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Сборник содержит научные статьи, отражающие результаты собственных исследований молодых учёных и студентов, посвящённые актуальным вопросам современной медицины.

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GENDER-SPECIFIC DIFFERENCES OF BRONCHIAL ASTHMA PHENOTYPES IN CHILDREN DEPENDING ON PUBERTY STATUS

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Ключевые слова: фенотипы астмы,дети, пол, пубертат.
Резюме: в статье с позиции клинической эпидемиологии изучены гендерные особенности эпидемиологических и клинических проявлений бронхиальной астмы у детей в зависимости от стадии полового созревания.
Key words: asthma phenotypes, children, gender, puberty.
Resume: in the article the peculiarities of gender specific epidemiological and clinical manifestations of the bronchial asthma in children depending on puberty status have been studied using means of clinical epidemiology.

Background. The prevalence of bronchial asthma (BA) has increased and asthma currently affects approximately 1-18% of children worldwide [3]. BA has sex-specific differences in prevalence, in particular BA is far more common in boys than girls during early childhood, but the prevalence equalizes between the genders during adolescence and then switches to a female predominance in adulthood [7,8]. BA comprised of highly heterogeneous clinical phenotypes resulting from complex interplay between genetic and environmental stimuli. The factors related to asthma prevalence may differ depending on sex in preschool and school-aged children [4,6]. The sex difference in the prevalence of BA is reflected in the sex difference in the hospitalization rate and asthma severity [8]. While much focus has been placed on extrinsic environmental stimuli, intrinsic environment such as sex can interact with genes to influence asthma risk [5,9]. The impact of asthma may be different according to gender in terms of different asthma clinical phenotypes manifestations in children and adolescents [1,2,10]. However, only few studies have examined sex-specific effects, especially in childhood [5,7]. Further investigations are needed to examine the effect of gender-specific differences in changes of asthma prevalence and phenotypes in pre- and post puberty.

Objective of the study was to evaluate if sex-based differences exist in clinical and epidemiologic characteristics of asthma in children before and after puberty.

The research assignments:

1. To study the peculiarities of clinical phenotypes of BA in children depending on gender in pre- and post-puberty.

2. To investigate the detailed data of bronchial asthma manifestations (birth weight and body mass index, familial allergic anamnesis and allergic skin tests, serum IgE, bronchial lability index and airways hyperresponsiveness index, type of acetylation) in males and females before and after puberty onset.

Material and methods. 120 children of 6-18 years old of both sexes with at least one year duration of persistent bronchial asthma were examined. The first (I) group included 49 patients with persistent BA before puberty, the second (II) clinical group was formed of 71 patients with diagnosis of persistent BA after puberty onset. No significant differences by sex, age, and place of residence have been shown due to correctly formed clinical groups of comparison. Methods: questionnaire answers (Alexithymia Questionnaire for Children; the Toronto Alexithymia Scale; The Spielberger State–Trait Anxiety Inventory), familial anamnesis, Tanner scale score, birth weight and body mass index (BMI), allergic skin tests results, total serum IgE, index of bronchial lability, $PC_{20}H$ (bronchial non specific hyperresponsiveness test to histamine inhalations which caused 20% fall of FEV_1). The clinico-anamnestic, allergologic, spirometric and statistical methods of research were used.

Results and discussion. In the examined cohort late onset BA phenotype (debut after 6 years old) predominated regardless of gender and puberty status, first of all in post-pubertal females as compared to pre-puberty period (RR=1,3; 95%CI:0,6-3,0). Such association may be explained by tendency of increasing BA prevalence in girls with aging as well as with BA under diagnosing (Yentl syndrome). Early onset BA (up to 3 years old) non significantly associated with male gender before puberty. Non-severe BA diagnosing predominated in pre-puberty period both in girls and boys, but post-puberty period both in females and males associated with non significantly increased risk of severe BA phenotype as compared to alternative asthma variant (RR=1,6; 95%CI:0,5-5,1 and RR=1,4; 95%CI:0,8-2,5 respectively). Atopic (allergic) BA predominated in males regardless of puberty status, as well as non-atopic phenotype associated with female gender both in pre- and postpuberty. Exercise induced asthma (phenotype with exercise induced bronchoconstriction) was almost equally distributed among both sexes regardless of puberty status. Futhermore, such atopic manifestations as max skin papula to one of the epidermal allergens and genealogic index of positive allergic familial anamnesis significantly predominated in males as compared to females in pre – and post-puberty respectively. No any significant differences of the spirometric indices were revealed in groups of children depending on gender and puberty status (see table).

Table 1. Gender differences of atopic characteristics, spirometric indices and weight parameters in groups of children depending on puberty status

Characteristics	Clinical groups on puberty status	Males	Females	Pt
Max skin papula to one of the epidermal allergens (mm)	I	5	7,5	3
	II	3	,6	=0,34
Total serum IgE (IU/ml)	I	4	4	27
	II	7	6	33
Positive allergic familial	I	0	1	=0,92

anamnesis per person (genealogic index)	II	0 ,	1 060	3
Bronchial lability index ($FEV_{1,}$ %)	I	8	13,3	58
	II	9	13,9	=0,12
$PC_{20}H$ (mg/ml) (bronchial hyperresponsiveness to histamine)	I			18
	II			24
Birth weight (g)	I	3604,7 ± 546,4	3235,6 ± 701,9	=0,051
	II	3465,0 ± 495,0	3150,0 ± 578,0	<0,03
BMI actual, kg/m^2	I	8	3,1	=0,32
	II	7	3,5	=0,56

Females tended to have lower birth weight as compared to males regardless of puberty status and no differences of actual BMI in groups of comparison were revealed. After puberty risk of hospitalization to emergency department due to BA exacerbation in males significantly decreased as compared to pre-puberty period (RR=0,6; 95%CI:0,4-0,8) and in females such risk slightly increased in post-puberty (RR=1,4; 95%CI:0,7-2,7).

Conclusions.

1. Late onset asthma phenotype with debut after 6 years old non significantly predominated in children regardless of gender and puberty status, first of all in post-pubertal females, while early onset asthma (up to 3 years old) associated with male gender before puberty.

2. Non-severe asthma diagnosing predominated in pre-puberty period both in girls and boys, but post-puberty period both in females and males associated with slightly increased risk of severe asthma phenotype. After puberty risk of hospitalization to emergency department due to asthma exacerbation in boys significantly decreased and in girls such risk slightly increased.

3. Non-atopic asthma phenotype associated with female gender both in pre- and post-puberty, while atopic (allergic) asthma predominated in males regardless of puberty status, as well as skin papula to the epidermal allergens and genealogic index of positive allergic familial anamnesis significantly predominated in males as compared to females in pre – and post-puberty respectively. Gender-stratified analyses identified associations with significantly lower birth weight in females as compared to males regardless of puberty status and no differences of actual BMI in groups of comparison were revealed.

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