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# MODERN METHODS OF EXAMINATION OF CHRONIC ETHMOIDITIS

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**Abstract.** For the first time, the features of the anatomical structure of the ethmoid bone were determined in patients with ethmoiditis. The relationship between the anatomical structure of the ethmoid bone cells and the volume of the inflammatory process, its localization and severity has been determined. For the first time, the frequency of damage to different groups of cells was determined in isolated ethmoiditis and in combination with damage to other sinuses.

**Key words.** Chronic ethmoiditis, sinus surgery, endoscopy, FESS operations.

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Analysis of special literature and dissertation studies on the structure of the paranasal sinuses, especially the ethmoid labyrinth, the role of genetic factors and bacterial biofilms in the development of chronic rhinosinusitis, the characteristics of the pathophysiological processes occurring in the cells of the ethmoid labyrinth. during ethmoiditis and in the body as a whole led to turning to various scientific sources at the intersection of different disciplines: rhinology, radiology, microbiology, allergology, genetics, cytology.

## The purpose of the study

Frontal, maxillary and sphenoid sinusitis often begins with a pathological process in the cells of the ethmoid labyrinth. This clinical association is explained by the close anatomical connections between the frontal, maxillary, sphenoid sinuses and the ethmoid bone, as theories regarding its development place the ethmoid labyrinth in a strategic central position within the nasal complex [4].

## Stages of development of ethmoiditis

The appearance of optical endoscopes and the introduction of computer tomography into practice allowed to change the approach to the assessment of the structural characteristics of the nose and paranasal sinuses, primarily the ethmoid bone [5]. The further development of this direction required a correct and precise anatomical description of the paranasal sinuses. The ethmoid sinus is highly variable in shape and structure, as well as in the number of air cells. The ethmoid labyrinth is often called the "cornerstone of the sinus system" because each paranasal sinus drains through it or adjacent to its lateral wall [6].

A series of tomograms of each patient were analyzed according to the type of structure of the ethmoid labyrinth, structural features of other paranasal sinuses,

localization of the inflammatory process, its distribution, and involvement of other paranasal sinuses. Of the 87 patients diagnosed with sinusitis, (64.3%) affected the cells of the ethmoid labyrinth. Of the total number of patients with sinusitis, isolated ethmoiditis was observed in (16.4%) patients, combined damage of ethmoid labyrinth cells with damage to other paranasal sinuses was (47.9%). Sinusitis without involvement of the ethmoid labyrinth was (35.7%).

In a detailed analysis of the prevalence of ethmoiditis and the degree of involvement of other paranasal sinuses in the process, the following data, presented in Tables 1 and 2, were obtained. examined patients, not the quantitative content of patients in unit groups, and the number of cases of damage to each paranasal sinus separately.

It is noteworthy that maxillary sinus is the most involved in the inflammatory process in ethmoiditis: 25 for bilateral and 85 for unilateral ethmoiditis (Table 1).

Table 1.

Frequency of occurrence of sinusitis with damage to ethmoid labyrinth cells.

| Sinusitis with damage to the cells of the ethmoid bone | | | | | | | |
|---|---|---|---|---|---|---|---|
| Isolated ethmoiditis | | Unilateral ethmoiditis combined with sinus lesions: | | | | Bilateral ethmoiditis combined with sinus lesions: | |
| One sided | Double sided | Same side | | Opposite side | | | |
| 51 | 91 | maxillary | 51 | maxillary | 34 | high maxillary | 215 |
| | | frontal | 30 | frontal | 22 | frontal | 146 |
| | | wedge-shaped | 25 | wedge-shaped | 12 | wedge-shaped | 165 |

When a bilateral inflammatory process occurs in the cells of the ethmoid labyrinth, the most common bilateral process occurs in the maxillary (215) and sphenoid sinuses (165). This condition can be observed both in the development of maxillary ethmoiditis and ethmoidosphenoiditis, and in the appearance of maxillary ethmoidosphenoiditis. With unilateral damage to the sinuses of the ethmoid bone, other paranasal sinuses are less involved in the pathological process, and the process is unilateral.

The sphenoid sinus ranks second in frequency of lesions. In sinusitis with damage to the cells of the ethmoid labyrinth, the frontal sinus takes the second place.

The least common is sphenoidal frontitis without involvement of ethmoid labyrinth cells.

It should be noted that without the involvement of ethmoid labyrinth cells in the pathological process, the inflammatory process is unilateral. At the same time, sinusitis and sphenoiditis take the first and second places, respectively, in terms of prevalence. Therefore, to determine the causes of sinusitis, it is necessary to conduct not only a computer tomography of the paranasal sinuses, but also an endoscopic examination of the nasal cavity.

In the analysis of the nature of damage to ethmoid labyrinth cells, the following data were obtained: anterior ethmoiditis - (47.8%), posterior ethmoiditis - (6.8%), general ethmoiditis - (7%), "mosaic. ethmoiditis - (33.9%), isolated inflammation of one cell of the ethmoid labyrinth (table required) - (4.5%).

Table 2. The main forms of damage to cells of the ethmoid labyrinth

| **Form of ethmoiditis** | **Frequency of occurrence in the study group** |
|---|---|
| Front | (47.8%) |
| Back | (6.8%) |
| Total | (7%) |
| "Mosaic" | (33.9%) |
| Isolated inflammation of the ethmoid labyrinth cell | (4.5%) |
| Total | 559 (100% |

Based on the analysis of computer tomograms by I.S. Piskunov. and Piskunov V.S. (2011) identified 5 main forms of the ethmoid bone based on the position of the paper plates:

- rectangular shape (a symmetrical prism with smooth and flat side walls);
- symmetric shape with external walls bent to different degrees to the orbital space;
- symmetrical shape, the outer walls of which are concave into the orbital cavity;
- a shape in which one of the paper plates is asymmetrically concave, and the other is flat or convex;
- a curved shape that deviates from the midline to one side.

In our study, the most common (115 or 43%) with anterior ethmoiditis was the rectangular bone shape, the second (77 or 28.8%) was the symmetrical shape with

the outer walls bent into the orbital cavity. The most common (20 or 52.6%) with posterior ethmoiditis is the rectangular form. A symmetrical shape with outer walls bent into the orbital cavity and a symmetrical shape with concave paper plates were observed at the same rate (9 or 23.7%). The most common form (70 or 36.9%) of ethmoiditis with a "mosaic" form was a symmetrical form with the outer walls bent into the orbital cavity. In isolated ethmoiditis, all forms of the structure occur equally often (25 or 20%). The study showed that the rectangular shape (14 or 36%) and the symmetrical shape with the outer walls bent into the orbital cavity (16 or 41%) are almost equally common with the total damage of the cells of the ethmoid labyrinth.

Group. 1. Computed tomography of the paranasal sinuses, axial projection: a - anterior ethmoid, rectangular bone shape; b – front ethmoid, symmetrical shape with external walls bent to the orbital space; c – posterior ethmoiditis, square bone shape; d - "mosaic" ethmoiditis, symmetrical shape with external walls bent into the orbital space; e - general ethmoiditis, symmetrical shape with external walls bent to the orbital space; e - isolated ethmoiditis, a form in which one of the paper plates is asymmetrically concave, and the other is convex.

All bony septa separating the air cells of the ethmoid labyrinth are divided into three main types [3]:

- septa of the first order (connecting the main plates of the ethmoid bone);
- secondary partitions (connect one or two main plates and a primary partition);
- third-order partitions (connect the first and second-order partitions).

**Summary.** Analyzing the structure of the ethmoid labyrinth in ethmoiditis of different localization, the following results were obtained: with anterior and posterior ethmoiditis, the structure of the ethmoid bone is dominated by septa of the first order, thus forming larger and regularly shaped cells - 77.5% and 76.5%. In the "mosaic" form of ethmoiditis, the process is more localized in small cells, and the structure of the ethmoid labyrinth is dominated by divisions of the 2nd and 3rd order, which form 77.8% of irregularly shaped cells. The pattern in the structure of the ethmoid bone with complete damage to the cells of the ethmoid labyrinth and isolated damage to the cells was not determined.

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