

The Treatment of Nasal Obstruction with Tubal Disorders in Patients with Chronic Suppurative Otitis Media

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ABSTRACT

76 patients of age 8 to 70 years were examined in order to study the condition of Eustachian tube. In addition to otitis media, those patients had different pathologies from the side of nose and paranasal sinuses, which caused instant nasal obstruction. Chronic otitis was developed on the basis of septal deviation in 68.4%; instant hypertrophy of conchae nasi was found in 9.2%. Different forms of chronic sinusitis were found in 15.8%, and adenoids in 6.6%. Ventilation and drainage functions of Eustachian tube were examined. Different levels of the drainage dysfunction of Eustachian tube were found in 53.3%, exceeding the indicators of ventilation dysfunction (48.5%). The collected data lead to the conclusion that chronic suppurative otitis media (CSOM) in patients with Eustachian tube disorders should be viewed as a rhinogenic ear complication. For the treatment of Eustachian tube dysfunction for restoring normal nasal breathing, it is necessary to conduct both adequate conservative and surgical treatment.

KEYWORDS: *Eustachian tube, nasal obstruction, paranasal sinus, ventilation, drainage function*

It has been established that diseases of nose and paranasal sinuses, causing difficulty of nasal breathing, are a predisposing factor for the development of dysfunction of Eustachian tube (ET). Clinical-experimental examinations have proved that during one- and two-side obstruction of nasal cavity, main functions of ET are distorted: 1) ventilation, 2) drainage-evacuation, 3) baro-accommodation.

The majority of researchers [1,2,3,4] consider that on the background of septal deviation, hypertrophy of conchae nasi, nasal polyps, dysfunction of ET is developed, which causes development of chronic inflammation process in middle ear cavity. Distorted functions of ET develop on the background of distortion of gradient of pressure between nasopharynx and middle ear cavities. Dysfunction of ET can be connected not only with the difficulty of nasal breathing, but also with change in speed, turbulence, and direction of air stream, being the main mechanical and chemical irritant of receptors of mucosa of nasal cavity; their irritation on its part causes reflector changes in mucosa of nasal cavity and in adjacent organs in the form of vasomotor distortions, hypersecretion [5,6,3]. As newest experimental examinations [7] have shown, the number of muscle fibrils in muscles flexing soft palatine, progressively decrease in rats with obstruction of nasal cavity compared with those in rats of control group, of same age.

The distortion of normal physiological rhythm of nasal breathing from the side of mucosa of nasal cavity causes the development of inflammatory reaction, which is directed at the elimination of stimulus, regeneration of tissues and restoration of functioning of the damaged structures. Defense mechanisms are set in - mediators for inflammation and free radicals of oxygen are excreting, which, in the whole, has a positive effect on pathological process. Though, long presence of highly active cells and free radicals in the hearth of inflammation leads to deep, irreversible damages of tissues due to destruction of collagen and peroxidation of cell membranes. In this case, inflammatory reaction often turns into uncontrollable, so-called vicious circle is formed, when infection and inflammation not only support, but also enhance each other, promote chronisation of the pathological process, both in nasal cavity and paranasal sinuses. In the given

context, from one side chronic otitis media should be considered as tubogen ear complication. From the other side, middle ear cavities can be considered as one of the forms of paranasal sinuses, connected with nasopharynx. Thus, ET is the main connecting unit of pathology of nose, paranasal sinuses and middle ear disorders.

In order to study the condition of ET during CSOM, we examined 76 patients of age 8 to 70 years, in whom in addition to middle ear disorder, there was found different pathology from the side of nose and paranasal sinuses.

Patients were grouped according to the nature of middle ear disorder in the following way: chronic suppurative mesotympanitis - 38, chronic suppurative epitympanitis - 26, chronic suppurative mesoepitympanitis - 12.

Considering that in 7 patients with chronic suppurative mesotympanitis, 4 patients with chronic suppurative epitympanitis and 3 patients with chronic mesoepitympanitis, the pathology of ear was two-sided, total number of observations was 90. Diagnosis was made on the basis of ENT-examination (including otomicroscopy) and audiological examination (tonal threshold audiometry). Ventilation and drainage functions of ET were examined.

The results of our study showed that the following pathology of nasal cavity and paranasal sinuses was found in patients with different forms of CSOM.

In majority of patients - 52 (68.4%) CSOM was developed on the background of septal deviation. In 7 (9.2%) patients "true" hypertrophy of conchae nasi was found. In 15.8% of cases (12 patients) dark patch of paranasal sinuses and, after appropriate additional diagnostic procedures, different forms of chronic sinusitis were found.

Adenoid vegetations of nasopharynx were found in 5 patients (6.6%). (These patients were children.)

Ventilation function (ET) was examined with acoustic impendaneometer ZS77-MB (Madsen). Change of pressure in external meatus was done and the indicators were recorded [8].

In hermetised external meatus positive pressure was created until it fell as a result of passive opening of the tube. In norm it was 330 ± 77 mm lift.

Our study showed that in 43 (48.5%) cases distortions of different levels of the ventilation function of ET were found.

Drainage-evacuation function of hearing tube was determined with 3% solution of collargol, inserted into cavum tympani through perforation of membrana tympani.

The degree of drainage function was determined according to the degree of positive pressure in external meatus and time of appearance of liquid in nasopharynx [9]. In case of good drainage function of ET, which is provided by normal muscular traction of opening-closing mechanism and active mucocele system, liquid falls into nasopharynx in 1 minute (I degree permeability). In case of II degree permeability, the solution passes through ET after some intensive pressing on tragus. III degree - solution passes through ET only after pumping it through external meatus with a balloon. IV degree - evacuation of solution into nasopharynx does not occur.

According to data of different authors [10], it suffices to evaluate just the ventilation function of ET, as there exists a correlation of degrees of ventilation and drainage functions of ET in case of CSOM. But, according to Tarasov et al. [11], in case of CSOM, the above mentioned correlation is sometimes distorted: substantial decrease in drainage function in case of good ventilation function.

Our study has shown important distortion of the drainage function in patients with CSOM in whom there was pathology from the side of nose and paranasal sinuses.

Drainage function	Number of observations	%
I degree	42	46.7
II degree	27	30
III degree	18	20
IV degree	3	3.3
Total	90	100

Tab.1 Characteristics of drainage-evacuation function of ET in patients with CSOM.

As it can be seen from the above data, in 53.3% of cases distortions of drainage function of ET of different degree have been found in patients in whom CSOM flowed on the background of pathology of nose and paranasal sinuses, which somewhat exceeds the indicators of distortion of the ventilation function of ET (48.5%).

Before conducting sanation surgery on middle ear, all patients underwent appropriate treatment with the purpose of sanation of paranasal sinuses and restoration of normal nasal breathing.

Types of Surgery	Number of Patients
Rhinoseptoplasty	52
Vasotomy of inferior conchae nasi	7
Adenotomy	5
Nasal polypotomy	2
Osteoplastic hymphorotomy, ethmoidotomy (by Winkler-Jansen)	4

Tab.2 Grouping of patients according to the nature of surgical intervention in nasal cavity and paranasal sinuses

6 patients (6.8%) with chronic sinusitis (suppurative, catarrhal, hyperplastic) underwent adequate conservative treatment.

Improvement of ventilation and drainage functions was achieved in patients with CSOM after conducting the above-mentioned methods of treatment.

As it can be seen from the above data, complete normalization of drainage function was achieved in 65 patients (72.2%) compared to 42 (46.7%) after adequate treatment (surgical and conservative) on nose and paranasal sinuses. Distortion of drainage function of ET of different degree was found in 25 patients. The majority (18 of 25) had a milder (II) degree of distortion of drainage function of ET. Improvement in drainage function was not achieved after appropriate treatment on nasal cavity and paranasal sinuses in 3 patients with block of ET.

Drainage function	Number of observations	%
I Degree	65	72.22
II Degree	18	20
III Degree	4	4.44
IV Degree	3	3.33
Total	90	100

Tab.3 Condition of drainage-evacuation function of ET in patients with CSOM after sanation of paranasal sinuses and restoration of nasal breathing.

As it consequently became clear (during sanation surgery on middle ear), block of ET was caused by presence of polyps and cysts in the area of tympanic orifice of ET.

Obtained data lead us to conclude that CSOM in patients with tubal disorder should be considered as a rhinogenic ear complication. Adequate conservative as well as surgical treatment aimed at sanation of paranasal sinuses and restoration of normal nasal breathing causes normalization or improvement in tubal function in majority of cases.

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Лечение назальной обструкции с дисфункцией слуховой трубы у больных хроническим гнойным средним отитом

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Р Е З Ю М Е

С целью изучения состояния слуховой трубы при ХГСО обследовано 76 больных в возрасте от 8 до 70 лет, у которых, наряду с поражением среднего уха, отмечалась различная патология носа и околоносовых пазух, вызывающая стойкое нарушение носового дыхания. В 68,4% хронический средний отит развился на фоне искривления носовой перегородки; в 9,2% - стойкой гипертрофии носовых раковин, в 15,8% - различных форм хронического синюита, в 6,6 % - аденоидных вегетаций. Исследовались вентиляционная и дренажная функции слуховой трубы. В 53,3% наблюдений выявлены нарушения дренажной функции слуховой трубы различной степени, в 48,5% - нарушения вентиляционной функции. Санацию околоносовых пазух с целью нормализации носового дыхания проводили адекватными методами хирургического лечения: риносептопластика, вазотомия нижних носовых раковин, аденотомия, полипотомия носа, остеопластическая гайморитная этмосидотомия по Винклер-Янсену. Нормализация и улучшение вентиляционной функции достигнуто в 88%, дренажной - в 72,2% случаев.

КЛЮЧЕВЫЕ СЛОВА: *евстахиева (слуховая) труба, назальная обструкция, параназальный синус, вентиляционная и дренажная функции*