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Research Article

MORPHOLOGICAL INDICATORS OF THE NASAL MUCOSA AND PARANASAL SINUSES IN CHRONIC RHINOSINUSITIS

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ABSTRACT

This study aimed to evaluate histopathological polyps in patients with chronic rhinosinusitis. In histological preparations of the first group of patients with polypous rhinosinusitis, morphological changes are characterized by hyperplasia of the mucosal epithelium due to prolonged catarrhal inflammation and mucus secretion by papillary growth, cystic changes in the lumen of the stromal glands, as well as focal inflammatory cell infiltration. Based on the results of histological examination of the second group of patients, it can be noted that morphological changes are mainly characterized by cystic lesions of the mucosal glands, as well as the integumentary epithelium with focal or diffuse inflammatory cell infiltration.

KEYWORDS

Chronic rhinosinusitis, polyp, inflammation, eosinophil, epithelium, nasal mucosa.

INTRODUCTION

Chronic polyposis rhinosinusitis is a common disease that typically affects about 2-4% of the world's population [1]. However, its prevalence differs among different groups; for example, its prevalence is quoted as: 36% in patients with allergies, 7% in patients with asthma, 0.1% in children and 20% in patients with cystic fibrosis [2]. Other common conditions associated with the disease are Churg-Strauss syndrome, allergic fungal sinusitis, and Kartagener syndrome [3,4].

This disease belongs to a group of dysfunctions characterized by inflammation of the nasal mucosa and paranasal sinuses, which persists for at least 12 weeks [5]. Based on the criteria for Ear, Nose and Throat Surgery in America, the main determining factors are facial pain or pressure, nasal discharge or postnasal drip, decreased or loss of sense of smell, and fever. In 2003, it was stated that this determination requires radiographic or endoscopic confirmation and clinical examination results in addition to the patient's medical history. The most common complaint of patients with

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chronic polyposis rhinosinusitis is nasal congestion, and the age group of 40 years has the greatest involvement of preferences [6,7]. The most common risk factors for developing a nasal polyp are smoking, exposure to pollutants and dust, eczema, aspirin allergy, alcohol consumption, asthma and atopy. It should be noted that a polyp is a mass of tissue that protrudes from the surface of the mucosa and is supported by a stalk-like junction, and a nasal polyp is a clinical condition characterized by the accumulation of polyps, especially in the middle nasal passage and ethmoid sinuses, which are usually bilateral and tend to be repetitive. Polyps are usually numerous, nontumorous, soft, luminous, nonbleeding, and translucent [8].

The pathogenesis of nasal polyp has not yet been properly identified. Recently, some differences have been observed in the demonstration of inflammatory mediators and cellular features in chronic polyposis rhinosinusitis. Most sources confirm that eosinophil and its inflammatory products are the main characteristics of nasal polyps [9].

Recent studies have shown that chronic polypous rhinosinusitis, contrary to what was previously believed, is not an allergic condition, and most articles divide polyps into two categories: eosinophilic and neutrophilic. While others, when classifying polyps, mention the groups of eosinophilic polyposis and glandular hyperplasia [10,11], but according to a study by Hellquist (1993) on 95 patients, he considered a more comprehensive classification that is based on four types of polyps.

The allergic type, which accounts for 86% of nasal polyps. Specifications of this type of polyp include: normal epithelium with some goblet cell activity, a thickened basement membrane, a large number of eosinophils that are mainly populated adjacent to the vessels along with plasma cells and histiocytes, and the presence of mast cells scattered in the stroma [12].

The second form is inflammatory or fibro-inflammatory (3.7%), changes in the epithelium are mainly observed such as the formation of stratified cuboidal or squamous cells, pseudo thickening of the membrane is irregular or not observed at all, infiltration of inflammatory cells includes a set of neutrophils, lymphocytes and plasma cells [13]. And eosinophils are no more numerous than other cell types, and the neutrophil is likely the dominant cell type. The third form is glandular hyperplasia (5.3%): in some cases, the serous glands become enlarged and hyperplastic, sometimes called tubo-cystadenoma.

Finally, polyps with atypical stroma, with a prevalence of about 1.1%, are not common. Typically, edematous stroma and active fibroblasts are located in parts of the polyp.

These fibroblasts exhibit unusual characteristics. They are star-shaped, large, irregular and hyperchromatic, usually without mitosis. This classification is confirmed by pathological evaluations [14].

Chronic polyposis rhinosinusitis has many direct and indirect social and economic costs to society, as well as a significant impact on patients' quality of life and is associated with occupational and social limitations that have a greater impact on people's mental health than on their physical health [15] . -21]. Determining the precise histopathological characteristics and variants of chronic polyposis rhinosinusitis may help in the selection of effective drugs for the treatment of this disease. In addition, it facilitates the identification of effective parameters for alternative treatment options for this disease, such as non-drug treatments.

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This study aimed to evaluate histopathological polyps in patients with chronic rhinosinusitis.

METHOD

In accordance with the purpose of the study and to fulfill the assigned tasks, clinical studies were carried out in 112 patients with CPRS and chronic rhinosinusitis, who were examined and treated in the ENT department of the multidisciplinary clinic of the Tashkent Medical Academy in 2017-2020. In order to identify various forms and the course of chronic polypous rhinosinusitis, as well as improving treatment methods, we conducted a morphological study of removed materials from the mucous membrane of the nasal cavity and paranasal sinuses. The patients were divided into two groups; The first group included patients with polypous rhinosinusitis, the second group – chronic rhinosinusitis.

For histological examination, the resulting material was placed in a 4% neutral formaldehyde solution, fixed in alcohol, and then paraffin blocks were prepared. The preparation of materials was carried out on a Thermo histoprocessor scientific STO 120", Histostar , Microm HM 325 The finished sections were stained with hematoxylin and eosin, viewed under a binocular microscope made in Germany LEIKA , photographed micropreparations using a web camera MD 130 Electronic Eyepiece .

RESULTS & DISCUSSION

During morphological studies in the first group, polypoid growth of tissue lined with columnar, ciliated epithelium was discovered in 80 patients, in some cases with destruction, massive desquamation until the basement membranes were exposed. In all cases, under the epithelium there is an edematous connective tissue stroma with numerous mucous glands with secretory activity, a diffuse polymorphic infiltrate with a predominance of eosinophilic leukocytes, foci of hemorrhage, and vascular hyperemia. In 26 cases, squamous metaplasia of the epithelium was noted

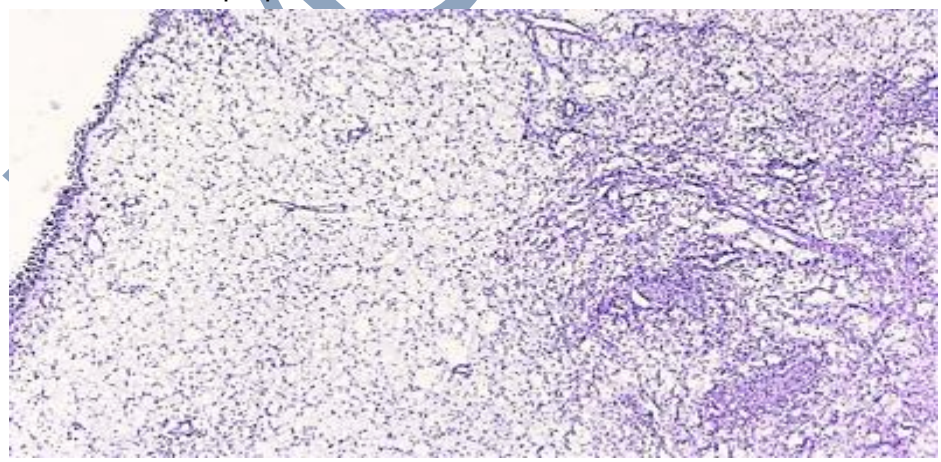

Fig 1.

The stroma of the formation is represented by loose connective tissue with uneven edema, angiomatosis, uneven vascular congestion, scattered and focal infiltration of lymphocytes, with an admixture of eosinophils, and accumulations of small mucous glands. (1 group) Staining with hematoxylin and eosin. UV about x10.0

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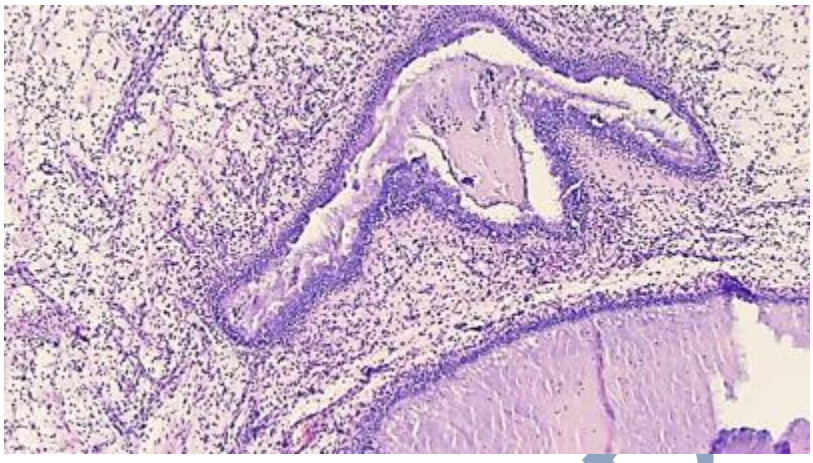

Fig 2.

The surface of the polypoid tissue is lined with columnar epithelium with destruction and massive desquamation until the basement membranes are exposed. The stroma is edematous with numerous mucous glands with secretory activity, diffuse polymorphic infiltrate. (1 group) Staining with hematoxylin and eosin. UV about x10.0

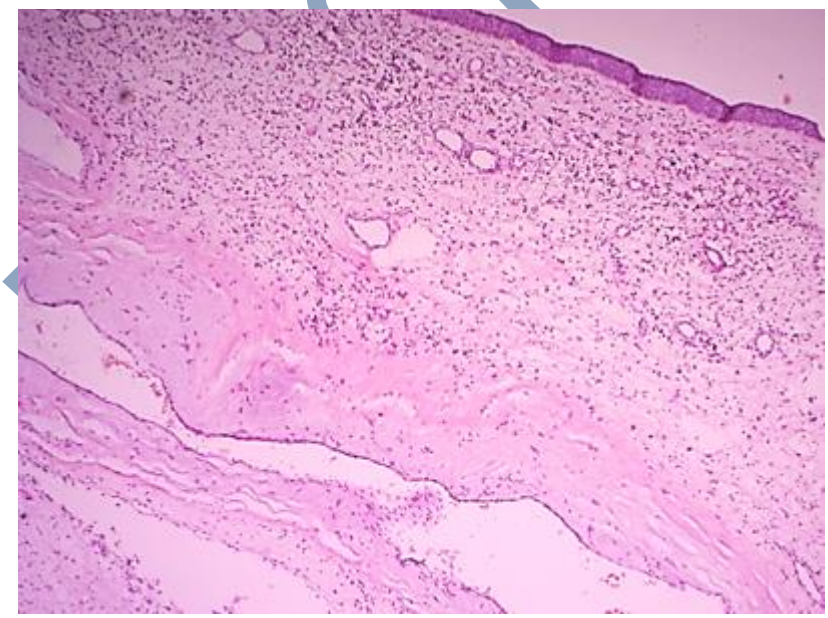

Fig. 3.

Loose fibrous tissue, in the form of a polyp-like formation, covered with prismatic epithelium, in places with its destruction, in places with squamous metaplasia. In areas where there are changes in the

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epithelium, there is diffuse lymphocytic infiltration. The stroma is loose, there are foci of hemorrhage, and there are also many cystic cavities with amorphous contents, without signs of atypia. (1 group) Staining with hematoxylin and eosin. UV about x10.0

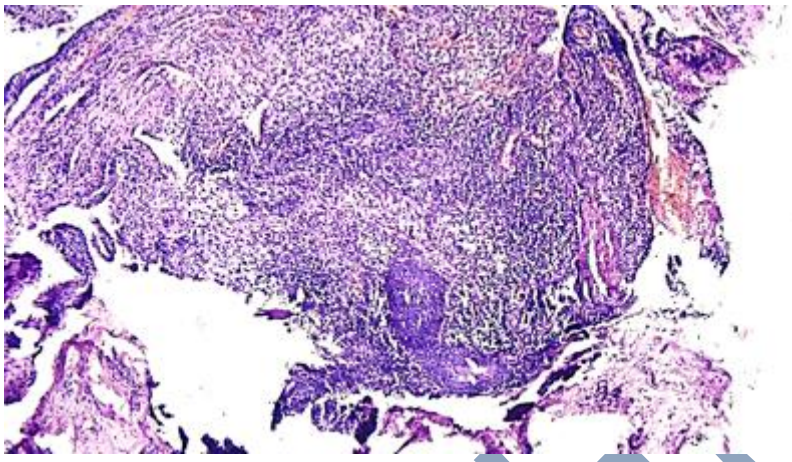

Fig 4.

Inflammatory polyp: the surface is lined with columnar epithelium with areas of total desquamation. Under the epithelium there is an edematous network of connective tissue with diffuse polymorphic inflammatory infiltration, hemorrhages, single large, secretory active glands. (1 group). Hematoxylin and eosin staining. UV about x10.0

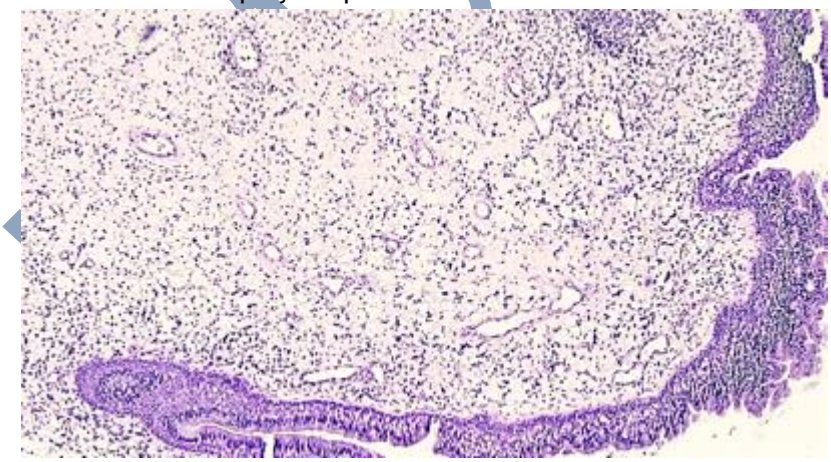

Fig. 5.

Mucous polyp with elements of chronic inflammation: the surface is covered with stratified columnar epithelium with foci of proliferation, destruction and dystrophy. The stroma consists of an edematous, thin network of connective tissue with foci of increased eosinophilic, plasmacytic and lymphocytic infiltration, vascular congestion. Foci of histiocytosis are noted. (1

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group) Staining with hematoxylin and eosin. UV about x10.0

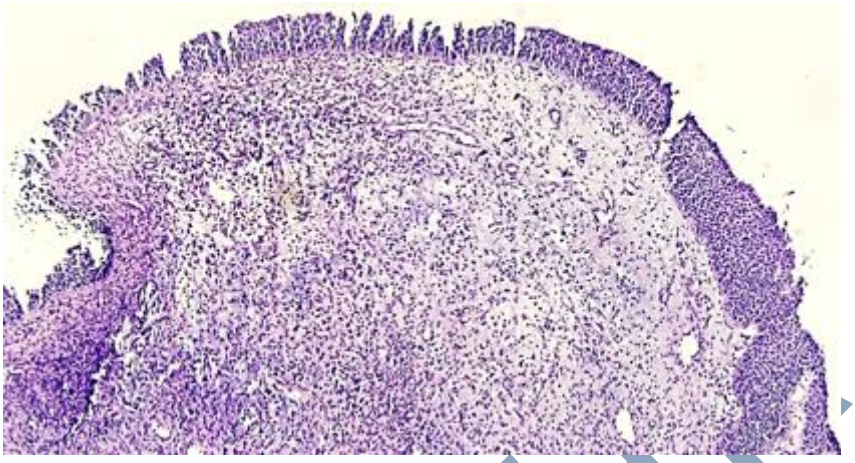

Fig. 6.

Inflammatory-angiomatous polyp, a bulging mucosa lined with a thickened layer of stratified ciliated epithelium with squamous metaplasia, where thick acanthotic strands are noted. The stroma is well vascularized, consists of edematous connective tissue with scattered lympholeukocyte infiltration and accumulations of small mucous glands. (1 group) Staining with hematoxylin and eosin. UV about x10.0.

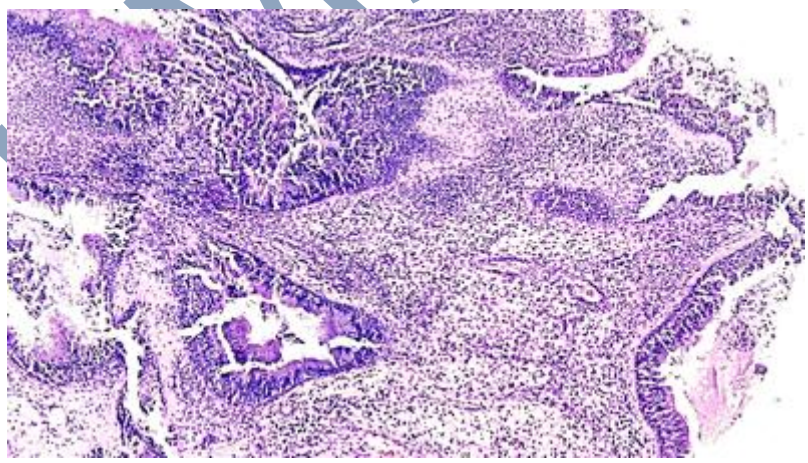

Fig 7.

Fragments of a polyp-like formation with a surface lined with stratified columnar epithelium with moderate proliferation or desquamation. The stroma consists of edematous, in places - compacted fibrous

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tissue with dense lymphohistiocytic infiltration, individual mucous glands and vessels. (1 group) Staining with hematoxylin and eosin. UV about x10.0

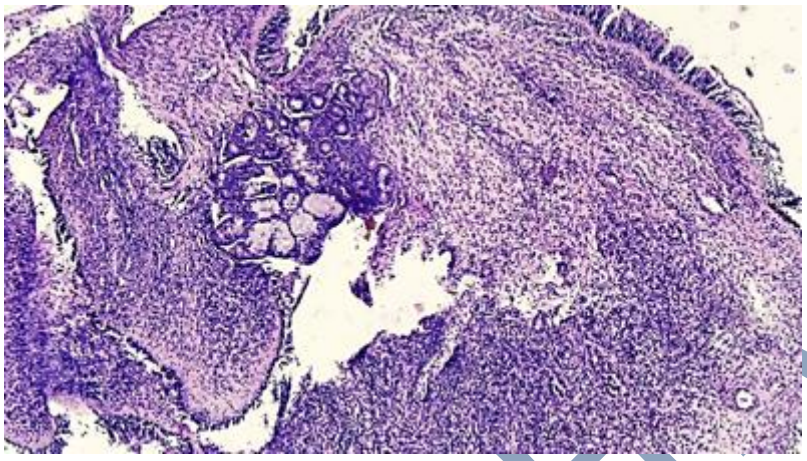

Fig. 8.

Fibrous-inflammatory polyp of the nasal cavity. The oval polypoid formation is in some places lined with stratified columnar epithelium on the surface; over large areas there is complete desquamation of the epithelium with exposure of the basement membrane. The stroma consists of compacted, superficially edematous fibrous tissue with dense lymphohistiocytic infiltration and accumulations of small mucous glands and vessels. (1 group) Staining with hematoxylin and eosin. UV about x10.0

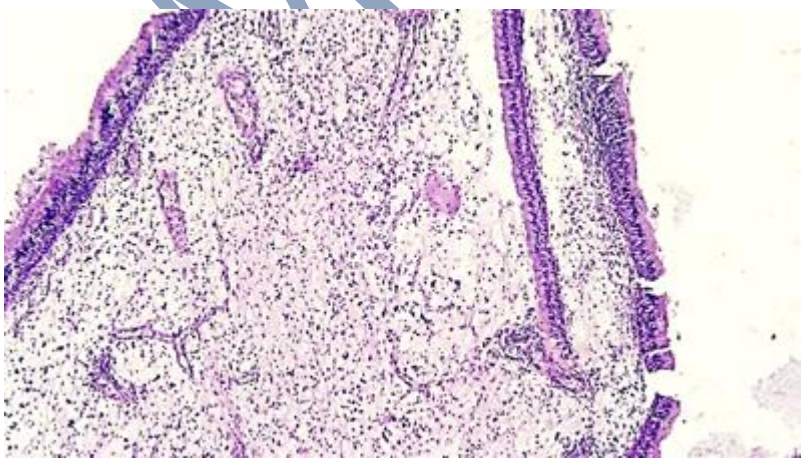

Fig. 9.

Inflammatory polyps of the nasal cavity. Several fragments of polypoid formations on the surface, covered with stratified columnar epithelium with moderate proliferation. The stroma consists of

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edematous, myxomatous fibrous tissue with dense lymphohistiocytic infiltration, accumulations of small mucous glands, and branched slit-like vessels. (1 group) Staining with hematoxylin and eosin. UV about x10.0

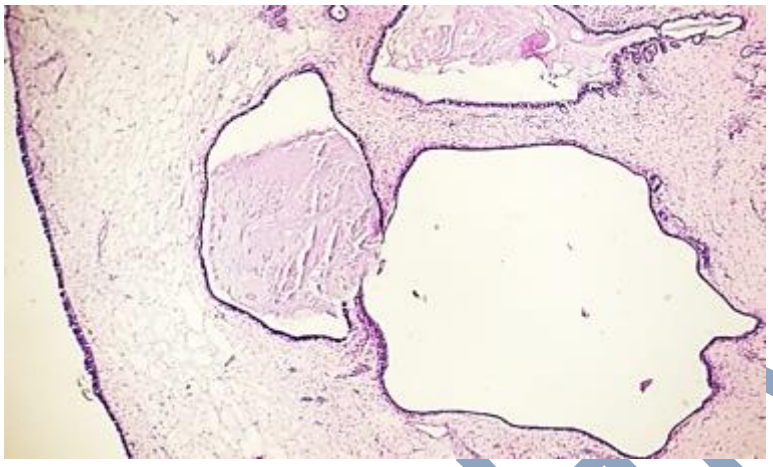

Fig. 10.

Glandular cystic nasal polyp with inflammation: the formation is covered with multi-row columnar ciliated epithelium with foci of proliferation, areas of desquamation and metaplasia into non-keratinizing stratified squamous epithelium. The stroma is represented by loose connective tissue with uneven edema, scattered lymphohistiocytic infiltration, angiomatosis and many cystically dilated serous glands. (1 group) Staining with hematoxylin and eosin. UV about x10.0.

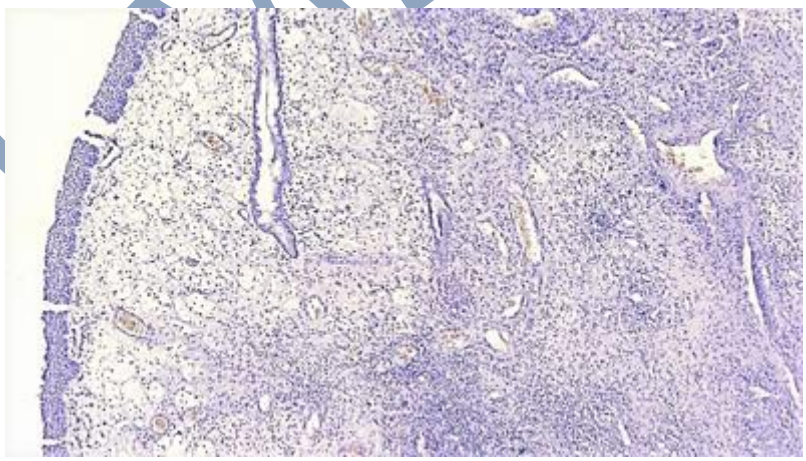

Fig 11. Myxomatous polyp with eosinophilic infiltration.

The formation is covered with single-row cylindrical ciliated epithelium with transition to multi-row, foci of proliferation and desquamation, invagination into the stroma. The stroma is represented by connective tissue

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with uneven edema, mucus and abundant inflammatory infiltration, consisting of plasma cells, lymphocytes and multiple leukocytes. (1 group) Staining with hematoxylin and eosin. UV about x10.0

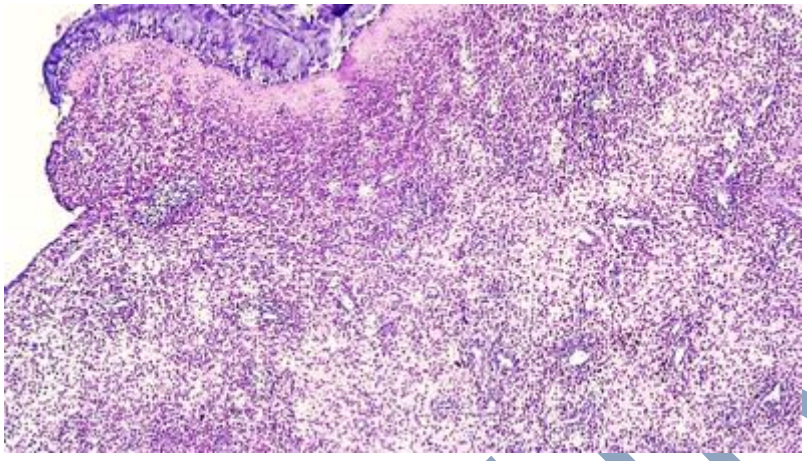

Fig 12. Allergic polyp.

The stroma contains loose connective tissue with abundant myxoid edema, vascular hyperemia, numerous eosinophilic leukocytes, and individual large lymphoid follicles. (1 group) Staining with hematoxylin and eosin. UV about x10.0

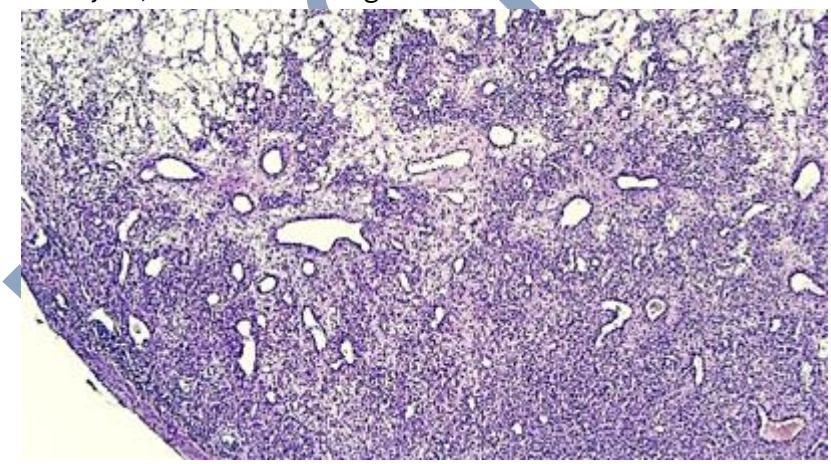

Fig. 13. Angiomatous nasal polyp with elements of inflammation.

Fibrous tissue of a polypous structure, in the stroma there are multiple proliferating vessels of the capillary type. with foci of lympho-leukocyte infiltration, numerous vessels with areas of granulation and stromal edema. (1 group) Staining with hematoxylin and eosin. UV about x10.0

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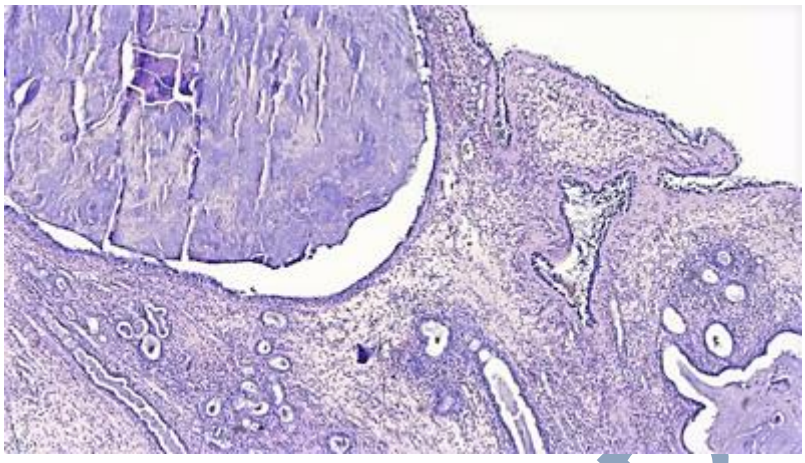

Fig. 14. Mucocystic polyp of allergic etiology.

The surface of the polyp is lined with multirow cylindrical ciliated epithelium with foci of proliferation and desquamation of the epithelium. The stroma consists of mucous connective tissue with myxoid edema, angiomatosis and a large number of eosinophilic leukocytes with an admixture of plasma cells. In the thickness of the polyp tissue, glands with cystic-enlarged lumens with serous contents and atrophy of the epithelial lining are noted. . (1 group) Staining with hematoxylin and eosin. UV about x10.0.

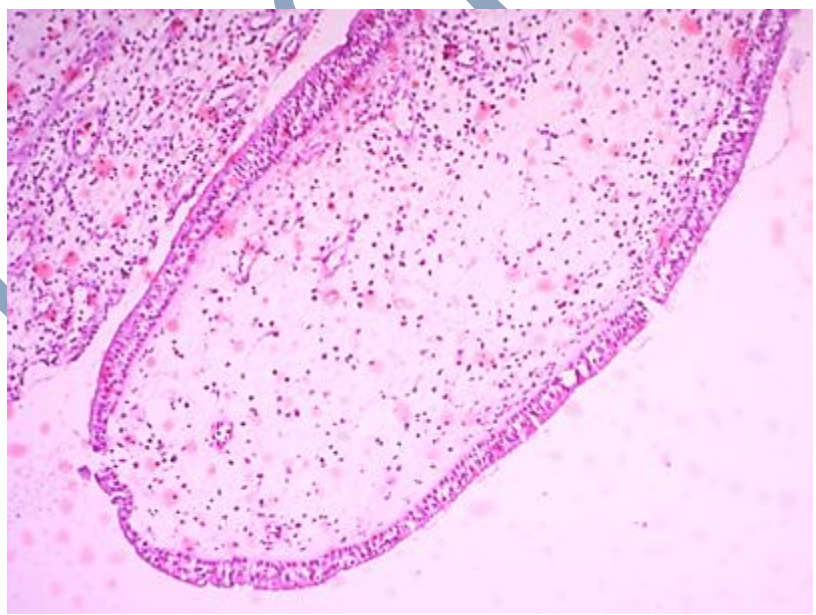

Figure 15. Polypoid formation covered with proliferating columnar epithelium.

The stroma is loose, rich in different-sized full-blooded vessels. Foci of inflammatory infiltration and hemorrhage. (1 group) Staining with hematoxylin and eosin. UV about x10.0

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Thus, in histological preparations of the first group of patients with polypous rhinosinusitis, morphological changes are characterized by hyperplasia of the mucosal epithelium due to prolonged catarrhal inflammation and mucus secretion by papillary growth, cystic changes in the lumen of the stromal glands, as well as focal inflammatory cell infiltration.

In the second group of observations, 21 patients had cystic changes in the lumen of the glands in the mucous membranes with the presence of secretion in the cavities.

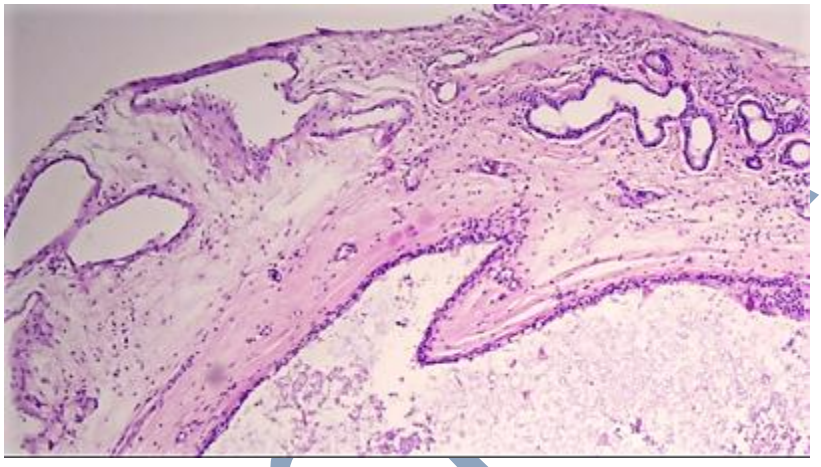

Figure 16. Glandular cystic nasal polyp with inflammation

In sections, there is a polyp-like formation covered with stratified transitional epithelium, consisting of a large number of glands lined with proliferating prismatic epithelium. Some of the glands are cystic, with atrophy of the epithelium; the lumen contains mucus. The stroma is edematous, represented by fibromyxomatous tissue with abundant lymphoplasmacytic and leukocyte infiltration. (Group 2) Hematoxylin and eosin staining. UV about x10.0

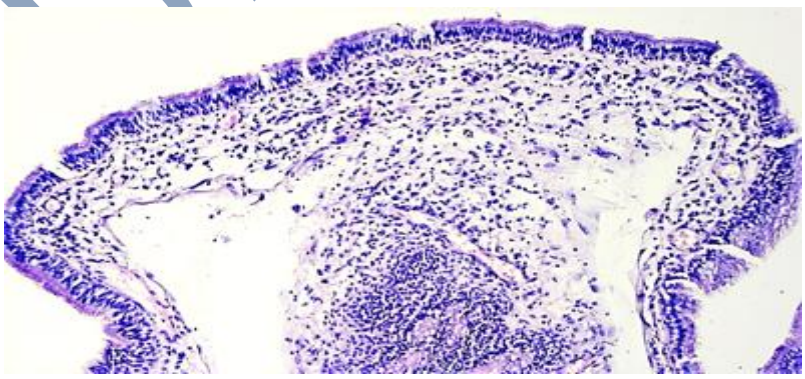

Fig. 17.

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Respiratory cyst with foci of inflammation; the wall of the cyst is lined with respiratory epithelium with foci of proliferation, desquamation and destruction. The stroma is represented by fibrovascular tissue with hyperemia and diffuse inflammatory infiltration of a mixed nature. There is also mucus with a blood clot. (2nd group). Hematoxylin and eosin staining. UV ob.x 10.0

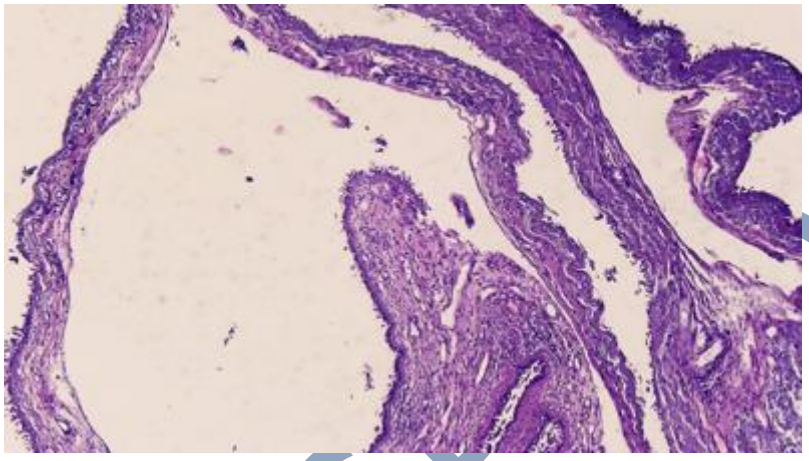

Fig. 18. Mucous cyst of inflammatory origin.

The wall of the cyst is lined with columnar stratified epithelium with foci of desquamation; the lumen of the cysts contains homogeneous and sometimes foamy eosinophilic content. (2nd group). Hematoxylin and eosin staining. UV ob.x 10.0

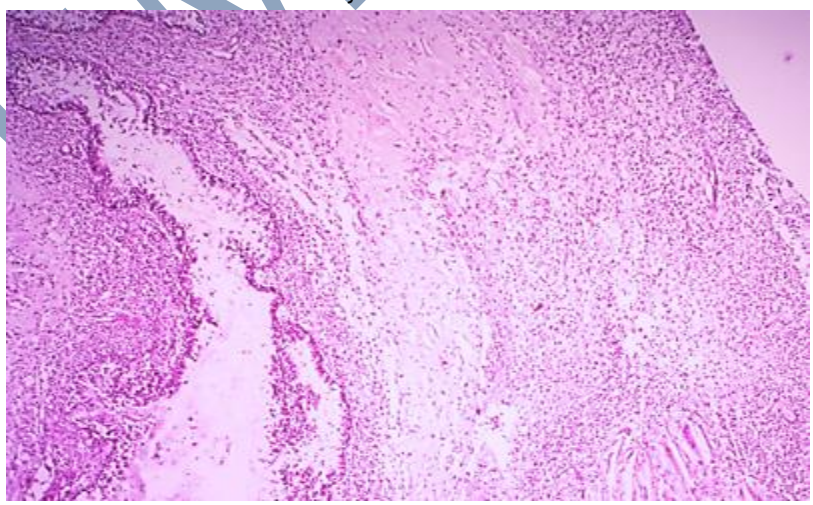

Fig. 19.

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Inflammatory cyst - fibrous wall of a cystic formation covered with metaplastic multirow epithelium. Elements of acute inflammation with its destruction are found in the integumentary epithelium. There is also leukocyte infiltration in the fibrous stroma. (2nd group). Hematoxylin and eosin staining. UV ob.x 10.0

Based on the results of histological examination of the second group of patients, it can be noted that morphological changes are mainly characterized by cystic lesions of the mucosal glands, as well as the integumentary epithelium with focal or diffuse inflammatory cell infiltration.

CONCLUSION

Thus, the above-described morphological changes in the nasal mucosa and paranasal sinuses, both in the first and second groups, characterize changes associated with the chronicity of the inflammatory process, disruption of the structural architectonics of the nasal passages, which is accompanied by disruption of natural breathing, leading to the development of prolonged hypoxia. The results of the morphological study provide a detailed description of changes in the mucous membranes and clinical signs, making it possible to assess the risk of developing chronic polypous rhinosinusitis, as well as preventing relapses of the disease.

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