

The article is dedicated to the investigation of frontal sinus connection variants with adjacent cavities and the frequency of their detection based on computer tomography data. It has been established that most frequently, frontal sinuses have connections with the ethmoidal cells and the superior nasal meatus (97.5% in both cases), somewhat less frequently with the middle nasal meatus (82.5%), and least commonly between each other (17.5%). In women, frontal sinuses more frequently connect with the superior nasal meatus compared to men. All other connection variants are visualized more frequently in men than in women. The connection of frontal sinuses between men is 2.5 times more frequent than in women (25% in men and 10% in women). The difference in the frequency of detecting other connection variants of frontal sinuses with adjacent cavities is insignificant and does not exceed 5%. In 5% of examined individuals, frontal sinuses have only one connection; in all other cases, there are multiple connections with different structures and in various combinations. Most frequently (67.5%), frontal sinuses have connections simultaneously with the ethmoidal labyrinth, the superior nasal meatus, and the middle nasal meatus.

Key words: frontal sinuses, computer tomography, connections, nasal meatus, ethmoidal labyrinth.

Connection of the publication with planned research works.

The study was carried out as part of the comprehensive research work of the Department of Normal Anatomy and the Department of Operative Surgery with Topographic Anatomy of Danylo Halytsky Lviv National Medical University "Morphofunctional features of organs in the pre- and postnatal periods of ontogenesis, under the influence of opioids, nutritional supplements, reconstructive surgery and obesity" (state registration number 0120U002129).

Introduction.

The anatomy of the nasal cavity and paranasal area is one of the most variable in the human body. Numerous studies are dedicated to exploring the anatomical variations in this area and their prevalence [1-3]. However, the criteria for the anatomical norm of the paranasal area remain undefined, complicating the prognosis of pathological processes and the selection of correction methods [2, 4, 5]. Therefore, a deep and detailed study of the structure and topography of the paranasal sinuses is crucial for understanding the predispositions for the development and progression of their pathology, as well as the choice of methods for diagnosis and treatment [5].

The aim of the study.

To clarify the variants of connections between frontal sinuses and adjacent cavities and the frequency of their detection.

Object and research methods.

The study was conducted by analyzing 40 series of anonymized archival computer tomograms of 20 men and 20 women of mature age. The material for the study was obtained at the «Lithotripsy Center» (Lviv) using the Siemens SOMATOM GO.UP 32 (64) device (Germany). Processing the series of computer tomograms in axial, frontal, and sagittal planes allowed us to identify the variants of connections between frontal sinuses and adjacent cavities and determine the frequency of their detection. To identify communication pathways or confirm their absence, we used a method of automatic digital filling of cavities in the series of computer

tomograms in frontal, sagittal, and axial planes using specialized software.

Research results and their discussion.

The analysis of the series of computer tomograms revealed various variants of connections between frontal sinuses and adjacent cavities. It was found that frontal sinuses can be connected to:

- the middle nasal meatus;
- the superior nasal meatus;
- the cells of the ethmoidal labyrinth;
- each other (fig. 1-4).

The results of the conducted study indicate that most commonly, frontal sinuses are connected to the ethmoidal cells and the superior nasal meatus (97.5% in both cases), somewhat less frequently to the middle nasal meatus (82.5%). The least common connection involves frontal sinuses being connected to each other, identified in only 17.5% of the examined individuals.

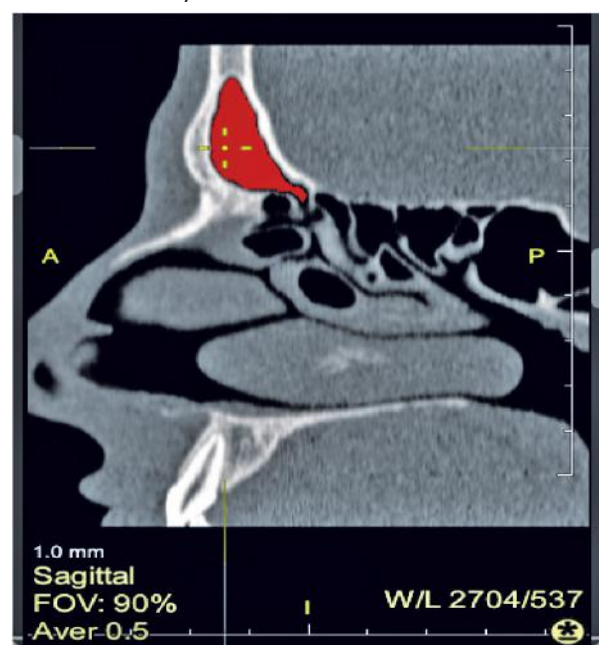


Figure 1 – The connection of the left frontal sinus with the anterior ethmoidal cells on the sagittal section of the computer tomogram with digital filling of cavities (Male, 35 years old).

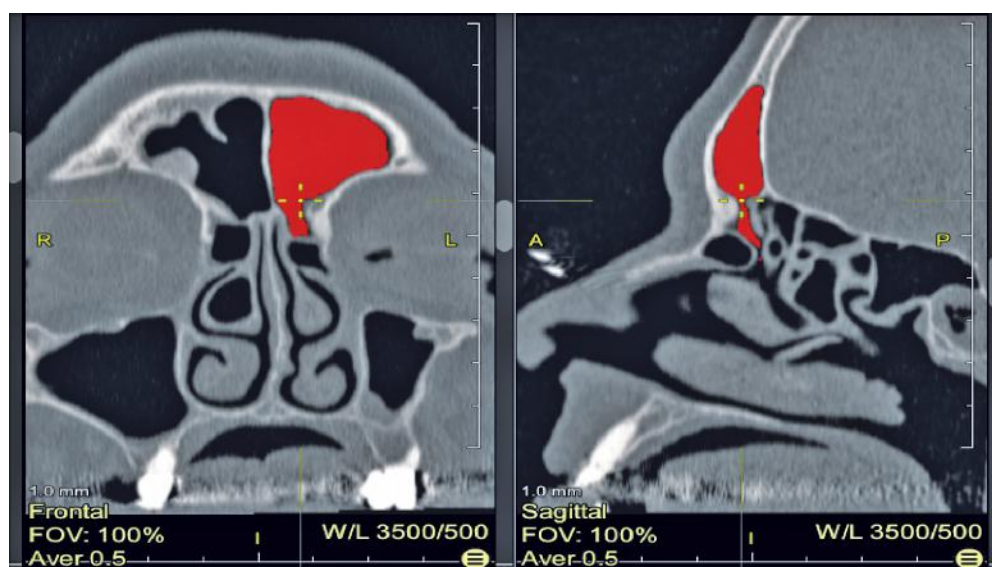


Figure 2 – The connection of the left frontal sinus with the superior nasal meatus on the frontal and sagittal section of the computer tomogram with digital filling of cavities (Female, 60 years old).

It was observed that in women, frontal sinuses more frequently connect to the superior nasal meatus compared to men, while all other connection variants are visualized more frequently in men than in women. However, the connection of frontal sinuses between men is 2.5 times more frequent than in women (25% in men and 10% in women).

The difference in the frequency of detecting other connection variants of frontal sinuses with adjacent cavities is insignificant and does not exceed 5%. It was found that only 5% of the examined individuals have frontal sinuses with a single connection, either with the superior nasal meatus (2.5%) or with the ethmoidal labyrinth (92.5%). In all other cases, frontal sinuses have multiple connections with different structures and in various combinations (table).

Most frequently (67.5%), frontal sinuses have connections simultaneously with the ethmoidal labyrinth, the superior nasal meatus, and the middle nasal meatus. In the group of examined men, the connection variant of the frontal sinus with the ethmoidal labyrinth, the superior nasal meatus, and the middle nasal meatus is 65%, while the simultaneous connection of the frontal sinus with the ethmoidal labyrinth, between each other, the superior nasal meatus, and the middle nasal meatus is 20%. Another 5% of examined men had different connection variants with adjacent structures: with the ethmoidal labyrinth and the superior nasal meatus; with the ethmoidal labyrinth, between each other, and the superior nasal meatus; only with the ethmoidal labyrinth.

Among the examined women, as well as men, the most common variant (70%) was the combined

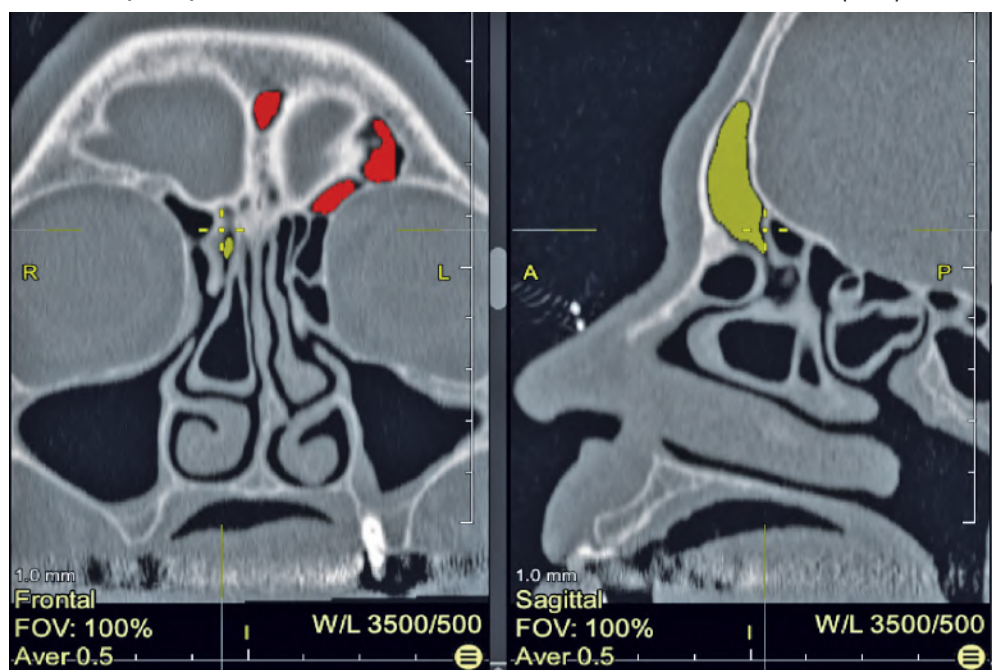


Figure 3 – The connection of the right frontal sinus with the middle nasal meatus on the frontal and sagittal section of the computer tomogram with digital filling of cavities (Female, 60 years old).

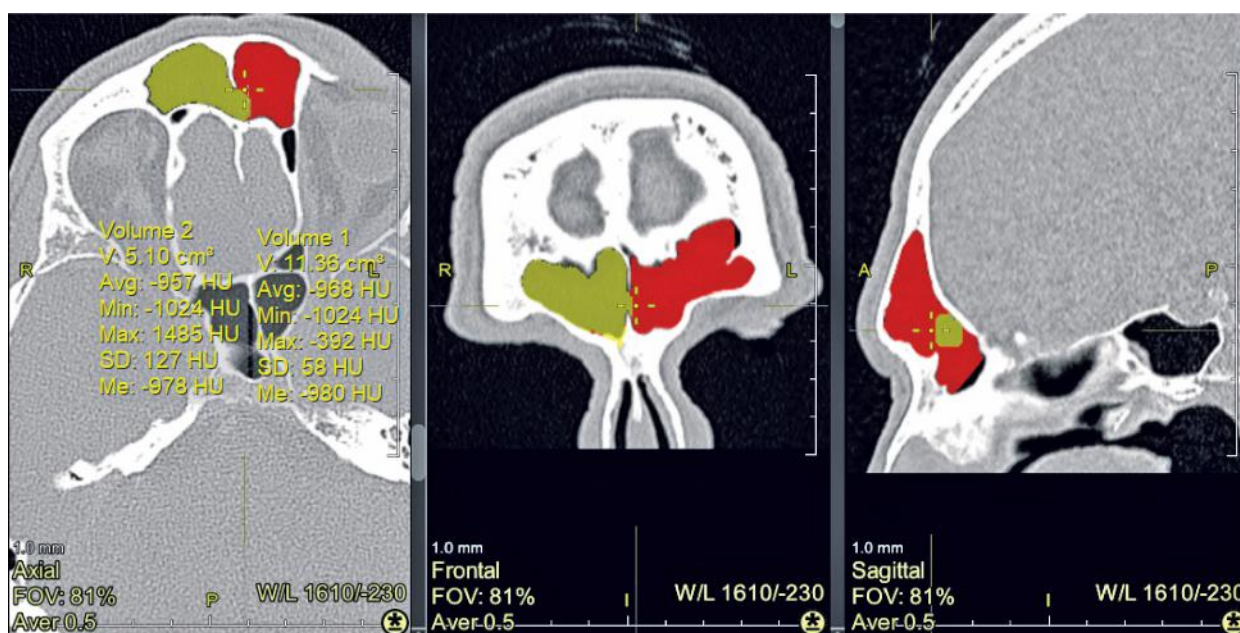


Figure 4 – The connection of the frontal sinuses with each other on the axial, frontal and sagittal sections of computer tomograms with digital filling of cavities (Male, 51 years old).

Table – Variants of connections between frontal sinuses and adjacent structures

	With the ethmoidal labyrinth, between each other, with the superior nasal meatus, with the middle nasal meatus.		With the ethmoidal labyrinth, with the superior nasal meatus, with the middle nasal meatus.		With the ethmoidal labyrinth, with the superior nasal meatus.		With the superior nasal meatus.		With the ethmoidal labyrinth, between each other, with the superior nasal meatus.		With the ethmoidal labyrinth.	
	n	%	n	%	n	%	n	%	n	%	n	%
Male	4	20%	13	65%	1	5%	0	0%	1	5%	1	5%
Female	2	10%	14	70%	3	15%	1	5%	0	0%	0	0%
Summary	6	15%	27	67,5%	4	10%	1	2,5%	1	2,5%	1	2,5%

connection with the ethmoidal labyrinth, the superior nasal meatus, and the middle nasal meatus. The variant of connecting frontal sinuses with the ethmoidal labyrinth and the superior nasal meatus was observed less frequently (15%), and the combination of connections with the ethmoidal labyrinth, between each other, the superior nasal meatus, and the middle nasal meatus was seen in 10%. Only connecting with the superior nasal meatus was observed in 5% of examined women.

The results of the conducted study significantly complement known data regarding the topography of the paranasal area and hold crucial practical importance. Various authors emphasize the importance of a deep understanding of the anatomical features of the frontal sinus not only for successful treatment of its pathology but also for preventing complications and reducing the risk of recurrence [6, 7].

Conclusions.

Most frequently (97.5% in both cases), frontal sinuses have connections with the ethmoidal labyrinth and the superior nasal meatus, somewhat less frequently with the middle nasal meatus (82.5%), and least commonly between each other (17.5%).

In women, frontal sinuses more frequently connect with the superior nasal meatus compared to men, while all other connection variants are visualized more frequently in men than in women. The connection of frontal sinuses between men is 2.5 times more frequent than in women (25% in men and 10% in women). The difference in the frequency of detecting other connection variants of frontal sinuses with adjacent cavities is insignificant and does not exceed 5%.

In 5% of examined individuals, frontal sinuses have only one connection – with the superior nasal meatus (2.5%) or with the ethmoidal labyrinth (92.5%). In all other cases, frontal sinuses have multiple connections with different structures and in various combinations. Most frequently (67.5%), frontal sinuses have connections simultaneously with the ethmoidal labyrinth, the superior nasal meatus, and the middle nasal meatus.

Prospects for further research.

Studying the individual features of paranasal sinuses in individuals of different ages and genders using modern imaging methods will allow optimizing preventive measures and increasing the effectiveness of treating sinusitis of various etiologies.

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АНАЛІЗ ВАРІАНТІВ СПОЛУЧЕННЯ ЛОБОВИХ ПАЗУХ З СУМІЖНИМИ ПОРОЖНИНАМИ

Василів М.-А. Л., Масна З. З.

Резюме. Анатомія порожнини носа і приносової ділянки є однією з найбільш варіабельних в людському організмі.

Метою нашого дослідження стало з'ясування варіантів сполучень лобових пазух з суміжними порожнинами та частоти їх виявлення.

Об'єкт і методи дослідження. Дослідження проведене шляхом опрацювання 40 серій архівних анонімізованих комп'ютерних томограм 20 чоловіків та 20 жінок зрілого віку.

Результати дослідження. Виявлено різні варіанти сполучень лобових пазух з суміжними порожнинами: з середнім носовим ходом; верхнім носовим ходом; з комірками решітчастого лабіринту; між собою. Найчастіше лобові пазухи мають сполучення з решітчастими комірками та з верхнім носовим ходом (по 97,5% в обох випадках) та з середнім носовим ходом (82,5%). Найрідше (17,5%) лобові пазухи сполучаються між собою. У жінок частіше, ніж у чоловіків лобові пазухи сполучаються з верхнім носовим ходом, всі інші варіанти сполучень є частішими у чоловіків.

У чоловіків варіант сполучення лобової пазухи з решітчастим лабіринтом, з верхнім носовим ходом та з середнім носовим ходом становить 65%, одночасне сполучення лобової пазухи з решітчастим лабіринтом, між собою, з верхнім носовим ходом та з середнім носовим ходом – 20%. Ще по 5% обстежених чоловіків мають інші варіанти сполучення з суміжними структурами. У 70% жінок спостерігали поєднане сполучення сполучення лобових пазух з решітчастим лабіринтом, з верхнім носовим ходом та з середнім носовим ходом, у 15% – з решітчастим лабіринтом та з верхнім носовим ходом, у 10% – з решітчастим лабіринтом, між собою, з верхнім носовим ходом та з середнім носовим ходом і у 5% лише з верхнім носовим ходом.

Висновки. У 5% обстежених осіб лобові пазухи мають лише одне сполучення, у всіх інших випадках – по кілька сполучень з різними структурами та у різних комбінаціях. Найчастіше лобові пазухи мають сполучення одночасно з решітчастим лабіринтом, з верхнім носовим ходом та з середнім носовим ходом.

Ключові слова: лобові пазухи, комп'ютерна томографія, сполучення, носові ходи, решітчастий лабіринт.

ANALYSIS OF CONNECTION VARIANTS OF FRONTAL SINUSES WITH ADJACENT CAVITIES

Vasyliiv M.-A. L., Masna Z. Z.

Abstract. The anatomy of the nasal cavity and paranasal area is one of the most variable in the human body.

The aim of our study was to clarify the variants of connections between frontal sinuses and adjacent cavities and the frequency of their detection.

Object and research methods. The study was conducted by analyzing 40 series of anonymized archival computer tomograms of 20 men and 20 women of mature age.

Research results. Various variants of connections between frontal sinuses and adjacent cavities have been revealed: with the middle nasal meatus; upper nasal meatus; with ethmoidal labyrinth cells; among each other. Most frequently (97.5% in both cases), frontal sinuses have connections with the ethmoidal labyrinth and the superior nasal meatus, somewhat less frequently with the middle nasal meatus (82.5%). Most rarely (17.5%) the frontal sinuses are connected with each other. In women, more often than in men, the frontal sinuses are connected with the upper nasal meatus, all other combinations are more common in men.

In men, the variant of connection of the frontal sinus with the ethmoidal labyrinth, with the upper nasal meatus and with the middle nasal meatus is 65%, simultaneous connection of the frontal sinus with the ethmoidal labyrinth, between each other, with the upper nasal meatus and with the middle nasal meatus – 20%. Another 5% of examined men have other variants of connection with their adjacent structures. In women, the most common variant (70%) was the combined connection with the ethmoidal labyrinth, the superior nasal meatus, and the middle nasal meatus. The variant of connecting frontal sinuses with the ethmoidal labyrinth and the superior nasal meatus was observed less frequently (15%), and the combination of connections with the ethmoidal labyrinth, between each other, the superior nasal meatus, and the middle nasal meatus was seen in 10%. Only connecting with the superior nasal meatus was observed in 5% of examined women.

Conclusions. In 5% of the examined persons, the frontal sinuses have only one connection, in all other cases – several connections with different structures and in different combinations. Most often, the frontal sinuses are simultaneously connected to the ethmoidal labyrinth, the upper and the middle nasal meatus.

Key words: frontal sinuses, computer tomography, communication, nasal meatus, ethmoidal labyrinth.

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Conflict of interest:

The authors declare no conflict of interest

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COMPARATIVE ANALYSIS OF METHODS OF DIAGNOSIS OF "DRY EYE" SYNDROME

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Despite the high prevalence of dry eye disease, it is difficult for a doctor to detect it. This problem is due to the wide variability of clinical signs and the need for a transparent diagnostic scheme for an accurate diagnosis. Therefore, a comparison of the values of diagnostic methods is presented to detect DED even with a mild form.

The study aims to compare and analyze the main ways of diagnosing "dry eye" syndrome.

We examined 28 people (56 eyes) aged between 30 and 60. All patients were interviewed before the main symptoms (sensation of dryness in the eye, foreign body and others), and the detected symptoms were evaluated on a point scale. The patients underwent the Schirmer I test, Norn test, instillation of 1% fluorescein solution and lissamine green. The quality of the tear film was determined using interferometry.

After examining the patients, two groups were formed: group I (18 people) had symptoms of mild DED, group II (10 people) had symptoms of moderate severity. The degree of expression on the scale of subjective symptoms of DED had significant variability. The analysis of the objective signs of DED indicates the non-specificity of subjective symptoms, which indicates the need for additional diagnostic methods (Schirmer test, Norn test, fluorescent test). The interferometry method for studying the state of the tear film showed the greatest informativeness in diagnosing the degree of DED.

In most cases, subjective symptoms and biomicroscopic signs do not fully characterize the tear film's condition, so additional research methods are necessary. The Norn test is more informative than the Schirmer I test for diagnosing mild DED. Detection of punctate corneal erosions is better when using 1% fluorescein than lissamine green. The interferometry method fully provides information about the state of the tear film, especially with a mild degree of DED.

Key words: "dry eye" syndrome, tear film, thickness of the lipid layer of the tear film, interferometry, influence of computer devices.

Connection of the publication with planned research works.

The publication is a fragment of the Department's research work "Development of diagnostic criteria for changes in the ocular surface and ganglion layer of the retina based on the data of interferometry and optical coherence tomography", state registration number 0119U102848.

Introduction.

The problem of diagnosis and treatment of dry eye disease (DED) is relevant in clinical ophthalmology because, despite numerous studies, the diagnosis and treatment of the "dry eye" syndrome have remained unsolved

problems until recently [1-3]. There is a trend towards an increase in morbidity, the frequency of DED in the structure of all primary patient visits to an ophthalmologist reaches 35-40% [4, 5, 6]. The causes of DED are numerous factors, such as exposure to the eyes of conditioned air, electromagnetic radiation from office equipment, the prevalence of contact vision correction, and refractive surgery. An essential factor in the spread of DED is the systematic use of drugs of different orientations, which leads to a violation of the stability of the tear film (anti-depressants, antiarrhythmic drugs, antihistamines, anti-glaucomatous drugs, etc.) [7, 8].