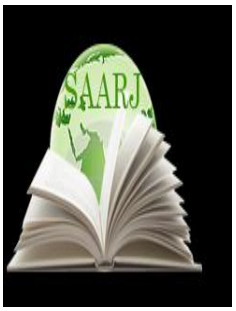
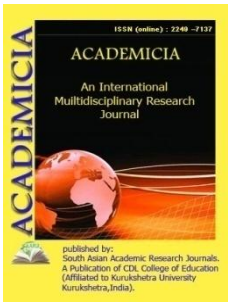


ACADEMICIA
An International Multidisciplinary Research Journal
(Double Blind Refereed & Peer Reviewed Journal)



DOI: 10.5958/2249-7137.2021.01133.2

MODERN METHODS FOR DIAGNOSING THE FUNCTION OF EXTERNAL RESPIRATION IN CHILDREN WITH BRONCHIAL ASTHMA

Barno Turdikhodjaevna Khalmatova*; Gulnoza Aloyevna Tashmatova; Nargis Khayrullayevna Mirsalikhova*****

*DSc, Professor,
Department of Children's Diseases,
Tashkent Medical Academy, UZBEKISTAN

**Senior Lecturer,
Department of Children's Diseases,
Tashkent Medical Academy, UZBEKISTAN

***Associate Professor,
Department of Children's Diseases,
Tashkent Medical Academy, UZBEKISTAN

ABSTRACT

The aim of the study was to study the validity of spirometry and bodyplethysmography methods for assessing the functional state of the bronchopulmonary system in children with bronchial asthma. Materials and methods. 62 children were examined, among them 27 children with a diagnosis of moderate bronchial asthma and 35 children are conditionally healthy children. All patients underwent a comprehensive study of respiratory function indicators in compliance with research standards. Results. When analyzing the FEV1 / FVC index, which characterizes the presence of bronchial obstruction, it was found that in the group of children with BA it was 69.6%, while in the control group it was 97.53%. The analysis of the results of bodyplethysmography showed an increase in ROL up to 117.2% (p <0.005) in children with bronchial asthma, relative to children in the control group (96.9%). Conclusions. Revealed a significant increase in ROL relative to the control group. Based on this, to clarify the presence of disturbances in external respiration and pathology of small bronchi in children with bronchial asthma, a more in-depth examination, in particular, bodyplethysmography, is required.

KEYWORDS: *Asthma, Diagnostics, Bodyplethysmography, Spirometry, Children.*

INTRODUCTION

Bronchial asthma (BA) is one of the most common diseases in all age groups, including children [1]. According to the WHO, the prevalence of asthma has reached the level of 5% among adults and 10% among the child population of the planet [3,5,6]. Bronchial asthma develops more often among preschool children (80%), often the first attacks occur already in the first year of life [4]. Recently, practical doctors have been paying great attention to assessing the functional state of the lungs. Respiratory function (RPF) indicators are important both for diagnosing, determining the severity of the disease, and for choosing treatment programs. Dynamic monitoring of patients with recurrent respiratory function studies allow you to make changes to the treatment, to predict the course and even the outcome of respiratory diseases in children.The main task of the study of the function of external respiration in most patients is to establish disorders of the ventilation capacity of the lungs, among which obstructive ones predominate, i.e. caused by changes in the passage of air through the tracheobronchial tree[6,10]. Less commonly, restrictive or restrictive disorders are diagnosed due to changes in the elasticity of the lung tissue. Unlike adults, the growth and development of bronchopulmonary structures continues in childhood[8,10].This explains the fact that even in the presence of chronic diseases of the respiratory system, due to the high compensatory capabilities, pulmonary dysfunctions are often absent.

Children suffering from bronchial asthma often have normal functional parameters, not only during remission, but even in the stage of exacerbation of the disease [2,4]. The most complete characterization of the ventilation capacity of the lungs is possible when examining the structure of the total lung capacity. The method of body plethysmography, simultaneously with the study of the total lung capacity (TLC), makes it possible to assess bronchial resistance, which is sufficient to diagnose the nature and degree of disorders.

In recent years, the understanding of the processes occurring in the airways of a patient with asthma has been supplemented by information about the role of small airways in the development of bronchial inflammation. Inflammation in the small bronchi in bronchial asthma leads to an increase in peripheral resistance, the appearance of nocturnal symptoms of asthma, repeated exacerbations, the formation of "air traps", despite ICS therapy [7]. In patients with mild BA compared with healthy children, the resistance in the small bronchi is 7 times higher, although the indicators of pulmonary function are within the normal range.[8].

The aim ofstudy of the validity of spirometry and bodyplethysmography methods for assessing the functional state of the bronchopulmonary system in children with bronchial asthma.

MATERIALS AND METHODS

In total, a comprehensive assessment of the state of the bronchopulmonary system was carried out in 62 children aged 12 to 18 years. Among them there are 27 children diagnosed with moderate bronchial asthma. The comparison group included "conditionally healthy" children of the same age and sex (n = 35).The diagnosis of BA was established in accordance with the International Consensus on Diagnosis and Treatment of BA (GINA, 2014, 2018). Among the surveyed children, 40.3% (n = 25) were girls, 59.6% (n = 37) were boys (Table 1). The average age of the surveyed was 15.27 ± 7.69 years. The length of the illness averaged 3 ± 1.1.

TABLE NO1 INDICATORS OF BA PATIENTS INCLUDED IN THE STUDY

№	Number of patients, n = 62		
1	Average age in years		14,21±1,9
2	Sex	boys	37 (59,6%)
		girls	25(40,3%)
3	Diagnosed with BA		27 (43,5%)
	"Conditionally healthy"		35 (56,4%)

Of the functional tests, spirometry was performed using a Microlab apparatus (England). The parameters of the forced expiratory volume in 1 second (FEV1), forced vital capacity (FVC) and the FEV1 / FVC ratio were assessed after the test with a bronchodilator (MDI Salbutamol, 200 μg).For the purpose of a more in-depth examination, bodyplethysmography was performed using the "Master Screen Body" apparatus (Jaeger, Germany). Statistical analysis was performed using the STATISTICA 10 software.

RESULTS AND DISCUSSION

The FEV1 value in children with asthma was 92.4%, in children in the control group - 100.2%. When analyzing the FEV1 / FVC index, which characterizes the presence of bronchial obstruction, it was found that in the group of children with BA it was 69.6%, while in the control group it was 97.53%.When spirography was performed in children with BA after inhalation of 200 μg of salbutamol, the FEV1 level was 101.2% and was comparable to the values of children in the control group. The FEV2 / FVC indicator was within the normal range and amounted to 70.3% in the group of children with BA and 95.2% in the group of "conditionally healthy" children.

To monitor the effectiveness of the treatment in order to prevent exacerbations and prevent the progression of the disease, it is very important to timely identify changes in bronchial patency using modern diagnostic methods. The variety of available equipment for studying the parameters of external respiration raises the question of choosing high-quality devices that meet modern standards and are reliable in operation. For doctors working with children, these requirements are supplemented by taking into account the age characteristics of their patients. To date, a research method that meets all these requirements is a bodyplethysmograph.

We carried out an additional examination to identify pathological abnormalities in volumetric parameters in children with BA using the bodyplethysmography method. The indices of intrathoracic pressure and residual lung capacity corresponded to normal values and did not differ statistically significantly in the study groups.A significant difference was obtained in the indicator of residual lung volume (ROL), which allows assessing the presence of pathology in the small airways (PSA) [4].As you know, bronchial asthma of any severity is characterized by an inflammatory process in the respiratory tract, which develops as a result of a complex interaction of genetic factors and environmental factors [6]. In our study, we obtained a statistically significant increase in ROL up to 117.2% ($p < 0.005$) in children with bronchial asthma, relative to children in the control group (96.9%).Despite the fact that similar indicators were obtained by the spirography method, in children of the main group, after taking salbutamol, ROL was within the reference values, the revealed significant difference in the direction of

increasing this criterion in patients with BA indicates the presence of a pathological process in the small bronchi.

CONCLUSIONS

Considering the above data, it can be concluded that in children with controlled bronchial asthma, when determining the lung function by spirography, obstructive disorders are not detected, although the FEV1 and FEV1 / FVC indicators are statistically lower than in the group of healthy children. Revealed a significant increase in ROL relative to the control group. Based on this, to clarify the presence of disturbances in external respiration and pathology of small bronchi in children with bronchial asthma, a more in-depth examination, in particular, bodyplethysmography, is required.

REFERENCE

1. Andreyeva A. O., Topalov F. S. Bodipletizmografiyakakmetoddiagnostikinarusheniyfunktsiidykhaniya u detey s bronkhial'noyastmoy //III International Scientific and Practical Conference" Methodology of Modern Research"(March 29, 2017, Dubai, UAE). – P. 23.
2. Ernu B., Zhob A. Vliyaniye obshchego osteopaticheskogo lecheniya na funktsiyu vneshnego dykhaniya detey, stradayushchikh astmoy //Rossiyskiy osteopaticheskiy zhurnal. – 2020. – №. 3. – S. 137-145.
3. Geppe N. A. idr. Bronkhofonograficheskoyeissledovaniyelegkikh u bol'nykhbronkhial'noyastmoyrannegovozrasta //Pul'monologiya. – 2020. – №. 3. – P. 38-41.
4. Khalmatova B. T. et al. Influence Of Ecological Factors On The Development And Progress Of Bronchial Asthma In Children //European Journal of Molecular & Clinical Medicine. – 2021. – T. 7. – №. 8. – C. 4374-4377.
5. Lebedenko A. A. idr. Bodipletizmografiyakakmetoddiagnostikinarusheniyfunktsiidykhaniya u detey s bronkhial'noyastmoy //International Scientific and Practical Conference World science. – ROST, 2017. – T. 6. – №. 4. – P. 23-25.
6. Lukina O.F. Sovremennyyemetodyissledovaniyafunktsiilegkikh u detey – ZH.Lechashchiyvrach -2003 №3
7. Mineyeva Ye. Ye. i dr. Funktsional'noyesostoyaniyemalykhdykhatel'nykhputey u patsiyentov s bronkhial'noyastmoy, assotsiirovannoy s ozhireniyem //Terapevticheskiyarkhiv. – 2019. – T. 91. – №. 1.
8. Mirrakhimova M. KH., Khalmatova B. T., Toshmatova G. A. Bronkhial'nayaastma u detey: sovremennyyvzglyadnaproblemu. – 2019.
9. Neklyudova G. V., Chernyak A. V., Kevorkova M. S. Parametryfunktsiivneshnegodykhaniya: sravneniyedvukhbodipletizmografov //Prakticheskayapul'monologiya. – 2019. – №. 2.
10. Toshmatova G. A., Shakarova M. S. Q. Meaning Of Respiratory Mycoplasma Infection In Children With Bronchial Asthma //The American Journal of Medical Sciences and Pharmaceutical Research. – 2020. – T. 2. – №. 12. – C. 47-54.