

CORRELATION OF HORMONAL STATUS INDICATORS OF PHYSICAL AND SEXUAL DEVELOPMENT IN CHILDREN WITH CHRONIC BRONCHITIS

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Abstract: the estimation of physical, sexual development was carried out, the hormonal status and interrelation between these parameters in patients with chronic lung diseases (CLD) were studied. The study included 84 children with chronic bronchitis and 42 children with bronchoectatic disease. It is established that in children with CLD the strength of reliable correlations changes. Violation of physical and sexual development in children with CLD contributes to the activation of intraendocrine relationships in the absence of significant correlations between the hormones content of the studied links of the endocrine system.

Keywords: chronic bronchitis, physical and sexual development, blood hormones, correlation.

ОСОБЕННОСТИ ВЗАИМОСВЯЗИ ПОКАЗАТЕЛЕЙ ГОРМОНАЛЬНОГО СТАТУСА, ФИЗИЧЕСКОГО И ПОЛОВОГО РАЗВИТИЯ У ДЕТЕЙ С ХРОНИЧЕСКИМИ ЗАБОЛЕВАНИЯМИ ЛЕГКИХ

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Аннотация: проведена оценка физического, полового развития, изучен гормональный статус и взаимосвязь между этими показателями у больных с хроническими заболеваниями легких (ХЗЛ). В исследование включены 84 ребенка с хроническим бронхитом и 42 ребенка с бронхоэктатической болезнью. Установлено, что у детей с ХЗЛ изменяется сила достоверных корреляций. Нарушение физического и полового развития у детей с ХЗЛ способствует активации внутриэндокринных взаимоотношений при отсутствии значимых корреляций между содержанием гормонов изученных звеньев эндокринной системы.

Ключевые слова: хронический бронхит; бронхоэктазия; физическое и половое развитие; гормоны крови; корреляция.

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The delay of physical development often leads to difficulties in psychological and social adaptation, the consequences of which can persist even when they reach the normal physical development [1, 3, 5].

Complicated relationship of neurohumoral mechanisms require a comprehensive study of the hormonal profile and its evaluation, taking into account the impact of chronic pathology, including that on the part of broncho pulmonary pathology [2, 6, 7].

Objective: To identify the features of the relationship between the parameters of physical, sexual development, and hormonal status in children with chronic bronchitis.

Materials and methods: A total of 84 (46 obstructive, 38 nonobstructive) children with chronic bronchitis at the age of 10 to 16 years were studied. Of them, 37 (35,7%) - girls and 47 (64,3%) - boys. According to duration of the disease, the patients were distributed as follows: 5-6 years old 32 (38%), 7 years old 14 (16,7%), 8 years old 13 (15,5%), 9 years old 12 (14,3%), 10 years old and more 13 (15,5%) children. The control group consisted of practically healthy children (110 boys and 120 girls) of comparable age.

To identify the relationship between the analyzed indicators we carried out a correlation analysis using the correlation coefficient r and test of its significance using Student's t test and Pearson χ^2 .

Results of the research and their discussion. Harmonious physical development was determined in 14.3% of patients. Delayed physical development was revealed in 72 patients, accounting for 85.7% of the total number of examined patients, 32 of them (44.4%) - were girls and 40 (55.6%) - were boys. Individual analysis of anthropometric data showed: 61 (84.7%) patients had a delay of average growth, 69 (95.8%) loss of body weight. In 11 (15.3%) patients aged 15-16 years, body length was above average and significantly ($P < 0.05$) different from the group of healthy peers. In patients of both genders with a delay of physical development a decrease in weight and growth indices occurred, which were in -2SD - -3SD zone. This point to a significant underweight.

Delayed puberty was diagnosed in 68 patients, accounting for 80.9% of the total number of patients examined, 32 of them (47%) - girls and 36 (52.9%) - boys, We found lagging of all genetometric indicators in 26 patients aged 14, 15 and 16 years. Comparative evaluation of the appearance of secondary sexual characteristics showed that in 17 sick boys with chronic bronchitis aged 14, 15 and 16 years secondary sexual characteristics were on the I - II stage of sexual development according to Tanner.

Clinical examination of girls found out that by the age of 16 in 8 (25%) patients with chronic bronchitis mammary glands were at Ma_3 stage and in 24 (75%) did not exceed Tanner II degree. By the age of 16 the sexual body hair was in P_2Ax_2 stage in 26 (81.3%) and in P_3Ax_2 stage was only in 6 (18.7%) sick girls. Steady menstrual cycle had only 5 (15.6%) girls aged 14-16.

When comparing the data of the physical and sexual development of children with severity and duration of chronic bronchitis, we noted a clear link between them. The more severe and prolonged the illness proceeded, the more often the children's physical development was delayed $r = 0,50$; $r = 0,39$ ($P < 0.05$).

In the study of correlations in a group of healthy boys a high positive correlation was marked between: testosterone and growth ($r = 0,64$), weight ($r = 0,65$) and the degree of pubic hair ($r = 0,72$), genetometric rates ($r = 0,7$). Also strong ($r > 0,8$) correlations between the parameters of physical, sexual development and levels of hormones of the pituitary-thyroid-genital systems were identified. In the group of healthy girls average positive relationship between the level of testosterone ($r = 0,56$), and growth, the weight ($r = 0,59$), pubic hair distribution degree ($r = 0,51$), maturity of mammary glands ($r = 0,56$); between LH and growth ($r = 0,50$), and maturity, of mammary glands ($r = 0,51$); between and FSH and growth ($r = 0,42$), the weight ($r = 0,51$), pubic hair distribution degree ($r = 0,37$), maturity of mammary glands ($r = 0,46$) were marked. GH, TSH and thyroid hormones with indicators of physical and sexual development in girls and boys have a negative correlation. The revealed relationships confirmed the basic physiological processes that occur at puberty. In boys with chronic bronchitis correlations between systems and within them in comparison with the control group were established. So strong positive relations ($r = 0,6$, $r = 0,74$) between the identified parameters of physical development and genetometric indicators were revealed. Mean positive connections were between FSH and growth ($r = 0,42$), body weight ($r = 0,45$) and LH ($r = 0,34$). Between LH and weight ($r = 0,39$), genetometric indications ($r = 0,37$). The average positive relationships between TSH and body weight ($r = 0,35$), between T_3 and body weight ($r = 0,32$), the size of the penis ($r = 0,33$), between T_4 and indicators of physical development ($r = 0,35$, $r = 0,37$), penis size ($r = 0,37$), between testosterone and body weight ($r = 0,48$), growth ($r = 0,44$), testicular size ($r = 0,47$) and FSH ($r = 0,59$) were revealed. Weak positive associations between T_4 and genetometric indications ($r = 0,27$), between FSH and the size of the testicles ($r = 0,25$) were revealed.

As it is known morphogenetic FSH has an effect on the development of the convoluted seminiferous tubules and testicular stroma, which is accompanied by a significant increase in the size of the testicles to the appearance of secondary sexual characteristics [4]. Boys ill with ChB with low genetometric indications most of connections are losing their strength in comparison with the control. New connections develop: the average negative relationships between E_2 and T_4 ($r = -0,58$), TSH ($r = -0,35$). In the group of patients with above-average growth rates average negative correlations with FSH ($r = -0,44$), LH ($r = -0,46$), testosterone ($r = -0,45$), TSH ($r = -0,49$) and genetometric performance ($r = -0,48$) are determined. This group of adolescents with high growth had low levels of FSH, LH, testosterone and genetometric parameters. The revealed relationships of gonadotrophic function of the pituitary and gonads functional state in children with ChB lead to a change in the of relations in the system of negative and positive revers connections.

Girls with ChB also had relationships, both between systems and within them. Less strong ($r = 0,76$), plurality of average ($r = 0,42$) and weak ($r = 0,28$) positive relations between physical, sexual development, and hormones of the pituitary-gonadal system were revealed.

From the above data it can be concluded that in patients with chronic bronchitis the delayed puberty, causes considerable decrease of interference indicators of physical and sexual development and the secretion of hormones of the studied units of endocrine system however, activation of intraendocrine relationships in these groups and the development of new significant correlations were marked.

Conclusions: In general, the identified correlations between the studied parameters of physical, sexual development and functional activity of the endocrine system in children with chronic bronchitis at puberty have

their characteristics in comparison with the healthy ones. Change of the number, strength and direction of significant correlations may contribute to more frequent impairment violations of physical and sexual development in children with chronic bronchitis.

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