

ПАТОМОРФОЛОГИЯ ПАТОГЕНЕТИЧЕСКОГО ВАЗОТОНИЧЕСКОГО И ВАСОДИЛАТИРУЮЩЕГО ПЕРИОДОВ АЛЛЕРГИЧЕСКОГО РИНИТА

Р.И.Исраилов.¹, Э.Э.Мирзакандов.²

¹Республиканский Патологоанатомический центр, Узбекистан,

²Ферганский медицинский институт общественного здоровья.

Для цитирования: © Исраилов Р.И., Мирзакандов Э.Э.

ПАТОМОРФОЛОГИЯ ПАТОГЕНЕТИЧЕСКОГО ВАЗОТОНИЧЕСКОГО И ВАСОДИЛАТИРУЮЩЕГО ПЕРИОДОВ АЛЛЕРГИЧЕСКОГО РИНИТА ПРОМЫШЛЕННОСТИ. ЖКМП.-2024.-Т.2.-№2.-С

Поступила: 16.03.2024

Одобрена: 14.04.2024

Принята к печати: 05.05.2024

Аннотация: В данной статье изучены патоморфологические изменения, характерные для патогенетического вазотонического и вазодилатационного периодов аллергического ринита. Материалом служили биопсии, полученные во время операции больных аллергическим ринитом в ЛОР-отделении Ферганской городской многопрофильной больницы. В зависимости от патогенетических и морфогенетических особенностей аллергического ринита выделяют несколько периодов: вазотонический, вазодилатационный, период развития хронического отека, период пролиферации тканевых структур. В 1-м вазотоническом периоде основные изменения заключаются в том, что артерии и артериолы в приватной пластинке и подслизистом слое слизистой оболочки резко укорачиваются и сужаются их пространство. При расширении сосудов наблюдают, что все микроциркуляторные сосуды слизистой оболочки резко расширяются, их стенки истончаются, проницаемость увеличивается.

Ключевые слова: нос, ринит, аллергия, патогенез, вазотония.

ALLERGIK RINITNING PATOGENETIK VAZOTONIK VA VAZODILYATATSIYA DAVRLARI PATOMORFOLOGIYASI

R.I.Israilov.¹, E.E.Mirzakandov.²

¹O'zbekiston Respublikasi Patologik anatomiya markazi,

²Farg'ona jamoat salomatligi tibbiyot instituti.

Izoh: © Israilov R.I., Mirzakandov E.E.

ALLERGIK RINITNING PATOGENETIK VAZOTONIK VA VAZODILYATATSIYA DAVRLARI PATOMORFOLOGIYASI. KPTJ.-2024-N.2.-№2-M

Qabul qilindi: 16.03.2024

Ko'rib chiqildi: 14.04.2024

Nashrga tayyorlandi: 05.05.2024

Annotatsiya: Ushbu maqolada allergik rinitning patogenetik vazotonik va vazodilyatatsiya davrlariga xos bo'lgan patomorfologik o'zgarishlar o'rganildi. Material sifatida Farg'ona shahar ko'p tarmoqli shifoxonaning LOR bo'limida allergik rinit bilan kasallanganlardan jarrohlik amaliyotida olingan biopsiya bo'laklari hisoblandi. Allergik rinitning patogenetik va morfogenetik xususiyatlariga qarab bir nechta davri farq qilindi: vazotonik, vazodilyatatsiya, surunkali shish rivojlanish davri, to'qima tuzilmalarining proliferatsiyalanish davri. 1-vazotonik davrida asosiy o'zgarishlar shilliq pardaning xususiy plastinkasi va shilliq osti qavatlaridagi arteriya va arteriolalar keskin qisqarib, bo'shlig'i torayganligi kuzatiladi. Vazodilyatatsiya davrida shilliq pardaning barcha mikrosirkulyator o'zan qon tomirlari keskin kengayganligi, devori yupqalashib, o'tkazuvchanligi oshganligi kuzatiladi.

Kalit so'zlar: burun, rinit, allergiya, patogenez, vazotoniya.

PATHOMORPHOLOGY OF PATHOGENETIC VASOTONIC AND VASODILATING PERIODS OF ALLERGIC RHINITIS

Israilov R.I.¹, Mirzakandov E.E.²

¹Republican Pathological Anatomical Center, Uzbekistan,

²Fergana Medical Institute of Public Health.

For situation: © Israilov R.I., Mirzakandov E.E.

PATHOMORPHOLOGY OF PATHOGENETIC VASOTONIC AND VASODILATING PERIODS OF ALLERGIC RHINITIS. JCPM.-2024.P.2.-№2-A

Received: 16.03.2024

Revised: 14.04.2024

Accepted: 05.05.2024

Annotation: This article examines the pathomorphological changes characteristic of the pathogenetic vasotonic and vasodilatory periods of allergic rhinitis. The material was biopsies obtained during surgery from patients with allergic rhinitis in the ENT department of the Fergana City Multidisciplinary Hospital. Depending on the pathogenetic and morphogenetic features of allergic rhinitis, several periods are distinguished: vasotonic, vasodilation, the period of development of chronic edema, and the period of proliferation of tissue structures. In the 1st vasotocin period, the main changes are that the arteries and arterioles in the lamina propria and submucosal layers of the mucous membrane sharply shorten and their space narrows. With vasodilation, it is observed that all microcirculatory vessels of the mucous membrane sharply expand, their walls become thinner, and permeability increases.

Keywords: nose, rhinitis, allergy, pathogenesis, vasotonia.

Introduction: Despite the thorough study of allergic rhinitis (AR), several aspects of this large-scale problem are still not fully resolved. The incidence rate of allergic rhinitis directly depends on the influence of regional climate and geographic characteristics of the region. The clinical course of AR depends on the individual influence of the patient's organism, age, gender, and ethnicity, along with various influencing factors. Allergic rhinitis sufferers are mainly urban residents, they established 75% of the total patients, and 25% are rural residents. [1]. The prevalence rate of AR depends on age and sex. Among children, more boys suffer from Allergic rhinitis AR. According to foreign authors, this disease occurs from 0.2% to 4.3% [2,3]. According to the data of the Russian state, when 50,000 patients were examined by front and back rhinoscopy, chronic allergic rhinitis was found in 1.02%. According to a study by French scientists, this disease was found in 0.1% of children. Morphological changes in allergic rhinitis and rhinosinusitis include the following, discirculatory, dystrophic, disorganized, destructive, and inflammatory processes are observed in the mucous membrane [1,4].

Material and methods: In the Otorhinolaryngology department of the Fergana City multidisciplinary hospital, the biopsy pieces taken during surgery from patients with allergic rhinitis were morphologically examined. A piece of nasal mucosa taken from a total of 62 patients was frozen in a 10% solution of formalin dissolved in phosphate buffer for 72 hours as a biopsy material, then washed in running water for 4 hours and dehydrated in alcohols and chloroform with increased concentration. Dehydrated tissue fragments were embedded in paraffin with wax, and blocks were prepared. Histological sections of 5-7 µm thickness were prepared from paraffin blocks on a semi-automatic microtome. To determine the amount and location of collagen fibers in the tissue, it was stained with picrofuchsin by the van Gieson method. As acidic glycosaminoglycans are increased in the tissue during the allergic process, histological sections were stained with altsian blue to identify them.

Results and discussion: As shown above, the 1st pathogenetic period of allergic rhinitis is the vasotonic period, that is, the period of increased contractile tone of the vessel wall. The results of the morphological examination showed that the main change characteristic of this vasotonic period was detected in blood vessels. It is observed that the arteries and arterioles in the tissue of

allergic rhinitis, that is, in the private plate of the mucous membrane and the submucosal layers, are sharply shortened and the space narrowed. In the special plate of the mucous membrane with unformed connective tissue, it is determined that the cell structures of the arteriole wall, including smooth muscle cells, are shortened, the wall is thickened, and the cavity is narrowed (Fig. 1). It is determined that lymphohistiocytic cells proliferate and increase in the thickened structure of the private plate tissue, thickening of the interstitial substance, and almost no swelling process. It is observed that the covering epithelium has a single-layer, multi-row structure, the epithelium in it has a cylindrical structure, and the nuclei are located in the basal part of the cell.

Morphological examination of the submucosal layer of the nose in allergic rhinitis revealed that the submucosal layer of the nose mainly contains sinusoids with wide spaces, connective tissue fibers, cells, and blood vessels located between them and on their walls. During the pathogenetic vasotonic period of allergic rhinitis, it is determined that not only small blood vessels, but also sinusoids are narrowed, the cavity becomes smaller, and the wall thickens. During the vagotonic period, a biologically active substance that narrows arteries and arterioles, i.e. histamine, is released in large quantities in the tissue structure, which is confirmed by the narrowing of the vessels.

Figure 1. During the vasotonic period of allergic rhinitis, the arterioles in the private plate are narrowed and their walls are thickened. Paint:10x40.

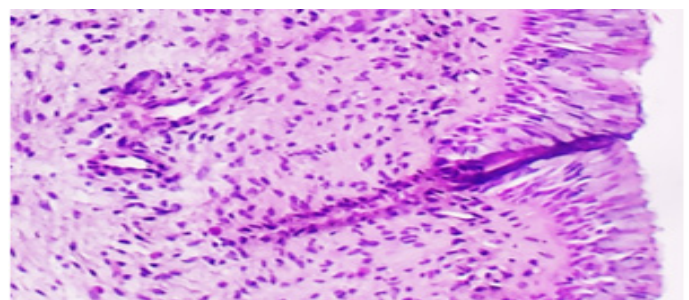
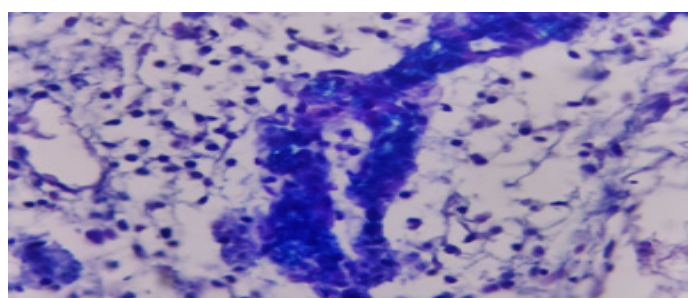


Figure 2. Vasotonic period of allergic rhinitis, acidic glycosaminoglycans accumulate in large quantities in the wall of arterioles in a vasotonic state. Paint: Altsian blue.:10x40.



During the vasotonic period of allergic rhinitis, the tissue is examined by histochemical method, i.e. when the collagen fibers of the connective tissue are stained with picrofuchsin by the van Gieson method, it is determined that due to the concentration of collagen fibers in the wall of the arterioles in the vasotonic state, they are located mainly in the adventitia in the form of dark purple tufts. It is observed that the inner layer of the arteriole wall is thickened and swollen. In this case, it is observed that endothelial cells have increased in size due to swelling and filled the arteriolar space. During the vasotonic pathogenetic period of allergic rhinitis, the amount and location of acidic glycosaminoglycans in tissue structures were studied. It was found that the wall of arterioles in a vasotonic state is sharply thickened and deformed due to the accumulation of dark blue acidic glycosaminoglycans in large quantities (Fig. 2), cell structures are not visible, and the cavity of the arteriole is sharply narrowed. It is determined that the connective tissue in the perivascular area is severely swollen, its fibrous structures are sparse, and they contain less acidic glycosaminoglycans.

The second pathogenetic stage of the development of allergic rhinitis is vasodilatation, that is, the steady expansion of blood vessels of the mucous membrane. As its morphological symptoms, all the microcirculatory blood vessels in the private plate with the unformed connective tissue of the mucous membrane are sharply expanded, their walls become thinner, their permeability increases, and as a result, the surrounding tissue is severely swollen. In this case, it is observed that arterioles, capillaries, and capillary space in the private plate are widened, both endothelial and pericyte cells in their walls are sparsely located, and in most cases, they are pushed to a part of the vessel wall. It is determined that the subepithelial basement membrane of the mucous membrane has expanded and thickened due to mucoid and fibrinoid thickening. It is determined that the intermediate connective tissue of the private plate is swollen, connective tissue cells are sparsely located, and there is lymphoid infiltration between them. In allergic rhinitis, the study of blood vessels located in the deep areas of the private plate of the nasal mucosa, that is, on the border with the submucosal sinusoids, showed that during the pathogenetic vasodilatation period of the disease, all blood vessels in this area were sharply expanded, among them there were postcapillary venules that became almost sinusoidal (Fig. 3), was determined.

It is determined that the inner endothelial layer consists of relatively densely located endothelial cells on their wall and protrudes into the vessel cavity. The subendothelial basement membrane and adventitial layers are found to be thickened and thickened. In the connective tissue space between the vessels, it is determined that the fibers are narrowed and thinned due to swelling, and the interstitial substance is vacuolated. The nuclei of connective tissue cells are found to be oval and elongated, and their chromatin is stained darkly with hematoxylin. Diffuse lymphoid infiltration is detected in the connective tissue.

Figure 3. During the period of vasodilatation of allergic rhinitis, the border of the submucosal layer of the private plate, and the postcapillary venules are dilated like sinusoids.

Paint: E-H 10x40.

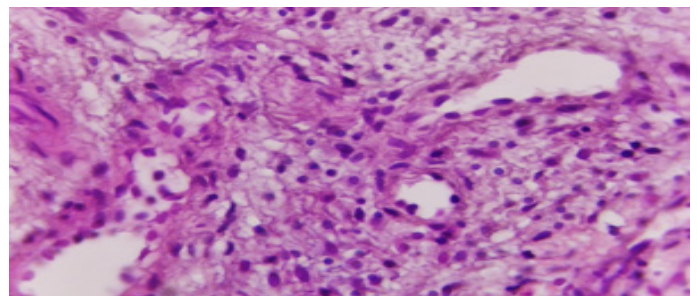
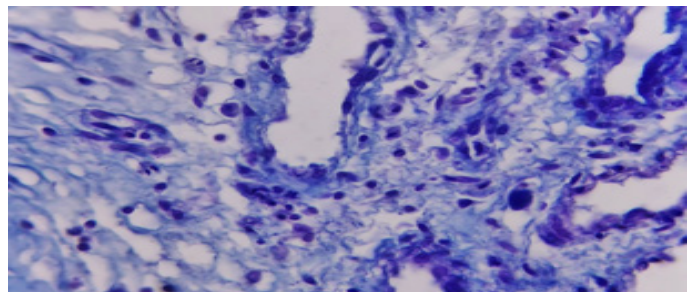


Figure 4. During the vasodilatation phase of allergic rhinitis, the amount of acidic glycosaminoglycans is also reduced in the blood vessel wall and interstitium.

Paint: Altsian blue.:10x40.



Microscopic examination of the tissue of the submucous layer under the special plate of the mucous membrane of the nasal concha revealed that during the pathogenetic vasodilatation period of allergic rhinitis, the sinusoids in this layer also expanded sharply, the cavity was deformed, intussusceptions appeared around them, and they turned into cavernous spaces. It is determined that the endothelial cells on the inner surface of the sinus wall are histotopographically deformed, and some of them are separated from the basement membrane and come out into the cavity. It is observed that the connective tissue cells in the fibrous connective tissue, which formed the wall of the sinusoids, are swollen due to pericellular swelling, and the fibrous structures are fragmented and disorganized.

When the tissue of allergic rhinitis was stained by the histochemical method with van Gieson during vasodilatation, it was revealed that the walls of blood vessels subjected to vasodilatation were stretched and mixed with the connective tissue of the basal membrane and adventitial connective tissue, which was confirmed by their light red staining. In this case, it is observed that the capillaries and capillaries in the private plate of the mucous membrane are sharply expanded, and the collagen fibers decrease due to the thinning of the wall. Due to the expansion of the area of the basement membrane due to fibrinoid swelling in the wall of the sinusoidal vessel, it was observed that the collagen fibers were stained in a light reddish color. In the intermediate connective tissue, it is determined that collagen fibers are mostly homogeneously located, only in some areas tufts have appeared. When the tissue of the private plate of the nasal mucosa was stained with altsian blue by histochemical method, it was revealed that due to the pathogenetic vasodilation period of allergic rhinitis, the blood vessels expanded paralytically, the wall became thinner, the number of acidic glycosaminoglycans in its content decreased, and it was painted in a relatively light blue color (Fig. 4). It is observed that the interstitial connective tissue is severely swollen, the interstitial substance is heavily vacuolated, and sour glycosaminoglycans are stored in a relatively small amount.

Conclusions: Depending on the pathogenetic and morphogenetic characteristics of allergic rhinitis, several periods are distinguished: vasotonic - a violation of the contractile tone of the vascular wall, vasodilatation - a steady expansion of blood vessels of the mucous membrane, a period of chronic edema development - the mucous membrane turns blue due to swelling and dilation of veins, a period of proliferation of tissue structures - the increase of tissue structures on the mucous membrane, the appearance of polyps, the spread of the process to additional spaces.

The 1st pathogenetic period of allergic rhinitis is the vasotonic period, i.e., the period of increased contractility of the vascular wall, and the main change characteristic of this vasotonic period is that the arteries and arterioles in the private plate and submucosal layers of the mucous membrane are sharply shortened and their space narrowed. During vasodilatation, all microcirculatory blood vessels in the private plate of the mucous membrane are sharply expanded, their walls become thinner, and their

permeability increases, including arterioles, capillaries, and capillary spaces, the density of both endothelial and pericyte cells on their walls is observed, and in most cases, they are pushed to a part of the vessel wall.

REFERENCES:

1. Emelyanov A.V., Ilyina N.I., Karneeva O.V., et al. Unresolved issues in the management of patients with severe allergic rhinitis and polypous rhinosinusitis. Anti capabilities -IgE therapy. Russian otorhinolaryngology. 2020;3(106):88-9
2. May JR, Dolen WK. Evaluation of Intranasal Corticosteroid Sensory Attributes and Patient Preference for Fluticasone Furoate for the Treatment. Clin Ther. 2019;41(8):1589-96.
[DOI:10.1016/j.clinthera.2019.05.017](https://doi.org/10.1016/j.clinthera.2019.05.017)
3. Ryazantsev S.V., Pavlova S.S. Difficulty nasal breathing in the practice of an otolaryngologist: how to help? Russian otorhinolaryngology. 2020;2(105):107-15
4. Sarah S, Husna N, Shukri N, et al. Zonula Occludens-1 expression is reduced in nasal epithelial cells of allergic rhinitis patients. Peer J. 2022;10:e13314.
[DOI:10.7717/peerj.13314](https://doi.org/10.7717/peerj.13314)

Информация об авторах:

© ИСРАИЛОВ Р.И.- Профессор, директор Республиканского Патологоанатомического Центра МЗ РУз. г.Ташкент. Узбекистан.
© МИРЗАКАНДОВ Э.Э.- Ассистент кафедры Стоматологии и Оториноларингологии Ферганского медицинского института общественного здоровья. г.Фергана. Узбекистан.

Muallif haqida ma'lumot:

© ISRAILOV R.I.- t.f.d., professor, O'zR SSV Respublika Patologik Anatomiya Markazi direktori. Toshkent sh. O'zbekiston.
© MIRZAKANDOV E.E.- Farg'ona jamoat salomatligi tibbiyot instituti Stomatologiya va Otorinolaringologiya kafedrasasi assistenti. Farg'ona sh. O'zbekiston.

Information about the authors:

© ISRAILOV R.I.- Professor, Director of the Republican Pathoanatomical Center of the Ministry of Health of the Republic of Uzbekistan. Tashkent, Uzbekistan.
© MIRZAKANDOV E.E.- Assistant, Department of Dentistry and Otorhinolaryngology, Fergana Medical Institute of Public Health. Fergana, Uzbekistan.