Республика спорт тиббиёти илмий-амалий маркази

ISSN 2181-998X

ТИББИЁТ ВА СПОРТ

MEDICINE AND SPORT

2024
4

ТОШКЕНТ

ЎЗБЕКИСТОН МИЛЛИЙ ОЛИМПИЯ ҚЎМИТАСИ

2024/4 ISSN 2181-998X

РЕСПУБЛИКА СПОРТ ТИББИЁТИ ИЛМИЙ-АМАЛИЙ МАРКАЗИ

ТИББИЁТ ВА СПОРТ
MEDICINE AND SPORT

Тошкент

www.sportmed.uz ISSN 2181-998X

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ЖИСМОНИЙ ТАРБИЯ ВА СПОРТ

УДК 618.179-06:616.248

ANALYSIS OF REPRODUCTIVE STATE IN GIRLS WITH BRONCHIAL ASTHMA

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BRONXIAL ASTMA BILAN KASALLANGAN QIZ BOLALARNI REPRODUKTIV HOLATINI TAHLILI

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АНАЛИЗ РЕПРОДУКТИВНОГО СОСТОЯНИЯ У ДЕВОЧЕК С БРОНХИАЛЬНОЙ АСТМОЙ

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Annotation. *Bronchial asthma is a complex disease characterized by chronic inflammation of the respiratory tract, to the development of this condition involving not only genetic, immune, environmental factors, but also endocrine mechanisms make a significant contribution. The role of sex hormones in pathogenesis of bronchial asthma in women is currently actual and less investigated problem.*
Key words. *Allergic reaction, hormones, estrogen, testosterone, menarche, bronchial asthma.*

Annotatsiya. *Bronxial astma nafas yo'llarining surunkali yallig'lanishi bilan tavsiflangan murakkab kasallik bo'lib, unga nafaqat genetik, immune va atrof-muhit omillari, balki endokrin mexanizmlar ham kata hissa qo'shadi. Ayollarda bronxial astma patogenezida jinsiy gormonlarning roli hozirgi vaqtda dolzarb va yaxshi o'rganilmagan muammodir.*
Kalit so'zlar. *Bronxial astma, allergik reaktsiya, gormonlar, estrogen, testosteron*

Аннотация. *Бронхиальная астма является комплексным заболеванием, характеризующееся хроническим воспалением дыхательных путей, в реализацию которого значительный вклад вносят не только генетические, имунные и внешнесредовые факторы, но также эндокринные механизмы. Роль половых гормонов в патогенезе бронхиальной асты у женщин на сегодняшний день является актуальной и малоизученной проблемой.*
Ключевые слова: *аллергическая реакция, гормоны, эстроген, тестостерон, менархе, бронхиальная астма, подростки.*

Introduction. Bronchial asthma (BA) is a disease characterised by chronic airway inflammation and diagnosed by respiratory symptoms of wheezing, dyspnoea, chest tightness or cough, variable in duration and intensity, combined with reversible airway obstruction. Bronchial asthma is a complex disease, in the realisation of which a significant contribution is made by multicomponent genetic, endocrine, immune and environmental factors. Despite a large number of studies on the mechanisms of AD development, not all links of pathogenesis are sufficiently studied, with the immune system playing a decisive role in the formation and maintenance of chronic inflammation of the respiratory tract, mainly of allergic nature, but there are also known cases of the disease with non-allergic inflammation.

Materials and research methods. Literature review was carried out using Google scholar, Scientific research, Elibrary, and search engines such as Google scholar. We used articles that had evidence-based clinical and experimental basis on the most relevant issues of sexual development in adolescents with AD.

Purpose of work: to summarise the problem of sexual development in children with AD based on the literature sources on these pathologies.

Main part.

The prevalence of bronchial asthma is increasing worldwide and remains a major problem in paediatrics. According to The Global Asthma Network, approximately 334 million people currently suffer from the disease, 14% of whom are children. In phase III observations of the International Study of Asthma and Allergies in Childhood (ISAAC), the prevalence of AD symptoms in preschool children as of 2007 was as follows: in children 6-7 years of age 11.1% - 11.6%, among adolescents 13-14 years of age 13.2% - 13.7% [1].

In addition to immune and neurogenic mechanisms of bronchial asthma development, there are also endocrine mechanisms. The role of sex and gonadotropic hormones in the pathogenesis of AD in women is currently an undoubted but poorly studied problem.

Bronchial obstruction and hypoxia in patients with bronchial asthma have a significant impact on the regulation of hormonal mechanisms of the reproductive system.

When analysing patients with AD in relation to severity and bronchoconstrictive syndrome depending on gender, certain regularities were revealed. In female patients compared to male patients, despite the shorter duration of the disease the severity of bronchoconstriction is greater. This condition with some probability implies the opposite influence of female and male sex hormones on the development of AD. Among the pathogenetic mechanisms of AD development, the authors also point out a dysovarian mechanism of development. On this basis, it can be assumed that depending on the age-related changes in the sexual sphere, the course or manifestation of bronchial asthma can be assumed.

According to the data of researchers L.I. Muradosilova, N.N. Kaladze, hormonal relationships of puberty in children with bronchial asthma were studied, where girls aged 7 to 16 years in the phase of exacerbation and remission of AD were examined. The number of girls suffering from BA were divided depending on the course of BA, i.e. exacerbation and remission phases. The girls were also divided according to sex and age into 2 groups: the first one - children from 7 to 11 years old (prepubertal period), the second one - children

from 12 to 16 years old (pubertal period) [1,2,5].

As a result of the conducted studies, depending on age, the data were obtained that in the period of transition from prepubertal to pubertal phase, i.e. in the period of 12 years in girls there was an increase in the level of LH with reliability $p<0.05$, the level of prolactin in girls 12-16 years of age at the time of examination, the level of testosterone hormone was significantly increased while estradiol showed inverse proportionality in the reliability of data in girls 12-16 years.

In girls suffering from AD, depending on the stage, an increase in the levels of gonadotropic hormones was observed both in the exacerbation of AD and in the remission period. In girls suffering from AD 7-11 years old there was a significant increase in the level of LH ($p<0,05$) during exacerbation and this fact indicated that the increase of this hormone is mediated by stress reactivity of the organism to the course of AD. In the group of girls 12-16 years old there was a significant decrease in prolactin level during exacerbation ($p<0,05$). This was explained by the insufficiency of adaptation to stress during the exacerbation period in patients with AD. In girls the level of testosterone was high in the remission stage and practically there were no fluctuations with age, similarly it was with estradiol in the remission period, but it should be noted that with age the level of estradiol decreased in both phases of the course of AD with reliability (0,01) in girls aged 12-16 years.

In the course of the conducted research, in girls suffering from AD, it was revealed that hormonal imbalance, the absence of a regular increase in sex hormones: i.e. girls had significantly high levels of testosterone, but reduced levels of estradiol. There was an increase in the levels of gonadotropic hormones and prolactin at the age of 12-16 years compared to the norm. These changes indicate that adaptation processes in the organism of children with bronchial asthma also involve changes in pituitary hormones.

In assessing signs of secondary pubertal development, it was found that some girls had delayed puberty, in which signs of puberty were slow to develop, or stopped secondary puberty and did not experience menarche [1,2,3].

The sex-specific incidence of AD is more common in boys before puberty and more common in girls after puberty, and this is also explained by the high incidence of AD in women. Changes occurring at key stages of a woman's life such as puberty, pregnancy, menopause and aging suggest the importance of the role of female sex hormones [3,4]. It is known from some data sources that estrogens have a moderate bronchoconstrictor effect and progesterone has a bronchodilator effect. The peculiarity of hormonal homeostasis of the reproductive system in women is the regular recurring follicle maturation, ovulation, formation of the corpus luteum, and biphasic secretion of ovarian hormones [4].

Puberty is the process of transition from childhood to puberty, preparing the body for reproduction, and one of the first signs of fertile age is menarche (first menstruation).

According to the Lieberoth 2014 meta-analysis, which included seven cohort studies conducted between 2000 and 2013 in Europe and the USA, the pooled results showed that girls with early menarche had a 37% higher risk of developing asthma than girls with late menarche [13]. In 2015, based on a large cohort with a duration of 50 years, meta-analysis data confirmed that women with very early menarche are at higher risk of developing asthma in middle age [14, 15]. A Mendelian randomisation-causality analysis found an inverse association between the timing of puberty and asthma: menarche before age 12 was associated with an 8% increase in asthma risk, and menarche after age 14 was associated with an 8% decrease [15]. The Campbell 2020 study, with a 50-year follow-up period, showed very similar results to those of the 2017 Mendelian randomisation study by Gill, where early menarche was associated with lower FVC (vital capacity of the lungs) in adulthood. In the same study, early menarche was found to be associated with higher FVC in adolescent girls.

According to R.S.Bonds, T. Midoro- Horiuti, 30-40% of women reported worsening of the symptoms of the disease during the menstrual cycle, namely during the perimenstrual phase, shortly before and for the first few days of the monthly period. In this category of women, a more severe form of AD was subsequently traced [4,7].

Studies conducted by author J.Thornton, also confirm monthly exacerbations of AD, which were conducted in 11% of 1260 female representatives aged from 12 to 55 years [6, 9].

M. T. Salam et al., conducted a research work, which included 905 female representatives of the female sex, using hormonal contraceptives and was found that their risk of developing AD increased 1.75 times (95% confidence interval 1.15-2.65) [8]. The author also assessed the role of menarche onset in relation to age: women with menarche before age 12 years had a 2-fold increased risk of developing AD after puberty compared with women with menarche after age 12 years (95% CI 1.05-4.12). Thus, early onset of menarche was considered as a risk factor for AD [7,8,4]

According to the authors R.M. Abueva and T.A. Gadzhieva, 789 adolescent girls aged 14-17 years were surveyed using the European Respiratory Community Health Survey (ERCHS) questionnaire to determine the prevalence of bronchial asthma in the city of Makhachkala. The sample of patients was made accordingly positive received at least one question of the questionnaire and it made (30%) 238 girls and further they were carried out clinical and instrumental examination, allergological study, study of external respiratory function and study of bronchial reactivity by means of inhalation-provocation tests with obzidan [1,10]. The studied subjects were divided into 2 main groups: group 1 consisted of 64 patients with confirmed AD, group 2 consisted of 174 patients at risk of developing AD. The control group consisted of 60 healthy girls. To determine and detect any abnormalities, physical development was assessed (height, weight, breast circumference, mass index was determined), the functional state of the reproductive system was assessed (gynaecological history, phenotypic indicators of secondary sexual development, sex hormone levels). The concentration of progesterone and estradiol in blood serum was carried out by radioimmunological method. The studies were performed on the 5th-7th and 21st-24th days of the menstrual cycle [10]. One of the main indicators of menstrual function is the age of menarche, this indicator revealed the same results in all groups: in group 1 - 13.8±0.4 years, in group 2 - 13.6±1.1 years and in control group - 13.1±0.2 years. Almost all subjects noted the presence of symptoms of premenstrual tension: 87.4 per cent of girls in group 1, 70.6 per cent in group 2 and 38 per cent in the control group. [4,10]. Regarding the study of sex hormones in group

1 compared to group 2 and the control group, a statistically significant decrease in the concentration of progesterone and an increase in the concentration of oestradiol was found when the blood was obtained on day 21-23; a significant decrease in progesterone was found in group 2 compared to the control group. Estradiol concentrations in the 2-group and control groups did not differ practically. These findings confirming progesterone deficiency were found in 46.6% of the girls in group 1, 76.5% of the girls in group 2 and 7% of the control group.

Hyperestrogenaemia was diagnosed in 40% of group 1 patients and in 46.5% of group 2 girls. Thus, hormonal imbalance was detected only in group 1 and group 2, and a correlation between the severity of bronchial adrenergic reactivity and the concentration of progesterone in serum was found (r=-0.72). The hormone progesterone stimulates the production of prostoglandin E (PG E), which has bronchodilating properties, and estradiol stimulates the synthesis of PG, which is a bronchoconstrictor. F_2a which is a bronchoconstrictor[10,11,12]. In patients with hormonal dysfunction in relation to sex hormones, the inverse proportionality of PG E and PG F_2amay contribute to increased bronchoconstriction and worsen the course of AD.

Conclusion. The above-mentioned data obtained from various sources indicate that girls suffering from AD have disorders in the system of neuroendocrine regulation, affecting pituitary-gonadal disorders caused by the course of the underlying disease. In children suffering from AD, gonadotropic and sex hormones are also included as a mechanism of adaptation to stress and this is manifested in their fluctuations at the plasma level depending on age, duration of the disease and activity of the pathological process. From the above it should be noted that female sex hormones play a significant role in the development of allergic diseases, including AD and even aggravate the course of this disease. Disorders in sexual development in adolescent girls may affect their reproductive potential, and it is also important to note that this problem will not be the only one for them and may entail disorders in their mental health and affect their quality of life.

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