

1000 examined (n=152). The largest share among them occupied trichomoniasis (30,2%), chlamydia infection (21,0%) and genital herpes (29,6% cases).

Conclusions:

1. The HIV-infection epidemic in Omsk region was characterized by a further development and growth of the advanced stages of disease.

2. 16,8% HIV-infected patients was a wide range of secondary diseases, predominantly infectious etiology.

3. In the structure of secondary infections the leading role took place tuberculosis (32,3%), candidiasis (24,4%), bacterial infections (23,7%). The average risk of getting tuberculosis was 24 cases for 1000 HIV- infected patients.

4. The received results show the necessity of optimization of the approaches to the organization of the early diagnostics and prevention of secondary disease of the HIV- infected patients.

References:

1. Global report. UNAIDS report on the global AIDS epidemic 2013. UNAIDS, 2013. <http://www.unaids.org/en/resources/campaigns/globalreport2013>.
2. European Centre for Disease Prevention and Control/WHO Regional Office for Europe. HIV/AIDS surveillance in Europe 2012. Stockholm: ECDC; 2012.
3. Getahun H, Gunneberg C, Granich R, Nunn P. HIV infection associated tuberculosis: The epidemiology and the response. *Clinical Infectious Diseases: Synergistic Pandemics: Confronting the Global HIV and Tuberculosis Epidemics*. 2010 May; 50 (3): 201–207.
4. Aksutina L. P., Pasechnik O. A. Approaches to the Management of the Epidemic Process in Terms Pathomorphosis Tuberculous Infection. *Epidemiologija i vakcinoprofilaktika*. 2014; 2 (75): 16–20.
5. Borowski I. V., Tumensev A. T., Kalacheva G. A. Evolution of the epidemic process of HIV infection in the Siberian Federal District. *Sibirskij medicinskij zhurnal*. 2014; 1:91–3.

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The value of vascular endothelial growth factor in the diagnosis of cardiohaemodynamics disorders in children with asthma

Abstract: The authors found that the increasing of VEGF concentration in the serum of children with asthma is a poor prognostic factor, indicating the activation of neoangiogenesis processes and the formation of pulmonary hypertension.

Keywords: asthma, children, vascular endothelial growth factor, cardiohaemodynamics disorders

Introduction. Asthma is one of the most common childhood diseases, often leading to the formation of pulmonary hypertension (PH), the development of «pulmonary» heart and patients disability [1]. The formation of PH in patients with chronic lung disease is always associated with structural changes of the vascular bed — with remodeling of the pulmonary vessels being characterized by a medial layer proliferation, migration

and proliferation of smooth muscle cells into the intima, fibroelastosis of intima and thickening of the adventitia [2, 3]. However, remodeling of pulmonary arteries occurs not only in the advanced stages of the disease but also in the early stages of pathology development. Vascular endothelial growth factor (VEGF) may be one of the most informative factors reflecting the initial micro-circulation changes [4].

VEGF was first identified by Napoleon Ferrara in 1989 and the gene which is responsible for this protein synthesis has been recently discovered [5]. Interacting with two close on a structure membrane tirozine kinase receptors (VEGF-1 and VEGF-2) VEGF activates them and starts a signal cascade of processes that stimulate the growth and proliferation of endothelial cells. The lack of oxygen resulting from emerging respiratory failure is the main stimulus for angiogenesis activation during the asthma exacerbation. Hypoxia contributes to the accumulation of a number of transcription factors — HIF (HIF-1 α and HIF-1 β). These factors penetrate into the cell nucleus, contact the appropriate HIF — responsible site and change the many genes transcription including VEGF-genes [6].

Thus, the determination of VEGF level allows diagnosing the changes in the microcirculation of the bronchopulmonary system in the early stages and, therefore, enables to correct the therapy and prevent cardiovascular system complications in patients with asthma in later life.

Objective: to evaluate the significance of VEGF contribution in the genesis of pulmonary hypertension in children with asthma.

Materials and Methods: to achieve this goal 30 children with asthma were studied. Diagnosis verification was performed in accordance with GINA (2011) [7]. Patients were examined in the exacerbation period. The mean age was $12,2 \pm 3,5$ years. Boys predominated among the patients — 20 (66.67%), girls — 10 (33.33%). The control group consisted of 30 children, matched by sex and age.

All the patients were carried out the complex clinical and laboratory examination including history taking and complaints, shared clinical and biochemical blood tests, determination of total Ig E, partial oxygen tension, chest radiography, peak flow monitoring, spirometry, electrocardiography and echocardiography. Cardiac ultrasound was performed on the scanner VIVID-3, General Electric, USA, using a transthoracic array sensor 3.5 MHz in the patient lying on his back or on the left side by the standard method [8]. Assessment of ventricular diastolic function was performed at a frequency of sinus rhythm, allowing them to identify two peaks motion valve leaflets. Control volume (PW) was placed consistently on all levels of the mitral and tricuspid valves in the apical four-chamber position by measuring the following parameters: early diastolic inflow velocity (E), late diastolic inflow velocity (A), an E/A ratio, deceleration time of early diastolic filling (DT), isovolumetric relaxation time (IWRT). We used M-mode recording and doppler

examination. Doppler examination and color flow imaging have provided reliable assessment of cardiac hemodynamics and blood flow.

On admission all children were performed blood sampling for determination of VEGF levels in the serum by the method of immune-enzyme analysis.

Statistical processing of the investigation findings were carried out with the help of a set of application programs «Microsoft Office 2000 Pro» for Windows OSR 2 on a computer PC Intel Pentium- 166 (Microsoft Office 97 Professional, 1997). Computer program «STATISTICA 6.0» was used for statistical analysis. The analysis included the determination of mean arithmetic values of the correlation coefficients. Differences reliability between the groups in average arithmetic values, as well as the accuracy of correlation coefficient were determined by Student's *t*-test. The result in $t > 2$, in which $p < 0.05$ was reliable.

Results. Our studies showed that the VEGF concentration in the serum of patients with asthma ($60,86 \pm 17,45$ pg/ml) was significantly higher than the average values determined in healthy children ($27,84 \pm 14,86$ pg/ml). And the value of VEGF ($r = -0,32$) was lower if the disease manifested in older age. Perhaps it is due to the fact that processes of angiogenesis are the most active at early age and they slow down with time.

A comprehensive study of morphometric parameters of cardiovascular system (the diameter of the aorta, left atrium, right atrium, interventricular septum, end-diastolic dimension, left ventricle posterior wall, end-systolic dimension, the diameter of the pulmonary artery) in the examined patients failed to reveal the significant differences of morphometric parameters both in patients with asthma and children of control group ($p > 0,05$). It confirms the data on later development of morphological myocardium changes forming in patients with chronic bronchopulmonary pathology.

In estimating cardiohemodynamic parameters characterizing blood movement in the pulmonary circulation

It was established that pressure indicators on pulmonary artery (PA) in patients with asthma had no significant differences from the indicators in children of control group and their mean values were $6,246 \pm 2,95$ mm Hg. (Table. 2) while estimating cardiohemodynamic parameters characterizing blood movement in the pulmonary circulation. However, the value of this indicator in children of control group were significantly lower ($3,01 \pm 0,12$ mm Hg). At the same time in 20% of patients with asthma velocity value of maximal blood flow to PA were above normal. It has a pathogenetic substantiation: in pa-

tients with bronchial obstruction in the hypoaerated sites of lungs hypoxic vasoconstriction occurs, which leads to the increase of the resistance in pulmonary vessels.

The analysis of received findings showed the velocity increase of late diastole stream to tricuspid valve in patients with asthma (tricuspid inflow $A=0,59\pm 0,02\text{m/s}$), as compared with control group (tricuspid inflow $A=0,49\pm 0,02\text{m/s}$) [$r=0,001$]. Indicating the significant rise of loading on the right ventricle during the acute period of the disease caused by the increase of pressure in the pulmonary circulation. Statistically significant value difference of tricuspid inflow to E/A in the examined children groups and in the control group ($p=0.001$) was also established. Among the studied patients tricuspid inflow coefficient E/A did not exceed 0.9 in 18 children (21.90%) in the period of asthma exacerbation, that indicates the formation of right ventricle diastolic dysfunction. The majority of them experienced either a severe dyspnea (46.0%) or an attack of moderate severity (23.0%). Hence, the increase of loading on myocardium in the development of bronchial obstruction is accompanied by the increase of pressure in RV, and consequently, by the increase of velocity values of blood flow in the pulmonary artery, indicating the formation of pulmonary hypertension.

Hypersthenia of pulmonary vessels is the main factor determining the development of pulmonary hypertension, hypoxia and activation of endogenous mechanisms with the releasing of significant amounts of biologically active substances. The proof of this is a significant increase of VEGF concentration in the serum of patients with high velocity values of blood flow to the pulmonary artery ($81,48 \pm 12,41\text{pg/ml}$), which greatly exceeds the average data of patients without echocardiographic evidence of pulmonary hypertension ($55,71 \pm 19,40\text{pg/ml}$). And the higher values of pressure on the PA are, the greater VEGF concentration in patients serum ($r = 0,73$) is.

It should be noted that the longer duration of the disease is, the greater of VEGF concentration in serum ($r = 0,29$) is. Perhaps this is due to the fact that the new ves-

sels of respiratory ways which were formed in the result of bronchial remodeling have instability that contributes to the increase of vascular permeability and, therefore, the progressing of edema and bronchoobstruction.

Thus, chronic hypoxia may lead to thickening of pulmonary arteries media, muscularization of precapillary pulmonary vessels, smooth muscle cell proliferation and fibroblasts adventitia and the increase of collagen and elastin content in the wall of pulmonary vessels as well. A progressing of changes indicated above contributes to the increasing of PH in patients with bronchial asthma.

Also the pressure findings on PA and the VEGF concentration in the serum of patients with bronchial asthma are strongly influenced by the severity of asthma: the more the number of exacerbations within a year occurred, the higher the values of this factor ($r = 0,53$) were. In turn, increase the number and size of blood vessels under the effect of VEGF contributes to the thickening of the airway wall, it resulting in the narrowing of the lumen, and therefore promotes the bronchial obstruction under the influence of minimal by force trigger factors.

This vicious circle can only be broken by correctly selected basic therapy that contributes to the reducing of inflammatory reactions in the bronchi, and also the decreasing the number of exacerbations. In the present study it was found that the longer the basic therapy was, the lower findings of pressure to PA and VEGF concentration were and, consequently the lower probability of pulmonary hypertension development in future would be.

Conclusion. The increasing of VEGF concentration in the serum of children with asthma is a poor prognostic factor pointing to the activation of «angiogenesis» mechanisms which predispose not only to the development of pulmonary hypertension in patients, but to the recurrence of bronchial obstruction processes. The detection of increased values of this biomarker in the serum of children with asthma allows to optimize the therapy and prevent the deterioration of patients' conditions and the development of serious complications in the cardiovascular system in the future.

References:

1. Tudor RM, Marecki JC, Richter A, Fijalkowska I, Flores S: Pathology of pulmonary hypertension. *Clin Chest Med* 2007; 28:23–42 vii.
2. Bischof RJ, Bourke JE, Hirst SJ, Meeusen EN, Snibson KJ, Van Der Velden J. Measurement and impact of remodeling in the lung: airway neovascularization in asthma. *Proc Am Thorac* 2009; 6 (8): 673–677.
3. Detoraki A, Granata F, Staibano S, Rossi FW, Marone G, Genovese A. Angiogenesis and lymphangiogenesis in bronchial asthma. *Allergy* 2010; 65 (8): 946–958.
4. Lee KY, Lee KS, Park SJ, Kim SR, Min KH, Choe YH, Lee YC. Clinical significance of plasma and serum vascular endothelial growth factor in asthma. *J Asthma* 2008; 45 (9): 735–739.

5. Lee S, Chen TT, Barber CL, Jordan MC, Murdock J, Desai S, Ferrara N, Nagy A, Roos KP, Iruela-Arispe ML: Autocrine VEGF signaling is required for vascular homeostasis. *Cell* 2007, 130:691–703.
6. Detoraki A, Granata F, Staibano S, Rossi FW, Marone G, Genovese A. Angiogenesis and lymphangiogenesis in bronchial asthma. *Allergy* 2010; 65: 946–58.
7. Global Initiative for Asthma (GINA). The Global Strategy for Asthma Management and Prevention. 2012. Available from <http://www.ginasthma.org/>. Accessed June 1, 2013.
8. Robert O. Bonow, Douglas L. Mann, Douglas P. Zipes, and Peter Libby. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. Chapter 15 Echocardiography: Mayo Foundation for Medical Education and Research; 2009.

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Quality of life of children with diabetes melitus associated with iron deficiency anemia

Abstract: On the basis of studies found the impact of anemia on the course of diabetes in children and adolescents is characterized by increased appearance of symptoms of the disease decompensation, decreased physical abilities, intellectual and psychosocial functions of patients.

Key words: diabetes, iron deficiency anemia, quality of life, children and adolescents

Topicality. Diabetes mellitus (DM) is the most widely spread endocrine disease which is recently called world non-infectious epidemics: it is supposed that the number of DM patients will exceed 300 million to 2025. It means that remote complications, appearing as a result of metabolic disorders caused by hyperglycemia, will also increase. It is well known that the duration and quality of DM patients' life is conditioned by the development and progress of the complications [2, 8–9; 4, 62–63]. Opposite to that, in the case of one-moment patients' examination in one of Australian diabetic clinics it was detected that 23% of them were diagnosed anemia according to WHO criteria [5, 1165–1667]. There are cogent data of the latest researches proving that anemia has unfavorable impact on the progress of

diabetic complications, it increases the risk of cardiovascular diseases and rise of lethality.

We found a lot of works dedicated to interrelation of anemia and diabetes mellitus in adults in scientific-research references. Though, that problem is not clarified in children yet, and the available works are inconsistent [3, 2–4]. Besides that, we didn't find works dedicated to the quality of children's life with diabetes mellitus complicated by anemia.

In relation with that, we consider it reasonable to study the effect of anemia on the progress and quality of life of children with pancreatic diabetes.

Materials and methods of the research: the research includes the results of examination of 72 children with the 1st type diabetes mellitus aged