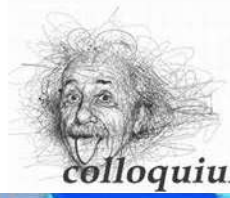

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FEATURES OF THE BLOOD SUPPLY OF THE ETHMOID LABYRINTH IN PEOPLE OF DIFFERENT AGE

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ОСОБЛИВОСТІ КРОВОПОСТАЧАННЯ РЕШІТЧАСТОГО ЛАБІРИНТУ У ЛЮДЕЙ РІЗНОГО ВІКУ

Abstract.
The sources of arterial blood supply to the walls of the labyrinth of the ethmoid bone and the mucous membrane of its cells are the anterior, posterior and, often, the middle ethmoid arteries from the system of the internal carotid artery, as well as the lateral nasal artery (branch of the sphenopalatine) from the system of the external carotid artery. Along with this, branches of the ophthalmic artery (median group), as well as branches from the mesh of the lacrimal sac and the frontal branch of the middle meningeal artery (external carotid artery system) participate in the blood supply of the walls of the cells of the labyrinth of the ethmoid bone. In the topography of the ophthalmic and sphenopalatine arteries and their branches, there are clearly defined individual variants and extreme forms.

Анотація.
Джерелами артеріального кровопостачання стінок лабіринту решітчастої кістки та слизової оболонки його комірок є передня, задня та, часто, середня решітчасті артерії з системи внутрішньої сонної артерії, а також бічна носова артерія (гілка клиноподібної) з системи зовнішньої сонної артерії. Поряд з цим, у кровопостачанні стінок комірок лабіринту решітчастої кістки беруть участь гілки очної артерії (присередня група), а також гілки від сітки слізного мішка та лобової гілки середньої оболонної артерії (система зовнішньої сонної артерії). У топографії очної та клиноподібної артерій та їхніх гілок є чітко виражені індивідуальні варіанти та крайні форми.

Key words: *ethmoid bone, ethmoid arteries, cells of the ethmoid labyrinth, anatomy, human.*
Ключові слова: *решітчаста кістка, решітчасті артерії, комірки решітчастого лабіринту, анатомія, людина.*

Introduction. It is known that the diagnosis and treatment of diseases of the ethmoid labyrinth is a more complex and difficult task compared to diseases of other sinuses [1]. There is an anastomosis between the branches of the external and internal carotid arteries. The posterior connecting artery is one of the main ways of collateral blood circulation between the carotid and vertebral-basilar systems [2]. The study of the topography of lattice channels, which are located on the medial wall of the orbit, has significant applied value, as it is a morphological basis for substantiating the methods of analgesia during surgical interventions on the sinuses [3-7]. In connection with the above, it is expedient to know the peculiarities of the branching of the ethmoid arteries in the canals of the same name of the ethmoid bone and the blood supply of the mucous membrane of the cells of the ethmoid labyrinth.

The aim of the study. To establish the features of the blood supply of the ethmoid labyrinth in people of different ages.

Material and methods. The study was carried out in compliance with the basic bioethical provisions of the Convention of the Council of Europe on Human Rights and Biomedicine (from 04.04.1997), the Helsinki Declaration of the World Medical Association on the ethical principles of conducting scientific medical research with human participation (1964-2013), the order of the Ministry of Health of Ukraine No. 690 dated September 23, 2009. A measuring ruler with a movable slider was used for measurement. The slider was fixed

to the medial wall of the orbit and the ruler was moved to the openings of the ethmoid canals. This method allows you to get distance values in millimeters.

Research results. During the histological study of ethmoid canals, it was established that the canals are lined with periosteum inside, which consists of the outer, denser, fibrous layer of the periosteum with a small number of connective tissue elements, and the inner one, in which the growth of cellular elements and the decrease of fibrous ones is noted. Lateral openings were found in the middle and end parts of the canals, the number of which varies from 5 to 14. The number and direction of the lateral openings corresponds to the number and topography of the rear and middle cells of the lattice labyrinth. On histological sections, three membranes are present in the wall of the ethmoid artery: a thin adventitia membrane, which without clear borders passes to the surrounding connective tissue; the middle one is muscular, well defined, the inner one is endothelial. 2-5 small branches depart from the posterior ethmoid artery within the canal, one or two of which (larger in diameter) go backward and enter the sphenoid sinus. The remaining branches supply blood to the walls of the posterior cells of the ethmoid labyrinth. After leaving the canal, the posterior ethmoid artery often branches in the thickness of the mucous membrane of the posterior-upper parts of the nasal cavity and reaches the openings of the posterior group of cells of the ethmoid labyrinth. The second group of branches penetrates through the perforated plate of the ethmoid bone into the anterior cranial fossa, giving off branches along the way. In the anterior cranial fossa, the posterior ethmoid artery participates in the blood supply of the olfactory bulb, and also gives off small branches to adjacent areas of the dura mater. Thanks to the application of injection methods, we discovered two main variants of the branching of the posterior ethmoid artery after its exit from the canal of the same name: in the first case, the artery rises up the main trunk and enters the anterior cranial fossa near the front edge of the cribriform plate, participating in the formation of a branched mesh, which supplies blood to the dura mater; in the second case, the artery, after leaving the canal, goes down and branches in the mucous membrane of the lateral wall of the nasal cavity above the superior concha into anterior and posterior branches. The posterior branch approaches the medial walls of the posterior cells of the ethmoid labyrinth and the sphenoid sinus. Its final branch anastomoses with the posterior lateral artery of the nasal septum, which departs from the sphenopalatine artery, which is a branch of the maxillary artery. The anterior branch of the posterior ethmoid artery gives a large vessel to the maxillary sinus and branches in the mucous membrane of the middle part of the superior nasal meatus. The anterior ethmoidal artery, like the posterior one, gives off 2 to 10 thin branches within the canal, the course of which mainly corresponds to the direction of the artery. However, there were isolated cases when individual branches went backwards. After exiting the canal, the anterior ethmoid artery enters the skull cavity, where it supplies arteries to the dura mater. These arteries are anastomosed with the frontal branch of the middle meningeal artery. The branches of these arteries penetrate through the bony wall (the roof of the labyrinth of the ethmoid bone) and go to the mucous membrane of the anterior cells of the ethmoid labyrinth. The second branch of the anterior ethmoid artery enters the nasal cavity and branches in the thickness of the mucous membrane of the middle nasal meatus. The number of its terminal branches corresponds to the number of openings of the anterior group of cells of the ethmoid labyrinth. Most often, the loose type of branching of the specified artery prevails. When pouring Gerot's mass through the external carotid artery (with prior ligation of the internal carotid artery), we managed to detect the involvement of the branches of the external carotid artery in the blood supply of the ethmoid labyrinth. This is done at the expense of the sphenopalatine artery. After leaving the opening of the same name, it gives off a branch to the pharynx, a posterior septal branch and a lateral nasal artery. From the latter, 2-6 branches depart, which go up and supply blood to the superior and middle nasal concha. Individual branches of these arteries participate in the formation of the arterial ring in the thickness of the mucous membrane of the middle nasal meatus around the openings of the maxillary sinus, as well as in the blood supply of the mucous membrane of the middle floor of the cells of the ethmoid labyrinth. The terminal branches of these arteries anastomose with the branches of the anterior and posterior ethmoid arteries in the area of the superior and middle nasal meatuses. The posterior-superior branches of the lateral nasal artery similarly penetrate the mucous membrane of the lower floor of the middle, and sometimes the posterior group of cells of the ethmoid labyrinth.

Conclusions. Thus, the sources of arterial blood supply to the walls of the labyrinth of the ethmoid bone and the mucous membrane of its cells are the anterior, posterior and, often, the middle ethmoid arteries from the system of the internal carotid artery, as well as the lateral nasal artery (branch of the sphenopalatine) from the system of the external carotid artery. Along with this, branches of the ophthalmic artery (median group), as well as branches from the mesh of the lacrimal sac and the frontal branch of the middle meningeal artery (external carotid artery system) participate in the blood supply of the walls of the cells of the labyrinth of the ethmoid bone. In the topography of the ophthalmic and sphenopalatine arteries and their branches, there are clearly defined individual variants and extreme forms.

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