Phenotypic features of a patient with bronchial asthma in the clinical practice of a pediatrician

SCO — краткое сообщение

https://doi.org/10.53529/2500-1175-2023-2-60-62

R. N. Khokha, N. S. Paramonova

Grodno State Medical University, Grodno, 230009, Gorky Street, 80, Republic of Belarus

Keywords: children, bronchial asthma, phenotype.

For citation: Khokha RN, Paramonova NS. Phenotypic features of a patient with bronchial asthma in the clinical practice of a pediatrician. *Allergology and immunology in pediatrics*. 2023; 2: 60–62. https://doi.org/10.53529/2500-1175-2023-2-60-62

Фенотипические особенности пациента с бронхиальной астмой в клинической практике врача педиатра

https://doi.org/10.53529/2500-1175-2023-2-60-62

Р. Н. Хоха, Н. С. Парамонова

Гродненский государственный медицинский университет, г. Гродно, 230009, ул. Горького, 80, Беларусь

Ключевые слова: дети, бронхиальная астма, фенотип.

Для цитирования: Хоха РН, Парамонова НС. Фенотипические особенности пациента с бронхиальной астмой в клинической практике врача педиатра. *Аллергология и иммунология в педиатрии*. 2023; 2: 60–62. https://doi.org/10.53529/2500-1175-2023-2-60-62

Introduction

Bronchial asthma (BA) is one of common non-communicable diseases of the respiratory system. The results of epidemiological studies, held by ISAAC program (International Study of Asthma and Allergies in Childhood) showed that the prevalence of asthma symptoms in children aged 6–7 years was 11,8 % and 13,8 % in children aged 13–14 years [1], in Russia — from 5 to 11 % among children aged 7–8 years and from 5 to 13 % among children aged 13–14 years [2], in RB (Grodno region) — 9,3 % in children aged 6–7 years and 9,1 % in children aged 13–14 years [3]. BA is an extremely heterogeneous disease. Heterogeneous nature is caused by different phenotypes. Thus, it was found that 43 % of cases with allergic, 29,5 % — multitrigger, 27,3 % — virus-associated phenotype [4, 5] occur in childhood, depending on the trigger. Allergen-induced asthma is characterized by a high level of total IgE and positive results of allergy testing, the presence of hereditary burden, mainly a mild course, the presence of two or more background allergic diseases, more severe bronchial sensitivity to bronchodilator. Virus-induced asthma is characterized by: an uncomplicated family history, parental smoking, mainly a moderated course with peak exacerbation in the autumn-winter period, bronchial hypersensitivity to physical exertion [6]. Pulmonary hypertension and fibrosis was more common in case of BA combination with different phenotypes of connective tissue dysplasia (CTD) in children; a longer period of bronchial obstructive syndrome, low steroid effectiveness and the need for antibiotic therapy were observed with no Th2-phenotype of asthma [7]. Neutrophil type of inflammatory blood pattern was associated with the more severe course of the disease, increased chances of developing severe bronchial obstruction by 3,3 times, the risk of losing control by 7,1 times. Clinical features of BA phenotype with obesity are characterized by severe immunological features (T- and B-cellular component stimulation; increase in parameters of oxidative neutrophil metabolism, reduction in reserve capacity of the oxygen-dependent phagocytosis) that together with increased concentrations of pro-inflammatory cytokines (IL-6, TNFα) and CRP, levels of serum IgA, total IgE are associated with systematic inflammation, leading to an increase in the degree of allergic airway inflammation [8]. Heterogeneous nature of clinical forms and the combination of different phenotypes modify BA course, which in turn creates difficulties

in the diagnostic plan for a clinician in real clinical practice.

Objective — to characterize the phenotypic features of a patient with BA in the real clinical practice of a pediatrician.

Materials and methods

There was a retrospective analysis of 289 medical records of children with BA, receiving medical treatment in the pediatric department, Gordon regional children's clinical hospital. Socio-demographic, clinical, laboratory and instrumental indicators were analyzed. Diagnosis and examination were carried out in accordance with the recommendations of the Global Initiative for bronchial asthma (GINA, 2014) and clinical protocols for diagnosis and treatment of allergic diseases in children (Minsk, 2014). Statistical processing of the data obtained was performed using пакета программ Statistica for Windows v. 7.0, StatSoft Inc. (USA) software package. The results were considered significant at the level of $p < 0,05$.

Results and discussion

The average age of examined children was 8,72 [5; 12] years; 198 boys (68,51 %, CI: 62,94–73,60), 91 girls (31,49 %, CI: 26,40–37,06). There was burdened heredity for allergic diseases (AD) in 183 children (63,32 %, CI: 57,62–68,67): 135 on mother's side (46,71 %, CI: 41,04–52,47), 48 on father's side (16,61 %, CI: 12,74–21,35). Burdened BA heredity was found in 60 children (20,76 %, CI: 16,47–25,82): 41 (14,04 %, CI: 10,61–18,71) on mother's side, 19 (6,5 %, CI: 4,19–10,09) on father's side. There was a history of atopic dermatitis in 68 children (23,53 %, CI: 18,99–28,76), allergic rhinitis — 245 children (84,77 %, CI: 80,16–88,48), allergic reactions to drugs — 43 children (14,89 %, CI: 11,21–19,47).

The analysis of intra/perinatal period showed that in most cases there were complications during pregnancy (62,28 %, 56,57–67,68), 1 birth (61,58 %, 54,73–68), physiological delivery process (88,24 %, 83,98–91,49). Birth weight of children with asthma was 3353,01 [3050; 3650] gr, body length 51,64 [51; 53] sm. 76,1 %, 70,88–80,69 children got breastfeeding from birth. The median value of breastfeeding duration in the group with BA was 3,0 [0; 12] months.

83,81 %, 75,5–89,74 children with BA were born in intact families. At the time of birth mother's age was 24,0 [22,0; 29,0] years, father's — 26,0 [24,0; 31,0] years. In most cases the parents have the higher or secondary professional education (mother 42,86 %, 35,75–50,27 and 38,28 %, 31,4–45,67, father 41,29 %, 33,84–49,16 and 49,03 %, 41,28–56,83).

BA was diagnosed at the age of 5,0 [3; 8], BA duration at the time of analysis was 2,46 [0; 4] years. Mild asthma prevailed in the degree of severity (90,65 %, 86,71–93,54); the basic phenotype on triggers is allergen-induced phenotype (60,5 %, 54,81–66,0), by age — 3–5 years old (45,33 %, 39,69–51,26) and 6–12 years old (34,6 %, 29,35–40,26). The level of total IgE was 358,8 [71; 523] IU/ml. In 63,68 %, CI: 57,18–69,71 children its level was higher with the average median 536,54 [209; 901] IU/ml. Analysis of eosinophilic inflammation markers by blood patterns showed its presence in 47,86 %, CI: 41,83–53,95 children with BA with average number of eosinophils 9,81 % [7;25; 12,14], by rhinocytogram pattern — in 58,67 %, CI: 52,73–64,37 children with the average number of eosinophils 32,09 % [18,16; 38,25]. In the entire sample the average (median) number of eosinophils in peripheral blood was 6,1 % [2; 9], in the nose mucus 20,33 % [2; 32]. Analysis of sensitization spectrum on skin samples showed an increase in sensitization frequency to household and epidermal allergens (90,26 %, CI: 85,21–93,74). The median values of ERF indicators did not deviate from the correct values. BMI in children with BA was (16,0 [14; 19] kg/m2.

The frequency of CTD external symptom occurrence in children with BA is from 27,2 % to 65,8 %. The most frequent one was high arched palate (61,2 %), impaired growth and dental crowding (55,3 %), velvety skin (44,7 %), joint hypermobility (45,9 %), flat foot (46,5 %), blue sclera (65,8 %).

Conclusion

Phenotype-based approach to patients with BA helps to ensure individual treatment of such patients in the phase of dynamic observation, choosing a therapy, predicting effectiveness of anti-inflammatory response, which is an important condition to achieve optimal disease control.

REFERENCES /ЛИТЕРАТУРА

1. Worldwide variations in the prevalence of asthma symptoms: the International Study of Asthma and Allergies in Childhood (ISAAC). Eur Respir J. 1998; 12: 315–335. https://doi.org/10.1183/09031936.98.12020315.
2. Batozhargalova BC, Mizernickij YuL, Podol'naya MA. Meta-analiz rasprostranennosti astmopodobnyh simptomov i bronhial'noj astmy v Rossii (po rezul'tatam programmy ISAAC). Rossijskij vestnik perinatologii i pediatrii. 2016; 4: 59–69. (In Russ.) https://doi.org/10.21508/1027-4065-2016-61-4-59-69.
3. Khokha RN. The prevalence of symptoms of allergic diseases among children in the Grodno region (Republic of Belarus). Russian Allergological Journal. 2014; 11 (5): 46–50. (In Russ.) https://doi.org/10.36691/RJA525.
4. Shanova OV, Pyura DK, Kharkovskaya AV. Features of clinical phenotypes of bronchial asthma in children. Amur Medical Journal. 2018; 4 (24). (In Russ.)
5. Banadyga NV, Voloshin SB. The role of phenotypic and genotypic traits in the course of bronchial asthma in children. Sovremennaya pediatriya. 2016; 4 (76): 62–65. (In Russ.) https://doi.org/10.15574/SP.2016.76.62.
6. Sabitov AU, Marakulina AV. Peculiarities of phenotypes of bronchial asthma in preschool children. Practical medicine. 2019; 17 (5): 200–205. (In Russ.) doi: 10.32000/2072-1757-2019-5-200-205.
7. Nesterenko ZV. From the phenotype of connective tissue dysplasia to the phenotype of bronchial asthma in children. Therapy. 2020; 6 (40): 59–63. (In Russ.) https://dx.doi.org/10.18565/therapy.2020.6.59-63.
8. Churyukina EV, Lebedenko AA, Galkina GA, Dudareva MV, Levkovich MA. Clinical and immunological features of the phenotype of bronchial asthma with obesity in children. Allergology and immunology in pediatrics. 2018; 3 (54): 14–20. (In Russ.)