

## **Epidermal growth factor and its role in the diagnosis polypoid rhinosinuitis**

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## **Эпидермальный фактор роста и его роль в диагностике полипозного риносинусита**

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**Abstract:** *frequency of polyposis rhinosinuitis (PRS) has an accurate tendency of growth, specific gravity in the structure of a case rate of ENT organs makes 5-20%.*

*Undoubtedly, search of new approaches of early diagnosis and well-timed medicamental treatment of PRS represents very serious unresolved problem of modern medicine.*

*The result of research shows, that the most optimum tactics of diagnosis of relapsing PRS is control of changes of an epidermal factor of growth after surgical excision of polyposis tissues in the blood serum.*

**Аннотация:** *частота полипозного риносинусита (ПРС) имеет четкую тенденцию к росту, удельный вес в структуре заболеваемости ЛОР-органов составляет 5-20%.*

*Бесспорно, поиск новых подходов к ранней диагностике и своевременному медикаментозному лечению ПРС представляет собой очень серьезную нерешенную проблему современной медицины.*

*Результат исследования показывает, что наиболее оптимальной тактикой диагностики рецидивирующего ПРС является контроль изменений эпидермального фактора роста после хирургического удаления полипозных тканей в сыворотке крови.*

**Keywords:** *polyposis rhinosinuitis, etiology, pathogenesis, epidermal growth factor.*

**Ключевые слова:** *полипозный риносинусит, этиология, патогенез, эпидермальный фактор роста.*

Polypoid rhinosinuitis (PRS) - a chronic inflammatory disease of the mucous membrane of the nasal cavity and paranasal sinuses characterized by the formation and growth of recurrent polyps, consisting mainly of edematous tissue infiltrated by eosinophils. [1, p. 110-116].

In accordance with the normative document EP3OS, adopted in 2012, ORS - a chronic disease of the nasal cavity and paranasal sinuses characterized by two or more necessarily present symptoms: block (obstruction), nasal congestion and runny nose (rhinorrhea), and accompanying symptoms (pain or voltage in the forehead and the nose, and reduced loss of smell), continuing over 12 weeks. According to data EP3OS about 1% of the world's population suffer from rhinosinuitis polypous. [2, p. 64-69].

The frequency of the CP has a clear upward trend, the proportion in the structure of the incidence of upper respiratory tract is 5-20%. [3, p. 41-44]. According to the observations AS Lopatin polyps in the nasal cavity are found in 1.02% of the people, and this applies only clinically manifest forms of the disease, the 54edx cxreal prevalence ozcxf CP in view of subclinical forms is considerably higher. [1, p. 110-116].

There is still a tendency to increase the growth of the incidence of CP and its frequency of relapses, which may be associated with deteriorating environmental conditions, environmental factors, and hazard production. [4, p. 10-14], [5, p. 477-481].

Undoubtedly, the search for new approaches to the early diagnosis and medical treatment of CP is a very serious unsolved problem of modern medicine. This disease is often a manifestation of systemic airway pathology and pathogenesis closely related to the pathogenesis of asthma with impaired metabolism of arachidonic acid and water and salt exchange in the body. [6, p. 65-67].

According to the theory of pathogenesis of nasal polyposis, and paranasal sinuses, the proposed SV Ryazantsev, the conditions for the formation of polyps are violations of various biological processes acquired or congenital nature of the body at the cellular or subcellular levels and the importance of environmental factors. [7, p. 127-134].

One indication of a biological processes at the cellular level is epidermal growth factor.

Epidermal growth factor (EGF) - refers to the group of growth factors and is a polypeptide, it is resistant to acids and high temperatures. It belongs to the most stable of all the studied proteins. Present in the cells of all tissues of the body regulates cell growth. [8, p. 1344-1350].

EGF plays an important role in the regulation of metabolic and regenerative processes. Binds specifically to receptors on cell surface membranes, inflammatory cells stimulates taxis.

Under normal conditions, the content of growth factors in the human body is relatively low and stable. But any damage, increases the number of receptors that are sensitive to EGF, thereby increases its concentration.

EGF governs the growth of epithelial cells, endothelial and fibroblast proliferation improves tissue. The biological effect of EGF includes the healing of the mucous membrane of respiratory tract, the mouth and gastro-esophageal card, isolation walls of the stomach from acid contained in the gastric juice as well as stimulation of DNA synthesis. Human EGF contained in platelets, phagocytes, urine, saliva, breast milk and blood plasma. [8, p. 1344-1350].

EGF acts by binding to the epidermal growth factor receptor on the cell surface, and then stimulates the activity of intracellular tyrosine kinases. Protein tyrosine kinases, in turn, transmit a signal inside the cell, leading to various biochemical changes (increase in intracellular calcium and increased glycolysis, increase rate of protein synthesis, DNA synthesis.), Which ultimately leads to cell division. As a result, cell division in the presence of EGF is faster than cell division without him, which is especially evident in tumors and tumor-like formations. [9, p. 3-9].

Although there are many published data on EGF for various tumors, studies of EGF when polypous rhinosinusitis or polyps other agencies virtually none.

After analyzing the above, our objective was to study - to assess the presence or absence of the dynamics of indicators of the EGF concentration in polypous tissue and blood plasma before and after the surgical removal of tissue polypous PRS.

### Material and Methods

The otorhinolaryngological department of multidisciplinary medical center in Khorezm region for the period 2010-2013. It examined 122 patients with CP aged 27 - 34 years old, the average age of  $29,1 \pm 0,7$ . Among women, there were 47 patients (39.5%), men - 75 (61.5%).

For the examination of patients used traditional complex otorhinolaryngology research, starting with a study of the history and examination of the nasal cavity. Blood test, urine, and general examination in accordance with the requirements of the preoperative clinic, performed X-ray and CT scan of the nose and the UNP.

All patients were divided into 4 groups depending on the duration of the current CP:

- Group I - 30 patients with CP duration up to 3 years;
- II group - 31 patients with a duration of 3-6 years of ORS;
- Group III - 29 patients with CP duration 6-10 years;
- Group IV - 32 patients with CP duration of 10-15 years.

The control group consisted of 26 healthy subjects of comparable age group who do not have bad habits and diseases polypous history.

Also, the patients were divided into 3 groups according to the degree of obstruction of the nasal cavity polypous tissue during endoscopic examination:

- A group - 1/3 of the lumen of the nasal cavity;
- Group B - 2/3 of the lumen of the nasal cavity;
- The group - complete obstruction of the lumen of the nasal cavity.

In these groups, in comparable proportions were represented by patients with different duration of the CP.

Samples were taken polypous tissue during surgery and immediately sent to the enzyme immunoassay in the Central Research Laboratory of the Tashkent Medical Academy under the direction of AS Komarin Test parameters were evaluated using standard kits for direct immunoassay according to manufacturer's instructions. Performance was measured on an automated universal reader ELX800.

When comparing performance using the Student's t-test, Mann-Whitney test, the median test, Pearson correlation test (r) and Spearman's rank correlation test (R). Statistical data processing was carried out using the software package «Statistica 6.0» (StatSoft Inc) and «R-2.15.0 for Windows» (R-project Inc).

The results are given in Table 1.

Table 1. EGF Concentration (pg / ml)

Groups	The Blood	polypous tissue
The control group (n=26)	123,3±0,646	
I rp, (n=30)	Before treatment	486,2±8,46*
	1 week after treatment	
	4 weeks after treatment	
II rp, (n=31)	Before treatment	488,2±8,68*
	1 week after treatment	
	4 weeks after treatment	
Group III, (n=29)	Before treatment	491,3±8,56*
	1 week after treatment	
	4 weeks after treatment	
Group IV, (n=32)	Before treatment	498,4±8,32*
	1 week after treatment	

	4 weeks after treatment	161,7±1,589*	
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\* - p < 0.05 for control; \* - P < 0.05 to data before treatment.

We have found that EGF content in plasma higher than the control group in 99 (81%) of the 122 patients examined, and the mean and median of this index was also significantly increased in polypous tissue (p < 0,05). Comparing EGF levels in blood plasma compared to the control group, we found an increase in its content at a polyp 4-67% in 78% of patients. Our results are comparable to the increase of EGF in prostate tumors and breast. [9, p. 3-9].

Determination of EGF revealed a significant difference between the level of the median values of this parameter in the blood plasma, with a median level of EGF was 1.4 times higher in ORS compared with the control group.

Results of the study EGF parameters in groups A, B, and C are shown in Table 2.

Table 2. EGF Concentration (pg / ml)

Group		The Blood	Polypous Tissue
The control group (n=26)		123,3±0,646	
A group, (n=21)	Before treatment	147,8±0,721*	481,3±7,98*
	1 week after treatment	141,4±0,971*^	
	4 weeks after treatment	134,1±0,637*^	
B group, (n=44)	Before treatment	158,4±0,637*	489,2±8,86*
	1 week after treatment	149,8±0,624*^	
	4 weeks after treatment	139,3±0,935*^	
C group, (n=57)	Before treatment	167,5±0,967*	496,8±9,62*
	1 week after treatment	162,6±1,718^	
	4 weeks after treatment	154,2±1,873*	

\* - P < 0.05 for control; \* - P < 0.05 according to the pre-treatment

Following the surgical treatment of nasal breathing was restored in all patients, EGF levels in the blood plasma to normal after 2,1 ± 0,28 months in group A, after 3,8 ± 0,24 months in group B, in group B reached the normal level of EGF quantities by 5,2 ± 0,21 months.

#### Conclusions:

1. By increasing the number and size of polyps in the nasal cavity EGF levels in plasma and tissue polypous significantly increased.
2. After surgical removal polypous formations in serum EGF concentration decreases inversely proportional to the term of the disease, normalizing for 6 months, which confirms the increase in its level due to the IRS.
3. EGF protein concentration of study in patients with rhinosinusitis polypous allows you to monitor and predict the recurrence process.

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