanovskaya, 1931). However, the primitive method of producing the preparation in separate laboratories, the time consumption of the process, its high costs and the discovery of antibiotics stopped the use of the lysozyme in clinical practice.

At the present time the factory production of pure crystalline lysozyme in Latvian SSR has been adjusted. In Italy the purified lysozyme is produced for intramuscular and intravenous administration.

In recent years the use of lysozyme in the clinic increased considerably.

As the investigations of a number of authors showed (N. A. Zhukovskaya, 1962; Z. V. Yermol'yeva et al., 1962, 1963, 1964; V. A. Shenderovich et al., 1964, 1965, and others), lysozyme turned out to be especially effective during treatment of the respiratory tracts in carriers of pathogenic staphylococci, for the prophylaxis of influenza, during treatment of the diseases caused by microbes resistant to antibiotics; the preparation was effective during staphylococcus-and coli-sepsis.

Abroad lysozyme is widely used for the prophylaxis of post-operative hemorrhages in patients after a tonsillectomy.

We investigated the theraputic effect of a 1% solution of crystalline lysozyme of Latvian production in patients with various forms of chronic exudative highmorites (according to B. S. Preobrazhenskiy's classification).

In addition to conventional clinical investigations, we conducted roentgenography of the nasal accessory sinuses, their puncture with an inoculation of the flora contents and the determination of its sensitivity to antibiotics, and the bacterioscopic investigation of the punctate.

The allegolegical nature of the disease was established on the basis of allegological anamnesis, the clinical picture, the eosinophil of the blood and mucus of the nose, roentgenography of the nasal accessory sinuses in dynamics, and also on the basis of intracutaneous samples with microbial allergens.

We have examined 137 patients (59 males and 78 females). There were eight people up to 15 years old, from 15 to 20 years - 11, from 21 to 30 - 18, from 31 to 40 - 44, from 41 years to 50 years - 36; from 51 years to 60 years - 9 and over 60 years - 11.

The duration of the disease up to one year was determined in 48 persons, from 1 year to 5 years - in 44, from 6 to 10 years - 20, from 11 to 15 years - 21, and more than 15 years - 4.

In 50 of the patients the process was bilateral, in 87 - unilateral.

The persons examined comprised two groups: with the allergic nature of disease (74 people) without signs of allergy (63 people). Each group of the patients was divided into subgroups.

One subgroup was the control group. For these patients we prescribed vascoconstricting nose drops. Sulfanilamide preparations; we punctured the Highmore antrums for a day by injecting into them antibiotics (to which the flora of the Highmore antrum of this patient was sensitive) and, in individual cases, injecting trypsin-type enzymes.

To the other subgroup of patients we administered a 1% solution of crystalline lysozyme: we punctured the Highmore antrums for a day according to conventional procedure, we abundantly washed the antrum sterile in a 05% solution of the table salt, after which in the mandibular antrum we administered 5 mm of the crystalline lysozyme solution made from a 0.5% solution of common salt. The course of treatment - up to 10 punctures. The effect basically began after 3-4 punctures. In the presence of exudate to the moment of 10 punctures the treatment was considered ineffective.

In the patients with the allergic nature of disease, we additionally performed desensitizing therapy (unspecific or specific - by microbial allergens). Vascoconstricting drops were not prescribed for the persons in these subgroups.

In the patients with a negative result of inoculating the punctate of flora for days we punctured the Highmore antrum for

a second time while investigating the contents of the mandibular antrum with flora by repeated inoculation and bacterioscopy.

Of 187 investigated mandibular antrums, there was pus in 82, pus with mucus - in 43, mucus - in 16, serous fluid - in 11, and no punctate obtained in 35 antrums.

In 111 patients the punctate was subjected to bacterioscopic investigation: flora was revealed in 68 persons.

With repeated puncturing for days, while investigating the punctate not only by inoculations, but also by bacterioscopy flora was additionally revealed in 16 of the 43 people, including one in a nutritional medium.

It is characteristic that in the majority of patients (in 11 of the 16) in which the flora was not inoculated but was revealed by bacterioscopy, there were clear signs of allergy.

As a result of determining the flora in the contents of the Highmore antrums it is established that in a definite percentage of cases the microbial composition in the contents of the mandibular antrums of one and the same patient can be different not only in its composition, but also in its sensitivity to antibacterial substances. We ascertained a similar fact in 19 patients, when the flora of the punctate on one side differed from the flora of the contents of the mandibular antrum on the other side.

The results of the punctures of the mandibular antrums in the process of treatment are reflected in the figure. As can be seen from the graph, even to the moment of the second puncture, i.e., for days after the administration of lysozyme, a quantity of Highmore antrums with a pathological exudate decreased by almost half (21 antrums of 41), whereas during treatment by antibiotics and their enzymes it was respectively 31 of 45. From

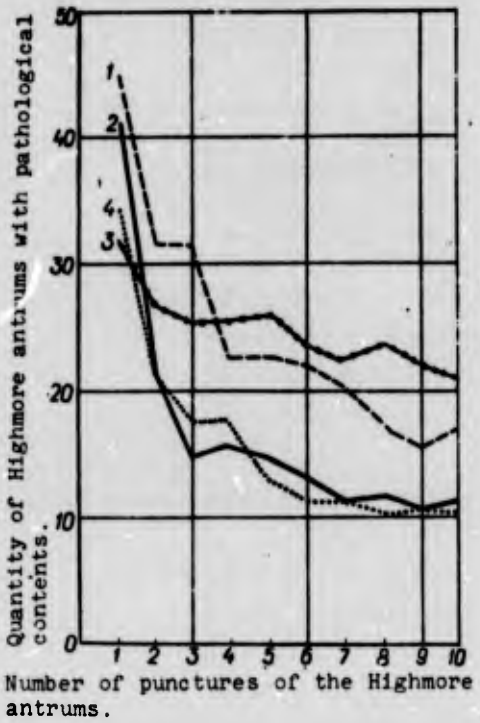

Figure. Change in the number of Highmore antrums with pathological contents in the process of treatment: 1) by antibiotics and enzymes in patients with chronic exudative highmorites (in the absence of an allergic component); 2) by lysozyme in the contingent of patients without signs of allergy; 3) by antibiotics and enzymes in patients with chronic allergic highmorites; 4) patients with chronic allergic highmorites with a 1% solution of crystalline lysozyme.

the graph we can distinctly see the advantages of lysozyme treatment in patients with chronic highmorites with an allergic component.

Table 1 shows the results of the punctures of the Highmore antrums in the distant period. The data given confirm good results of lysozyme treatment in the distant period also.

So, in patients without signs of allergy two years after lysozyme treatment, the exudate was absent from the mandibular antrums in 21 of the 29 examined, and after treatment with antibiotics and enzymes - in 8 of the 21.

Among the persons with allergic exudative highmorites in the distant period, the exudate was absent after lysozyme treatment in 23 of the 29, whereas after medical treatment by antibiotics and enzymes it was absent in only 10 of the 22 examined in this period.

Table 1. Results of the punctures of Highmore antrums in the distant period (in 6-12 and 24 months after medical treatment).

Method of treatment	By antibiotics and enzymes						By lysozyme					
Contingent of patients	with allergic sinusites			without signs of allergy			with allergic sinusites			without signs of allergy		
Periods of examination (in months)	6	12	24	6	12	24	6	12	24	6	12	24
Quantity of that examined	23	22	22	23	21	21	31	31	29	32	30	29
Nature of the punctate: Pus	8	7	3	5	8	7	2	2	3	1	2	3
Pus-mucus	6	5	7	4	5	6	2	2	2	2	3	2
Mucus	1	1	2	1	1	—	1	2	1	2	2	3
Contents not obtained	8	9	10	13	9	8	26	25	23	27	23	21

The data on the presence of flora in the contents of the highmore antrums are shown in Table 2. So, the flora was inoculated in the contents of 79 mandibular antrums of the 152, and by the method of punctate bacterioscopy it was revealed in 100 antrums from this same number of patients. This shows that negative inoculation of the contents of the mandibular antrums in the flora still does not indicate its absence, since the latter is frequently detected during bacterioscopy of smears from the punctate. Here our results agree with the data of the literature (M. A. Parkhomovskiy, I. A. Grushinskaya, T. G. Polyakova, 1972).

From the data in Table 2 it is evident that a month after treatment of the patients with the allergic nature of disease, flora is detected considerably less often in the persons treated with lysozyme, compared with the control group. Thus, a month after therapy of this group of patients with lysozyme, flora was revealed in seven of the 48 persons, and in the control group - in 20 of the 40.

In the patients with an absence of exudate and flora in Highmore antrums, as a rule, complaints were not characteristic

Table 2. Results of the investigation of the contents of Highmore antrums in flora in patients before and a month after medical treatment.

By which method	In patients with chronic highmorites without signs of allergy (56 patients, 86 antrums)				In patients with chronic allergic highmorites (54 patients, 66 antrums)			
	Number of cases in the presence of flora				Number of cases in the presence of flora			
	Before medical treatment		A month after medical treatment		Before medical treatment		A month after medical treatment	
	With antibiotics and enzymes	With lysozyme	With antibiotics and enzymes	With lysozyme	With antibiotics and enzymes	With lysozyme	With antibiotics and enzymes	With lysozyme
Inoculation on nutritional mediums.....	20	22	5	4	17	20	6	3
Bacterioscopy of the smear..	23	26	7	4	23	28	14	4

of highmoritis; the X-ray photographs of the nasal sinuses and the rhinoscopic picture which indicated clinical recovery were normal.

Any allergic reactions or other complications during lysozyme treatment were not noted.

Analysis of the results of the investigations conducted makes it possible to consider that lysozyme is an effective preparation in the therapy of the exudative forms of chronic allergic siusites of microbial etiology.

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RESULTS OF APPLICATION OF LYSOZYME FOR THE TREATMENT OF CHRONIC HIGHMORITIS

Professor *S. I. MOSTOVOI, N. I. GLEYEVOI* (Kiev)

Summary

The authors studied the therapeutic effect of 1% solution of crystalline lysozyme introduced in the antrum of Highmore in 74 patients with chronic exudative highmoritis of allergic nature and microbial genesis as well as in 63 patients without signs of allergy. Ever group of patients was divided into two sub-groups, principal and control onea.

The patients of the control sub-groups underwent usual treatment. Patients with the allergic nature of disease got desensitizing therapy in addition to it.

Two years after the course of treatment (10 injections of lysozyme into the antrum) no pathologic exudate was found in 79.3% patients with the allergic nature of the disease and in 72.4% patients without signs of allergy. After lysozyme therapy the flora was studied in the excretion of the Highmore's entrum in 14.6% cases of the allergic group, and in 50% cases of the control sub-group.

The authors did not observe any allergic reactions or other complications during lysozyme therapy.

They consider lysozyme an effective preparation for the treatment of exudative forms of chronic allergic sinusitis of microbial etiology.