

# GEORGIAN MEDICAL NEWS

ISSN 1512-0112

No 5 (266) Май 2017

ТБИЛИСИ - NEW YORK



ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии  
საქართველოს სამედიცინო სახელგანთქა

## CORRELATION BETWEEN SPIROMETRY DATES AND SPECIAL ALLERGEN-SPECIFIC IgE IN PATIENTS WITH BRONCHIAL ASTHMA IN WEST GEORGIA

Sepiashvili R., Chikhladze M., Khachapuridze D., Gamkrelidze S.

*National Institute of Allergology, Asthma and Clinical Immunology, Georgian Academy of Sciences, Tskaltubo, Georgia;  
Peoples' Friendship University of Russia (RUDN University), Moscow, Russia*

Bronchial asthma is a serious global health problem. 5% to 10% of persons of all ages suffer from this chronic airway disorder. An atopic diathesis, a genetic predisposition toward the production of IgE antibodies in response to pollen, house dust mites, fungi, or animal-derived proteins, is the most important risk factor for bronchial asthma. Prevention of the disease, as well as effective diagnostic and treatment methods have great importance for managing this problem [1,4]. The modern approaches in the prevention and treatment of asthma are delivered by GINA „Global Strategy for Asthma Management and Prevention” [2,5]. The main recommendations of this initiative have already been using in different countries, includes Georgia, with consideration of national peculiarities. The clinical-epidemiological study revealed that the western Georgia is distinguished with diversity and frequency of allergic diseases, especially high rate of respiratory allergies caused by the acute factors of eco-geographical climate: air temperature, humidity and the variety of plants represented in the region .

According to the above-mentioned, at this stage, the study aimed to establish correlation between airway obstruction and specific IgE specificity, managing future treatment in the patients with bronchial asthma, among the population of west Georgia.

**Material and methods.** In the study have been involved 56 patients (among them 24 males and 32 females) of different ages, with diagnostic bronchial asthma (according to GINA recommendation), who applied to the S/R Institute of Allergology, Asthma and Clinical Immunology of Georgian Academy of Sciences for specific allegro-diagnostics and for management of treatment (Tskaltubo, Georgia).

On the ground of the aim the study included the following steps of allegro-diagnostics:

I step – Computerized spirometry by apparatus „SPIRO-LAB 3” was conducted for verification of external respiratory changes and estimation level of bronchial obstruction. Besides Peak expiratory flow (PEF), the following parameters were studied and analyzed: forced expiratory volume in 1 sec (FEV1), forced volume vital capacity (FVC), FEV1/FVC ratio (FEV1%) - Tiffeneau-Pinelli index.

II step – To detect allergenization degree, total serum IgE levels, specific IgE and concentration of Phadiatop, using modern automated system - “Immuno CAP 100” (PHADIA, Switzerland), were estimated in the patients.

III step- future treatment recommendations.

**Results and their discussion.** All 56 patients were undergone the spirometry measurement. Our results show that from 56 patient 21 (38%) had very severe obstruction by spirometry: Pretest: FEV1 – 28%; FEF-45%; FEV1/FVC ratio -55% on average. Post test: significant bronchodilatation was revealed FEV1> +12%( > 200mL) after the inhalation of four puffs of a short – acting beta2 sympathomimetic agent, e.r., 400 µg of salbutamol. In 19 (33%) patients severe bronchoobstruction was established. By spirometry was revealed: Pretest: FEV1 – 42%; FEF-55%; FEV1/FVC ratio -67% on average. Post test: significant bronchodilatation was revealed FEV1> +12%( >200 mL) after the inhalation of four puffs of a short – acting beta2 sympathomimetic agent, e.r., 400 µg of salbutamol. In 14 (25%) patients moderate bronchoobstruction was diagnosed, the spirometry results were : Pretest: FEV1 – 52%; FEF-65%; FEV1/FVC ratio -67% on average. Post test: It was revealed significant bronchodilatation FEV1> +12%( >200 mL). Only in 2 (4%) patients were diagnosed the normal spirometry.

All the patients were treated by GINA „Global Strategy for Asthma Management and Prevention” with consideration of national peculiarities. From 56 patients in 49 (88%) the asthma was controlled, and only in 7 (12%) patients disease was uncontrolled.

According to the analysis of the laboratory results obtained after using modern automated system - “ImmunoCAP 100” showed that all patients with bronchial asthma revealed high titers of total IgE, Phadiatop test was positive in 48 (85%) patient from 56 and only in 8 (15%) Phadiatop was negative. Identification of a particular allergen was carried out by investigation of allergen-specific IgE.

In the patients with bronchial asthma of a specific positivity of specific IgE to the weeds (Wx2) – ambrosia, plantain, clasp/tarragon, atriplex –in 23 (53%) on average; tree dust (Tx9) - alder, lactarius piperatus, nuts, oak, willow - 11 (19%) ; and cereals (Gx1) - festuca pratensis, lolium temulentum, timoti grass, poa - 9 (16%); Mx2 -Penicillium potatum, Cladosporium herbarum, Aspergillus fumigatus, Candida albicans, Alternaria alternate- 15 (21%) was revealed, only in 5 (9%) patients we cannot established the allergy specific IgE.

It was established the correlation between spirometry dates and special allergen specific Ig E in patient with bronchial asthma.

According to the study results, among the etiologic factors of bronchial asthma the highest percentage comes on plant allergens-aeropollutants, which is proved by appropriate specific IgE positivity. The modern management of allergy is allergo-specific immunotherapy (ASIT), there are: Allergen-specific subcutaneous (SCIT) and Sublingual immunotherapy (SLIT), also called "desensitization," has been shown to reduce medication use and bronchial hyper-reactivity, as compared with placebo, in mild to moderately severe asthma, although it does not improve pulmonary function values [3,6]. This statement applies mainly to younger patients. ASIT has a markedly lower chance of success in older patients who have had asthma for a long time, whose symptoms arise independently of allergen exposure, and for whom anti-inflammatory pharmacotherapy has been less effective. ACIT is contraindicated in patients whose pulmonary function is persistently impaired with FEV<sub>1</sub> values below 70%. Specific immunotherapy should be performed only by a physician with experience in allergology. It does not replace effective anti-asthmatic pharmacotherapy, but should rather be seen as a complementary element of asthma management. There is accumulating evidence that ACIT can help prevent the progression of allergic rhino-conjunctivitis to allergic asthma in children and adolescents.

The patients suffering from bronchial were supplied with the data of aeropolinometer "Burkard Trap", developed by our clinic permanently updating calendar for distribution of aeroallergens in Imereti region, which reflects the concentration of blossoming plant-trees and atmospheric aeroallergens in the air at a given period of time.

#### Conclusion.

By spirometry is possible to estimate degree of bronchoobstruction and severity of disease in patient with diagnostic bronchial asthma.

Increased concentration of Immuno CAP/Phadiatop in blood indicates to the present of bronchial asthma to inhalative allergens.

"Immuno CAP 100" allowed us to specify/determine the presence of specific IgE to certain allergens in blood serum. It was established the correlation between spirometry dates and special allergen specific Ig E in patient with bronchial asthma.

The high level of specific IgE to aeroallergens was revealed in the patients with bronchial asthma, the specificity of which was particularly strengthened by correlation with other allergens specific for the given region. The latter is of great importance for providing the effective and safe allergo-specific immunotherapy (ASIT) and successful preventive measures.

## REFERENCES

1. Arztliches Zentrum für Qualität in der Medizin. Nationale Versorgungs-Leitlinie Asthma bronchiale Dtschbl. 2005;102(40):A 2734-A 2734.
2. Bateman ED, Hurd SS, Barnes PJ, et al. Global strategy for asthma management and prevention: GINA executive summary. *Eur Respir J.* 2008;31:143-178.
3. Buhl R, Berdel D, Criege C-P, Gillissen A, Kardos P, Kroegel C, et al. Leitlinie zur Diagnostik und Therapie von Patienten mit Asthma. *Pneumologie* 2006;60:139-183.
4. Reddel HK, Salome CM, Peat JK, Woolcock AJ. Which index of peak expiratory flow is most useful in the management of stable asthma? *Am J Respir Crit Care Med.* 1995;15:1320-1325.
5. Nelson HS. Is there a problem with inhaled long-acting b-adrenergic agonists? *J Allergy Clin Immunol.* 2006;117:3-16.
6. Bousquet J, Lockey R, Malling HJ. Allergen immunotherapy: therapeutic vaccines for allergic diseases. A WHO position paper. *J Allergy Clin Immunol.* 1998;102:558-562.

## SUMMARY

### CORRELATION BETWEEN SPIROMETRY DATES AND SPECIAL ALLERGEN- SPECIFIC IgE IN PATIENTS WITH BRONCHIAL ASTHMA IN WEST GEORGIA

Sepiashvili R., Chikhladze M., Khachapuridze D., Gamkrelidze S.

*National Institute of Allergology, Asthma and Clinical Immunology, Georgian Academy of Sciences, Tskaltubo, Georgia; Peoples' Friendship University of Russia (RUDN University), Moscow, Russia*

The study aimed to establish correlation between airway obstruction and specific IgE specificity, managing future treatment in the patients with bronchial asthma, among the population of west Georgia. In the study have been involved 56 patients (among them 24 males and 32 females) of different ages, with diagnostic bronchial asthma (according to GINA recommendation). On the ground of the aim the study included the following steps of allergo-diagnostics: I step - Computerized spirometry by apparatus „SPIROLAB 3". II step - To detect allergenization degree, total serum IgE levels, specific IgE and concentration of Phadiatop, using modern automated system - "Immuno CAP 100", were estimated in the patients. III step-future treatment recommendations. All 56 patients were undergone the spirometry measurement. Our results show that of 56 patient 21 (38%) had very severe obstruction by spirometry: Pretest: FEV<sub>1</sub> - 28%; FEF<sub>25-75</sub>-45%; FEV<sub>1</sub>/FVC ratio -55% on average. Post test: significant bronchodi-

lation was revealed FEV1> +12% (>200 mL) after the inhalation of four puffs of a short-acting beta2 sympathomimetic agent, e.g., 400 µg of salbutamol. In 19 (33%) patients severe bronchoobstruction was established. By spirometry was revealed: Pre test: FEV 1 – 42%; FEF-55%; FEV1/FVC ratio -67% on average. Post test: significant bronchodilatation was revealed FEV1> +12% (>200 mL) In 14 (25%) patients moderate bronchoobstruction was diagnosed, the spirometry results were. Pretest: FEV 1 – 52%; FEF-65%; FEV1/FVC ratio - 67% on average. Post test: It was revealed significant bronchodilatation FEV1> +12% (>200 mL). Only in 2 (4%) patients were diagnosed the normal spirometry. In the patients with bronchial asthma of a specific positivity of specific IgE to the weeds (Wx2) – ambrosia, plantain, clasp/tarragon, atriplex - in 23 (53%) on average; tree dust (Tx9) - alder, lactarius piperatus, nuts, oak, willow - 11 (19%); and cereals (Gx1) - festuca pratensis, lolium temulentum, timoti grass, poa - 9 (16%); Mx2 -Penicillium notatum, Cladosporium herbarum, Aspergillus fumigatus, Candida albicans, Alternaria alternate- 15 (21%) was revealed, only in 5 (9%) patients we cannot established the allergy specific IgE.

It was established the correlation between spirometry dates and special allergen specific IgE in patient with bronchial asthma. The latter is of great importance for providing the effective and safe allegro-specific immunotherapy (ASIT) and successful preventive measures.

**Keywords:** bronchial asthma, spirometry, special allergen-specific IgE, ASIT.

## РЕЗЮМЕ

### КОРРЕЛЯЦИЯ МЕЖДУ СПИРОМЕТРИЧЕСКИМИ ПОКАЗАТЕЛЯМИ И СПЕЦИФИЧНОСТЬЮ АЛЛЕРГЕНСПЕЦИФИЧЕСКИХ IgE У ПАЦИЕНТОВ С БРОНХИАЛЬНОЙ АСТМОЙ

Сепнашвили Р.И., Чикладзе М.В., Хачапуридзе Д.Р., Гамкрелидзе С.Л.

*НИИ аллергологии, астмы и клинической иммунологии Академии наук Грузии, Цхалтубо, Грузия; Российский университет дружбы народов, Москва, Россия*

Целью исследования явилось определение корреляции между данными спирометрии и специальными, аллергоспецифичными IgE среди населения Западной Грузии с целью эффективного лечения пациентов с диагнозом бронхиальной астмы.

Исследовано 56 пациентов различного возраста, из них мальчиков - 24, девочек - 32 с диагнозом бронхиальной астмы, которые обратились в Институт аллергологии, астмы и клинической иммунологии Академии наук Грузии (Цхалтубо, Грузия) для аллергодиагностики.

Исследование включало следующие этапы: I этап - компьютерная спирометрия Spirolab III; II этап - определение специфического IgE в сыворотке крови с помощью автоматизированной системы «Immuno CAP 100» (PHADIA, Швейцария); III этап - планирование эффективного лечения- аллерген-специфическая иммунотерапия.

В результате проведенного исследования выявлена корреляция между данными спирометрии и специальными, аллергоспецифичными IgE у больных бронхиальной астмой, что весьма значимо для проведения целенаправленного лечения, эффективной и безопасной иммунотерапии и успешной реализации профилактических мер.

## რეზიუმე

კორელაცია სპირომეტრიულ მაჩვენებლებსა და ალერგენსპეციფიკურ IgE-ს სპეციფიურობას შორის ბრონქული ასთმის მქონე პაციენტებში

რ. სეფიაშვილი, მ. ჩიხლაძე, დ. ხაჭაპურიძე, ს. გამყრელიძე

ალერგოლოგიის, ასთმისა და კლინიკური იმუნოლოგიის ს/კ ინსტიტუტი. წყალტუბო, საქართველო; ხალხთა მეგობრობის უნივერსიტეტი, მოსკოვი, რუსეთი

კვლევის მიზანს წარმოადგენდა კორელაციის დადგენა ბრონქობსტრუქციის სპეციფიურ IgE-ს სპეციფიურობას შორის დასავლეთ საქართველოს მოსახლეობაში.

კვლევაში ჩართული იყო სხვადასხვა ასაკის 56 პაციენტი (24 მამაკაცი, 32 ქალი) ბრონქული ასთმის დიაგნოზით, რომლებმაც ალერგოდიაგნოსტიკისა და ეფექტური მკურნალობის მიზნით მიმართეს საქართველოს მეცნიერებათა აკადემიის ალერგოლოგიის, ასთმის და კლინიკური იმუნოლოგიის სამეცნიერო-კვლევით ინსტიტუტს (წყალტუბო, საქართველო). კვლევა მოიცავდა შემდეგ ეტაპებს: I - ბრონქობსტრუქციის დიაგნოსტიკა კომპიუტერული სპირომეტრიით (Spirolab III); II - სისხლის შრატში სპეციფიკური IgE-ს დადგენა ავტომატიზებული სისტემით ("Immuno CAP 100", PHADIA, შვეიცარია), III - ეფექტური მკურნალობის ტაქტიკის შემუშავება - ალერგოსპეციფიკური იმუნოთერაპია.

დადგენილია კორელაცია ბრონქობსტრუქციის სხვადასხვა ხარისხსა და ალერგენსპეციფიკური IgE-ს სპეციფიურობას შორის, რაც მნიშვნელოვანია მიზანმიმართული მკურნალობის, ეფექტური და უსაფრთხო იმუნოთერაპიის და პრევენციული ღონისძიებების წარმატებით განხორციელებისათვის.