

Lingual tonsils hypertrophy and possibility of its correction by physical factors

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Abstract

Introduction: The component of the lymphopharyngeal ring is the lingual tonsil (LT), located on the root of the tongue. With pathological changes in the lymphoid tissue of the pharynx, surgical removal of the tonsils, as a result of increased antigenic load, a compensatory increase in LT is observed – «lingual tonsillar hypertrophy». This is observed against the background of age-related involutive changes, when the remaining elements of the lymphopharyngeal ring begin to perform anti-antigenic and adaptive activity. The processes taking place in, the structure of the LT, which is familiar to the body, changes - the receptor apparatus creates pathological impulses from the organ. The severity of clinical manifestations correlates with the degree of increase in LT. The emphasis on these manifestations, psychosomatic conditions, create a complex of pathological sensations that violate the quality of patients' life. The goal and objectives of the study are aimed at improving the quality of patients' life with lingual tonsil hypertrophy (LTH), by developing effective methods of diagnosis and treatment, assessing the role of the immunoregulatory shift in the pathogenesis of LTH of the possibility of their correction by the action of a physical factor (cold destruction). **Materials and methods:** When examining 850 people who underwent complex research and instrumental diagnostics in connection with the pathology of ENT organs, 119 people (the main group) were diagnosed with different degrees of LTH, with control of 30 healthy people. Cryosurgical treatment was offered to 76 patients who used the method for treating of lingual tonsil hypertrophy by cryodestruction using a hook-shaped applicator with a heat-insulating nozzle on the back surface, an individual polyethylene cap, and a cryoapparatus.

Results and discussions: With LTH, an increase in the volume and mass of tissues forming the morphological basis of the tonsil was detected: the main substance was an increase in the number and size of layers of coarse fibrous fibers, fields of fat cells, and the growth of mucous glands. The mucous membrane, thinning, undergoes dystrophic-degenerative changes. The rate of proliferation correlates with the severity of inflammation, the causes of which are multifactorial, individual. There is an increased sensitivity reaction to microbial and household allergens, an increase in the content of antibodies in the blood to LT tissues, a change in microbiocenosis of the pharyngeal mucosa, and vegetation of non-resident microflora. As a result of cryosurgical treatment in 56 (73.68%) cases, a decrease in the volume of LT tissue was observed. The deep layers, partially absorbed, were replaced by healthy tissues, the surface layers were rejected with the formation of an atrophic scar or regenerate, the structure of which was close to organotypic. The cause of pathological impulse was eliminated, clinical indicators were normalized, the quality of life of patients was improved. **Conclusions:** LTH should be considered as a continuation of the development of a productive process associated with immunoregulatory changes in chronic infectious and allergic conditions. Local cryogenicity on LTH was accompanied by normalization of the structure of its own substance, LT, and a decrease in inflammatory changes in surrounding tissues. The development of inflammatory changes in LT was a local manifestation of a general disturbance in the functioning of the immune defense system. Achieving a persistent positive effect in the treatment of LTH requires an integrated approach with mandatory systemic immune correction and hormonal correction.

Key words: *lingual tonsil hypertrophy, cryosurgery, immunoregulatory shift, obstructive sleep apnea,*

Introduction

The lingual tonsil, which is part of the Pirogov-Valdeier lymphadenoid pharyngeal ring, quite often becomes the object of attention at adulthood due to its excessive hypertrophy or transformation into a focus of persistent infection of both the tonsil itself and the sensitization of the whole body (1,2,3,4,5). To date, little attention has been paid to the problem of developing of effective methods of treating hypertrophy of the lingual tonsil.

In recent decades, data on the important role played by the structures of the lymphadenoid pharyngeal ring (LPR) in the implementation of mucosal

immunity, immunoregulation and immunoadaptation at the systemic level have been generalized (6,7,8). In connection with these provisions, methods for the treatment of pathology of the lympho-pharyngeal ring (9,10,11) corresponding to the modern doctrine of the most sparing relation to the organs of LPR are developed, as important structures in the formation of protective and adaptive reactions of the organism (12,13,14). In recent years, there has been a trend of selective study of the lymphoepithelial tissue of the lympho-pharyngeal ring of any localization. Obviously, this

is due to a deeper understanding that large lymphoid formations, which are the entrance gates to the primary intestine and organs formed in connection with it, have a different embryological basis. Lymphoid tissue is settled in a different ways. Hence, despite the unity of functional load, there are differences in the morphological structure, neurohumoral regulation, periods of age involution of the lymphoid tissue of the upper respiratory tract (15,16,17).

In the literature the pathology of the lingual tonsil is recalled in its acute state, obstruction of the upper respiratory tract, oncological changes. The fact that the lingual tonsil often carries a compensatory functional load is unjustly forgotten. By removing of pathologically modified pharyngeal and palatine tonsils, a local immune deficiency is created, which the body compensates, including spare mechanisms. The lingual tonsil, being one of the largest accumulations of lymphoid tissue, can compensate for the changes that have occurred, or the compensation may be temporary, and subsequent decompensation of the organ will lead to pathological changes in the microstructural formations that form the morphological basis of the lingual tonsil (18,19).

Age-related changes that lead to a weakening of the immunological functions of the palatine tonsils, a decrease in their volume, or surgical removal of the palatine tonsils, leads to a compensatory increase in the volume of the lingual tonsil from the papillary growths to its diffuse increase, almost closing the entrance to the esophagus, which in turn leads to mechanical contact with the petal of the epiglottis. In this case, the base of the epiglottis inevitably significantly shifts, deforming the entire vestibular part of the larynx; the swallowing reflex is disturbed, accompanied by pathology of the sensitive part of nervus vagus. The muscles of the pharynx and, especially, of the larynx, in violation of their tone, contribute to high reflux episodes with reflux of aggressive gastric contents, which leads to the formation of reflux-induced diseases of the pharynx, larynx, middle ear, nasal cavity and paranasal sinuses, including the lingual tonsil (20,21,22).

Of interest is the diagnosis of conditions associated with hypertrophy of the lingual tonsil, the development of indications for gentle methods of

treatment of this organ to improve the quality of life of patients with hypertrophy of the lingual tonsil.

The goal and objectives of the study is to improve the quality of life of patients with lingual tonsil hypertrophy by developing of effective methods of diagnosis and treatment. To evaluate the role of the immunoregulatory shift in the pathogenesis of lingual tonsil hypertrophy and justify the possibility of their correction by the action of a physical factor (cold destruction).

Materials and methods A total of 119 patients with hypertrophy of the lingual tonsil of different age groups were examined, revealed during examination of 850 people who underwent clinical, biochemical, histological, microbiological, cytological, morphological and immunomorphological studies, instrumental diagnostics in connection with various pathology of ENT organs and presenting any complaints encountered with diseases of the lingual tonsil. The criterion for the inclusion of patients in the study was the presence of GMN, informational consent to participate in the study; exclusion criterion was the presence of any acute or exacerbation of chronic diseases. The examined were divided into 2 groups. The main group consisted of 119 people (2 age subgroups of patients aged 18 to 44 years old and 45 to 68 years old) who had organic factors that could explain the origin of abnormal sensations: the presence of hypertrophied lingual tonsil, contact of the epiglottis petal with the root of the tongue. In the second group, the data obtained during the examination of 30 practically healthy people over the age of 18 years who did not have signs of pathology of the lymphopharyngeal ring, organ and systemic diseases were used as control. Patients with diffuse prolapse of the lingual tonsil, 76 persons, were selected from the main group for cryosurgical treatment. The methodology developed and described in the author's certificate was applied (23), – a method of treating lingual tonsil hypertrophy by cryodestruction using a L-shaped applicator, a (CAO-2) cryoapparatus with a heat-insulating nozzle on the back surface and an individual polyethylene cap (Fig.1). For the impact, cryoapplicators of different sizes with different tilt angles, repeating the shape of the root of the tongue, were used.



Fig. 1. Hooked – formed applicator with a heat-insulating nozzle on the back surface, an individual polyethylene cap

Results and discussions

Of the entire examined population (850 people-100%), lingual tonsil hypertrophy was diagnosed in 14% of patients with various pathology of ENT organs, i.e. is a fairly common disease. It should be noted that among women, the incidence of lingual tonsil hypertrophy is 3.1 times higher than in men. It was revealed that the most common background otorhinolaryngological disease with lingual tonsil hypertrophy is the pathology of the tonsils of the

lymphopharyngeal ring, existing or existed before, as a result of which the surgical procedure was performed: adenotomy, tonsillotomy, or tonsillectomy, after which compensatory (vicarious) mytrophly developed (Table 1).

The most common complaints made by patients were: discomfort in the area of the root of the tongue – «foreign body in the throat», dry cough, recurrent sore throat, swallowing and breathing problems, pharyngeal paresthesia, snoring during sleep, and apnea. For a more complete description of the state of the pharynx, we evaluated the functionality of the mucous membrane of the pharynx by its resistance to external influences. For this, the cellular composition of the oropharyngeal secretion was studied (Table 2).

Table 1. The frequency of pathology of the lingual tonsil among the total number of surveyed included in the work

Gender	Nosology	Number of observation	Identified pathology of the lingual tonsil (% from total surveyed)	
Male	Chronic pharyngitis. GERD (gastroesophageal reflux disease)	211(24,83%)	16 (13,45%)	27(22.69%)
Female			11 (9,24%)	
Male	Chronic pharyngitis, condition after tonsillectomy, adenotonzyllectomy.	69(8,12%)	4 (3,36%)	45(37.82%)
Female			41 (34,45%)	
Male	Chronic tonsillitis.	249(29,29%)	8 (6,72%)	42(35.29%)
Female			36 (30,25%)	
Male	Acute and chronic rhinosinusitis	321(37,76%)	1 (0,84%)	5(4.20%)
Female			4 (3,36%)	
Total		850(100%)	119(100%) [14%]	
			Male 29(24.37%) [3,4%]	Female 90(75.63%) [10,6%]

Table 2. Changes in the cellular composition of oral fluid in patients with lingual tonsil hypertrophy of different ages

Age groups	18-44 years		45 -68 years		Control
	absolute	relative	Absolute	relative	
Lymphocytes	23,9±2,1	26,97%	28,5±7,4	35,78%	7,33%
Neutrophils	4,0±0,1	3,89%	9,6±3,7	10,10%	19,15%
Epithelium	56,0±6,0	69,14%	48,5±7,7	54,12%	73,05%
«Bare nuclei»	2,4±0,5	2,89%	3,0±0,5	3,38%	0,47%

According to the data in Table 2, the increase in the relative content of lymphocytes was common for patients of all age groups, which may indicate the presence of chronic inflammation or a compensatory change in the number of these cells due to decrease in their functional activity, the state of regulatory systems of the whole organism, one of the components of which is considered to be bacterial background of the mucous membrane. Almost all showed pronounced changes in the microbiocenosis of the pharyngeal mucosa, vegetation of non-resident microflora - a large percentage of the presence of *Candida* genus in microbial associations was found. Associations with one bacterial species were identified in 43.7% of the samples, with several species were found in 37.5% of the samples. Among associations of gram-positive cocci with fungi of the genus *Candida*, streptococci in 83.8% of the samples prevailed. In the study of saliva in 17 people, the causative agent *Helicobacter pylori* (HP - Gram-negative microaerophilic bacteria) were found which is atypical for the oropharynx and pharynx, which was confirmed by immunological examination of blood serum and determination of specific antibodies. HP possesses many pathogenicity factors, which, when interacting with the cells of the gastric epithelium, lead to inflammation of the mucous membrane, a direct damaging effect. The earliest reaction of epithelial cells to HP is hyperplasia, lymphocytic proliferation. The rate of proliferation correlates with the severity of inflammation. Recently, it was proved that on epithelial cells with HP damage, the expression of epidermal growth factor receptors is sharply increased, and this mechanism is universal and one of the most powerful for proliferation stimulating (24). In addition to local causes leading to inflammation of the mucous membrane of the root of the tongue, general causes were determined - a high frequency of virus carriage was observed among patients with lingual tonsil hypertrophy. Among all the examined, the carriage of viral pathogens was detected in 52 patients with GMN, most often in the age group from 18 to 44 years old, which amounted to 43.7% of the total number of examined (table 3).

Table 3. Carriage of viral pathogens in the group of patients with GM

Type of pathogen, lymphadenitis profile	Carriage of ARVI viruses in the group of patients with GM
HHV-6, Parainfluenza virus type I, VEB-CA, VEB-EA, CMV, Adenovirus type 3, Coxsackie virus type B5, Coxsackie virus type A9, HSV-1, HSV-2	n=52 43,7% of the total number of examined patients

For an objective assessment of changes in the lingual tonsil, instrumental (CT, ultrasound, endoscopic) studies of the tonsils and surrounding formations were performed. During ultrasound examination, the lingual tonsil was visualized as a formation with predominantly reduced echogenicity, without clear boundaries, rounded, relatively homogeneous, located among the characteristic and easily recognizable landmarks of the bottom of the oral cavity and pharynx. Some patients showed a significant increase in the size of the lingual tonsil (Fig.2,3,4).



Fig. 2. Ultrasound Scan Hypertrophy of the lingual tonsil of 4th degree. The distance between the root of the tongue and the epiglottis is minimal, the presence of contact of the epiglottis with the root of the tongue



Fig. 3. CT scan. The increased size and shape of the lingual tonsil, the presence of contact of the edge of the epiglottis with the root of the tongue

Ultrasound findings were confirmed by endoscopic examinations with a flexible laryngoscope. When scanned in real time, during the pharynx, hypertrophied lymphoid tissue prolapsed into the esophagus, significantly deforming the epiglottis, pressing it to the back of the pharynx.



Fig. 4. Lingual tonsil is dense, tuberosus, 4th degree of hypertrophy. Tongue vallecular is filled with lymphoid tissue

Attention is drawn to patients with hypertrophy of the lingual tonsil against the background of chronic pharyngitis, gastroesophageal reflux disease. Patients complained of perspiration, a foreign body sensation - a «film in the throat», which causes a desire to remove it, which caused a change in voice, coughing. An instrumental examination of such patients revealed the presence of copious viscous mucous discharge on the back of the pharynx, a loose whitish coating on the root of the tongue, on the surface of the hypertrophic lingual tonsil. The variant of hyperplastic pharyngitis predominated: diffuse, lateral, granulose, which may suggest a similarity of causative factors causing a hyperplastic process in this section of the pharynx.

Histological examination of the tissue of hypertrophic lingual tonsil determines a sharp increase in the mass and volume of the main substance due to an increase in the number and size of layers of fibrous tissue that form the fields (Fig. 5). The mucous membrane is a narrow strip.

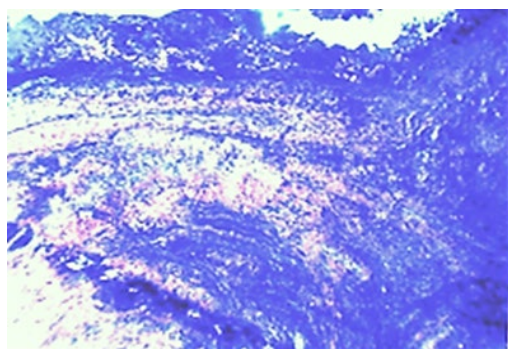


Fig. 5. Lingual tonsil in a patient with a diagnosis of «hypertrophy of the lingual tonsil». Thinning of the mucous membrane, the field of coarse fibrous fibers in its own substance. Dying: hematoxylin - eosin. Magnification: x100.

Macroscopically observed irregularities on the surface of the tonsil are caused not by accumulations of lymphoid follicles, but by protrusion of the tonsil's own substance, the distribution of follicles in the mucous membrane is quite discharged. Most of them give the impression of decaying. The center is crumpled, reduced, in the submucosal layer of the mucosa, the lymphoid follicles do not collect in large clusters, they are rather scattered along the mucosa. The composition of the germination center is usual. Visually there are lymphoid elements, many plasmocytes, reticulocytes. The distribution of cells with moderate density, or discharged, especially in the center is shown (Fig. 6). In some follicles in the germination center, gaps are defined.

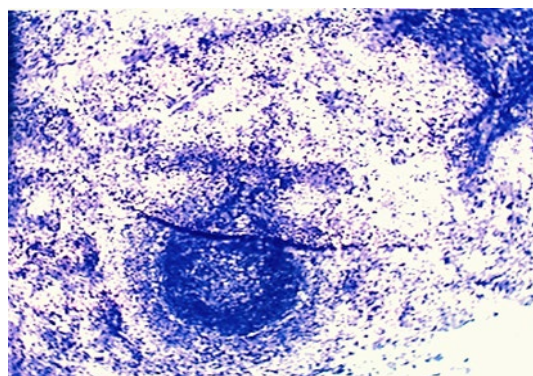


Fig. 6. Tonsil lingual. Follicle of the mucous membrane with a discharge of the center. A thin peripheral layer of discharged lymphoid elements. Dying: hematoxylin-eosin. Magnification: x100.

Thus, the results of the studies showed that macroscopic changes in the lingual tonsil and related clinical manifestations are due to an increase in the volume and mass of tissues involved in the construction of the lingual tonsil: the main substance due to sharp increase in the number and size of layers of coarse fibrous fibers; the formation of extensive fields of fat cells; significant growth of the mucous glands, while the mucous membrane itself, being in a state of permanent inflammation, becomes thinner, undergoes dystrophic-degenerative changes. The rate of proliferation correlates with the severity of inflammation. The causes of inflammation are multifactorial, individual. Their activity, obviously, is influenced by genetically determined age-related changes in metabolism and body functions.

The development of dystrophic-degenerative changes in the lingual tonsil was accompanied by the development of indicators' violation of the state of the immune system. An immunological study of

patients with lingual tonsil hypertrophy, determining the level of immunoglobulins of various classes, it was found that the content of class G and class E immunoglobulins was significantly increased in this category of patients.

Determination of specific IgE antibodies to microbial or food allergens in the examined patients with GMN and healthy people showed that in the main group the spectrum of response to various allergens was quite wide. More often found increased reacting sensitivity to microbial and household allergens. In addition, in examined persons an increase in the content of antibodies in the blood to the tissues of the lingual tonsil was found. In general, the increase in the content of antibodies to the tissues of the lingual tonsil was 4-fold. It should be noted the high individuality of the observed deviations (Table 4).

Table 4. Immunological study conducted before treatment

Group Index	Control n=30	In general, by contingent n=119	Minimum value	Maximum value
Antibody titers of lingual tonsil tissue antigen (blood), c.u. (reaction titer 1:10)	7,01±0,81	26,66±0,81	10	40
CICmg/ml (small)	139,24±0,84	182,90±12,22	142,0	220,0
ASLO	112,33±11,41	262,33±25,22	60,0	800,0
IgG, g/l	12,63±0,54	14,38±0,49	8,0	18,0
IgA, g/l	2,43±0,05	2,46±0,52	1,0	3,8
IgM, g/l	1,57±0,05	1,95±0,45	0,8	4,2
IgE, mU/l	71,91±11,41	174,38±16,21	6,7	900,0

We began assessing the state of hormonal regulation in patients with lingual tonsil hypertrophy by examining thyroid hormones, such as thyroxine (T4sv.) and thyroid-stimulating (TSH) hormones, one of whose functions is to influence the speed and differentiation of tissue elements. As the material accumulated during the study of the relationship between the immunopathological conditions in the pathogenesis of lingual tonsil hypertrophy and the special features of the morphofunctional structure of the hypertrophic lingual tonsil, an increase in the level of autoantibodies to both the tonsil tissue and thyroid peroxidase (ATPO), thyroglobulin (ATTG)

was found. Antibodies to thyroglobulin and thyroid peroxidase are an important indicator of autoimmune processes of the thyroid gland, a characteristic feature of which is the loss of immunological tolerance to peroxidase and thyroglobulin. Considering that in women of the main group (21.7 ± 6.0% of patients), when conducting general clinical studies, multiple hyperplastic processes of the organs of the reproductive system, combined with diseases of the thyroid gland, were revealed, another group of hormones involved in the regulation of proliferative and differential processes in organism tissues was studied - sex hormones.

The activity of synthesis and secretion of sex hormones is regulated by the activity of the structures of the hypothalamic-pituitary-adrenal-sexual axis of the humoral regulation. Due to this, it can be assumed that the imbalance and change in the content of these hormones are associated with

changes in the activity of the centers of the autonomic nervous system. Since the studied population includes patients of a wide age range, which determines the mandatory changes in the content and activity of sex hormones, and which are not necessarily related to the pathological process under consideration, we did not perform a comparative analysis of changes in the content and ratio of sex hormones in people of different ages and the special characteristics of the pathological process in lingual tonsil.

At the same time, the somatic and gynecological status of the examined women (age range of 35-50 years), in which hyperplastic syndrome was

revealed during an in-depth examination, attracted attention. The gynecological status of the examined was characterized by a combination of uterine fibroids with endometrial hyperplasia, ovarian cystic diseases and fibro-cystic disease, often combined with diseases of the gastrointestinal tract, thyroid pathology, and metabolic syndrome. Hypertrophy of the lingual tonsil is not the norm. With an increase in the lingual tonsil in patients of an older age group, one should be more careful in examining to exclude neoplasms, acid-dependent diseases, and identify the causes of immunoregulatory changes

leading to a compensatory increase in the tissue of the lingual tonsil.

Taking into consideration the structural features of the zone of the lingual tonsil location - inaccessibility, high reflexogenic sensitivity; structural features of the mucous membrane in the area of the intersection of the respiratory and digestive tracts; the presence of hyperplastic processes in the connective tissue and degenerative-dystrophic in the lymphoid tissue of the hypertrophic lingual tonsil, for the correction, a gentle, organ-preserving method should be chosen. Such a method was used to select the method of local exposure of ultralow temperatures to pathologically altered tissues, which contributes to the stimulation of the formation of an individualized immune response, elimination of pathologically altered tissues, followed by plastic restoration of characteristic tissues that are functionally full for this localization. The deep layers, partially absorbed, are replaced by healthy tissues, the surface layers are more rejected with the formation of an atrophic scar or regenerate, the structure of which is close to organotypic.

Patients with indications for «minor surgery» - with diffuse proliferation of the lingual tonsil, partially in contact with the epiglottis, performing tongue vallecula (1-3 hypertrophy grade), cryoapplication on the surface of the organ in order to reduce its size was conducted. In the postoperative period, for 5-7 days, patients complained of slight sore throat, aggravated by swallowing, malaise, and fever to subfebrile numbers, which was observed in 53 (69.7%) patients. Under endoscopic control, the lingual tonsil was edematous; a delicate fibrin coating was found in the places where the cryoapplicator was exposed. Palpation of the submandibular lymph nodes was painless. There were no differences in the postoperative course in men and women. In the postoperative period, symptomatic remedies, rinsing, irrigation of the oral cavity with antiseptic solutions (in accordance with the antibioticogram) were used. After 30 days, all patients felt good, there was no temperature reaction, raids, and pain in the operated area. The mucous membrane covering the lingual tonsil had the usual color. When compared with the preoperative level, the tonsil lost from 50 to 70% of the volume. This result was regarded as positive. Patients noted a significant, 3-4-fold reduction in the

number of complaints about the symptoms of the main complex: sensations of a foreign body in the throat, difficulty breathing, a symptom of an "empty throat", paradoxical dysphagia. The frequency of other symptoms decreased slightly: attacks of causeless cough were found four times less often, paresthesia in the throat - three times. There is also a decrease in the occurrence of symptoms of general disorders: increased excitability, emotional lability, carcinophobia, fatigue, snoring, and apnea - at times.

An objective assessment of the condition of the lingual tonsil after cryotherapy according to the data of ultrasound and endoscopy showed the following: ultrasound scan, carried out immediately at the time of cryosurgical intervention, indicated a dynamic change in the tissue of the lingual tonsil (Fig. 7, 8, 9).

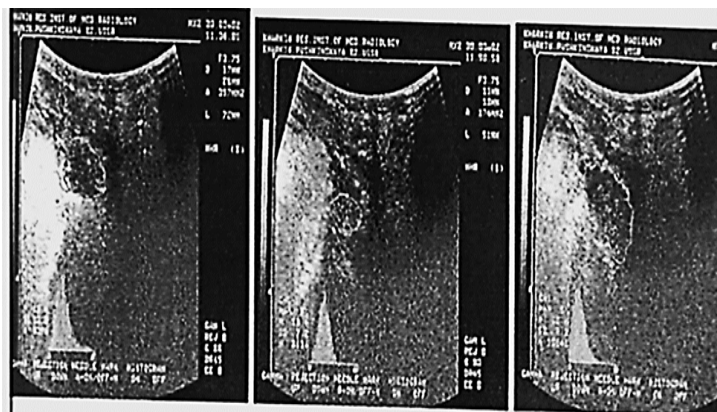


Fig. 7. Ultrasound scanning of a hypertrophied lingual tonsil before cryosurgical intervention, at the time of intervention and 11 minutes after cryotherapy



Fig. 8. Ultrasound scan 30 days after cryodestruction of the lingual tonsil. The distance between the root of the tongue and the epiglottis has increased. There is no contact of the epiglottis with the root of the tongue

According to ultrasound, after cryointervention, the root of the tongue is slightly increased (Fig. 8). In the thickness of the tongue, in the area of the tonsil, single cysts with a diameter of up to 3 mm are determined. Tongue tonsil tissue is of reduced echogenicity with smooth contours. The fabric itself is homogeneous. It should be noted a visual increase

in the distance between the root of the tongue and the epiglottis. Also noticeable is a visual reduction in tonsil volume (Fig. 9.).

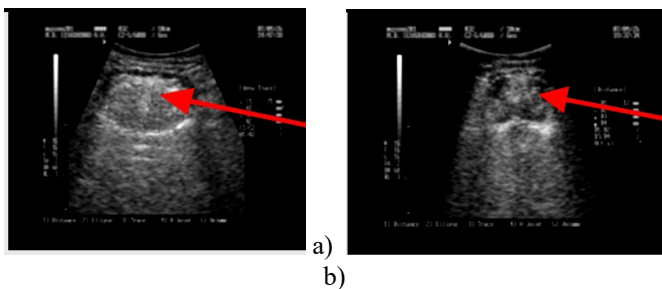


Fig. 9. a) Visualization of a hypertrophied lingual tonsil during ultrasound examination prior to cryosurgical intervention - tissue is defined without clear boundaries, round in shape, relatively homogeneous, located among the characteristic and easily recognizable landmarks of the oral cavity and pharynx. b) Ultrasound scanning 30 days after cryodestruction of the lingual tonsil. The lingual tonsil is reduced in volume

Endoscopic examinations of the lingual tonsil with a flexible laryngoscope, performed 1 month after cryotherapy, revealed the following: the lingual tonsil looked normal, with no signs of inflammation. The surface of the lingual tonsil follows the contours of the surface of the tongue. In most cases, this area is pale pink in color, although in some cases some cyanosis remains. The surface of the tonsil is flat-tuberculous, in almost all the examined it does not protrude above the surface of the mucosa. Permanent contact of the epiglottis and the root of the tongue is absent (fig.10).

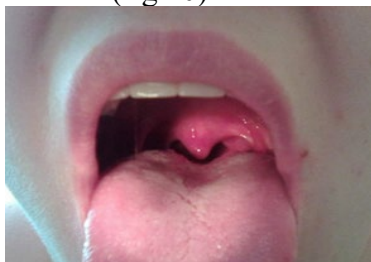


Fig. 10. Condition after cryodestruction of the lingual tonsil. The lingual tonsil protrudes slightly above the surface of the root of the tongue. The space between the root of the tongue and the epiglottis is free

Microscopic examination of the tissue of the lingual tonsil, carried out after treatment, revealed the following changes: the own substance of the tonsil is represented by a few bundles of fibers of the connective tissue, arranged randomly. In contrast to observations before treatment, the fibers are tender, of different lengths, arranged compactly. Quite numerous fibroblasts with oval nuclei of moderate density are seen. The glands in one's own substance are single. Their shape is tubular, although some of the tubules are deformed. Epithelial cells line the tubules completely. No visible changes were found in them. The vessels are few, moderate blood supply.

Immunological studies after cryotherapy in the group as a whole showed that the content of antibodies in the blood to the tissue of the lingual tonsil decreased almost twofold compared to the initial level, and in the majority of the examined patients it ranged from 1:10, only 2 patients made 1:40. The decrease is statistically significant. Moreover, this indicator still exceeded the norm. In the age-related aspect, changes in the level of antibody content did not have fundamental differences, although these changes were more pronounced in people aged 45–68 years. In general, it can be said that the immune reactions to the tissues of the lingual tonsil are a fragment of systemic immunoregulatory changes, and the cryodestruction of tissues of the lingual tonsil changed as a result of inflammatory reactions has a positive effect on these processes, but this effect is not comprehensively positive (Table 5).

Table 5. The effect of cryotherapy on the immune status of patients with lingual tonsil hyperplasia depending on their age

Group	18-44 years	45-68 years
Antibodies to the tissue of the lingual tonsil (blood), conv. units	17,09±1,86	19,01±0,75
CIC, mg/ml small	162,01±10,82	157,90±12,32
ASLO IU/ml	190,30±1,86	240,10±2,16
IgG, g/l	10,69±0,48	14,13±0,49
IgA, g/l	2,67±0,52	1,83±0,05
IgM, g/l	1,46±0,45	1,22±0,33
IgE, mU/l	139,59±20,50	84,91±9,21

The level of antistreptolysin antibodies changes at the level of a moderate tendency to decrease, such changes are observed in the whole group. The changed indicators of bacterial contamination of the mucous membrane of the oral and laryngopharynx in patients with lingual tonsil hypertrophy indicate a change in the control conditions for the reproduction of pathogenic flora and its activity. These indicators decreased, but were slightly higher than the average, which indicates the preservation of the conditions for the inflammatory process in the mucous membrane, which we observed in the examined patients. Above the average normal values, the level of blood concentration of total IgE in the age group from 18 to 44 years is maintained, indicating the presence of an allergic background, for the normalization of which it is necessary to connect the appropriate treatment, which should be considered when developing an individual complex for the treatment of patients with lingual tonsil hypertrophy.

Thus, we obtained a reduction in the volume of tissues of the lingual tonsil in 56 (73.68%) cases and found this result to be positive.

When treating patients with GMN, we understood that a person's condition is unique, and variants of changes may differ even within the framework of a single diagnosis. There are differences in bacterial contamination, hormonal levels depending on the clinical variant. We took into account these nuances for an individual approach to each clinical situation. In addition to cryosurgical treatment, concomitant pathology was treated in these patients.

Analyzing the data of a clinical study of patients with relapses of the disease (15 people - 19.74%), and in patients with no effect (5 people - 6.58%), we came to the conclusion that there were complaints of discomfort in the throat after cryodestruction of the lingual tonsil many times less, while the symptoms of general disorders (increased irritability, carcinophobia, fatigue) persisted, despite the improvement of the endoscopic picture (reduction in the volume of the tonsil, lack of contact of the epiglottis with the root of the tongue). The structure of concomitant diseases in patients with GMN was characterized by an increased frequency of pathology occurrence of internal organs - gastroenterological pathology, hyperplasia of the organs of the reproductive system, endocrine and metabolic changes. The age of these patients

was 45-55 years. The formation of pathological status in the lingual tonsil, the change in tissue structure, the presence of pathological impulses from a diseased organ, individual sensitivity, and the ability to respond to stimuli in accordance with features of the type of nervous activity create a psychosomatic status and individual clinical manifestations. This should be taken into account when considering the reasons for repeated visits by patients, which will allow more correctly assess the patient's complaints, develop tactics for his treatment, and prevent the development of unpleasant sensations that reduce the patient's quality of life.

Conclusions

1. Hypertrophy of the lingual tonsil should be considered as a continuation of the development of a productive process associated with immunoregulatory changes in chronic infectious and allergic conditions. The result of such processes is a change in the ratio of connective tissue and parenchymal elements in the NM, which cannot but affect its functional capabilities, which is manifested by a change in the cellular composition and increased bacterial contamination of the oral cavity.
2. Local cryotherapy on a hypertrophic lingual tonsil is accompanied by normalization of the structure of the lingual tonsil's own substance, a decrease in inflammatory changes in the surrounding tissues, and restoration of normal relations of the tonsil with surrounding organs and tissues.
3. The development of inflammatory changes in the lingual tonsil is a local manifestation of a general malfunction of the immune defense system associated with bacterial, toxic or viral load against the background of hormonal dysregulation of energy supply processes. Achieving a persistent positive effect in the treatment of lingual tonsil hypertrophy requires an integrated approach with mandatory systemic immune correction and hormonal correction.
4. With diffuse enlargement of the lingual tonsil (1st -3rd degrees) and signs of chronic inflammation, the cryodestruction is the method of choice. With a significant growth of its sections or lobe (4th degree of hypertrophy), as well as in the presence of cysts in the thickness of the tonsils one of the methods of surgical resection should be used.

References

1. Grishunina OE, Leiserman MG. The spread of lingual tonsil hypertrophy and treatment tactics. *Problems of Women's Health*. 2013;8(4):73–75.
2. Tearful AG, Kalutsky IV, Mazur AA, Nezboresky IV, Tsurkan MM. Differential diagnostic criteria and principles for the treatment of hypertrophy of the lingual tonsil // *Journal of Ear, Nasal and Throat Diseases*. 2018;3:93–95.
3. Caylakli F, Akkuzu B, Avci S. Lingual tonsillar hypertrophy: A case report. *Kulak Burun Bogaz Ihtis Derg*. 2004; 13 (1-2):28–30.
4. Darrow DH. Surgery for pediatric sleep apnea. *Otolaryngol Clin North Am*. 2007;40(4):855–875.
5. Patel AB, Davidian E, Reebye U. Complicated airway due to unexpected lingual tonsil hypertrophy. *Anesth Prog*. 2012;(2):82–84.
6. Bykova VP, Bakhtin AA. Epithelial structures of the mucous membranes of the upper respiratory tract - a connecting link of innate and adaptive immunity. *Russian rhinology*. 2016;24:43–49.
7. Bykova VP, Belavina PI, Ryazanskaya AG, Yunusov AS. The condition of the pharyngeal and palatine tonsils in children with the modern treatment of infectious and inflammatory diseases of the upper respiratory tract and pharynx, including the administration of immunotropic drugs. *Russian rhinology*. 2018;2:3–14.
8. Melnikov OF. Modern representations of the lymphopharyngeal ring in immunity reactions in norm and pathology. *Immunology and allergology*. 1998; 1-2:64–68.
9. Pokotilenko AK, Dragomiretsky VD. Structural features of palatine tonsils in patients with chronic tonsillitis after cryosurgical exposure. *Journal of Ear, Nose and Throat Diseases*. 1987;1:36–39.
10. Tearful OG, Kalutsky IV, Mazur OO, Nezboresky IV, Tsurkan MM. Differential and diagnostic criteria and the principle of hypertrophy of the lingual migdala. *Journal of Ear, Nose and Throat Diseases*. 2018;3:93–95.
11. Abdel-Aziz M, Ibrahim N, Ahmed A, et al. Lingual tonsils hypertrophy; a cause of obstructive sleep apnea in children after adenotonsillectomy: operative problems and management. *Int. J Pediatr. Otorhinolaryngol*. 2011;75(9):1127–1131.
12. Kryukov AI, Khamzalieva RB, Yoylov AY., Zakharova AF, Matveeva EV. A retrospective assessment of timely tonsillectomy in children with chronic tonsillitis. *Russian Otorhinolaryngology. Application*. 2010;5:152–154.
13. Popovich VI. Chronic tonsillitis and tonsilogenous conquest «I am healthy in Ukraine»
CONSUMPTION ZU - resp-3_2014.qxd
10/08/2014;16–18.
14. Khaitov RM. *Immunology: textbook/2nd ed., Revised and supplemented – 2013:528 p.*
15. Burzhinsky A A. «Gerontology and geriatrics». Stromal-parenchymal changes in the structure of the human tongue in the age aspect - the topic of the dissertation and abstract on the Higher Attestation Commission. Reference: 364730 Year: 2005.
16. Gemonov VV, Lavrova EN, Falin LI. *Atlas on histology and embryology of the organs of the oral cavity and teeth*. Gemonov, Moscow. 2003:96 p.
17. Jibiinkoka N, Kaiho G, Kaiho NJG. Histological study of human lingual tonsil, especially changes with aging. Article in Japanese Kamata T. 1992;95(6):825–843.
18. Abdallah-Matta MP, Dubarry PH, Pessey JJ, Caron P. Lingual thyroid and hyperthyroidism: a new case and review of the literature. *Journal of Endocrinological Investigation*. 2002;25:264–267.
19. Bock IM, Trask DK. Coblation-assisted lingual tonsillectomy for dysphagia secondary to tongue base hypertrophy. *Ann Otol Rhinol Laryngol* 2008;117(7):506–509.
20. Bobrov VM. Dysphonia and dysphagia caused by Forestier disease. *Vestnik of Otorhinolaryngology*. 2009;1:67–68.
21. Kokorina VE. Features of the clinical manifestation of otorhinolaryngological diseases caused by gastroesophageal reflux disease. *Russian Otorhinolaryngology*. 2010;3(46):84–88.
22. Solomentseva T.A. Esophageal reflux: what a practitioner needs to know. *Gastroenterology, Hepatology, Coloproctology*. 2007;20(1):72–73.
23. Tagunova IK, Andreev AV. Method of treating lingual tonsil hypertrophy by cryodestruction. Patent № 29413 Ukraine, IPC A61B 17/24, A61P 41/00, № u 2007 1073; stated. 28.09.2007; published 10.01.2008. 2010; Bul. №1.
24. Alzahrani S, Lina TT, Gonzalez J, Pinchuk IV, Beswick EJ, Reyes VE. Effect of *Helicobacter pylori* on gastric epithelial cells. *World J Gastroenterol*. 2014 Sep. 28;20(36):12767–12780.