

PATTERNS OF SENSITIZATION BY FOOD AND INHALANT COMPONENTS IN GEORGIAN PATIENTS

Lomidze N., Gotua M.

Center of Allergy and Immunology; Tbilisi State Medical University, Georgia

Molecular-based allergy (MA) diagnostics is a novel approach used to map the allergen sensitization of a patient at a molecular level, using purified natural or recombinant allergenic molecules (allergen components) instead of allergen extracts. Singleplex and multiplex measurement platforms are available for MA diagnostics. The Immuno-Solid phase Allergen Chip (ISAC) is the most comprehensive platform currently available, which involves a biochip technology to measure sIgE antibodies against more than one hundred allergenic molecules in a single assay [1,3,5,7,9,10]. Food allergic reactions can range in severity from mild to severe and life threatening. Accurate diagnosis of food allergy is necessary not only to provide appropriate and potentially life-saving preventive measures but also to prevent unwarranted dietary restrictions. The diagnosis of food allergy has traditionally been based on clinical history and food specific IgE (sIgE) testing, including skin prick testing (SPT), serum tests, or both. These tests tend to be extremely sensitive, but positive test results to foods that are tolerated are common. Recently, a number of studies have demonstrated that CRD may improve the specificity of allergy testing to a variety of foods including peanut, milk, and egg [2,4,6,8].

High levels of milk and egg white IgE may predict the likelihood of sensitivity, but may not be solely predictive of reactions to cooked food or allergy duration.

CRD test results give more of the information necessary to evaluate patient's potential risk of systemic reaction, manage dietary modifications and medication, and improve patient's quality of life.

The aim of our study was to: 1) investigate sensitization patterns to food and inhalant allergen components in different age groups of Georgian allergic patients. 2) Evaluate patient's potential risk of systemic reaction and manage dietary modifications. 3) Study the correlation of food and inhalant components with clinical manifestations of allergic disease in different age groups.

Material and methods. The study population comprised 81 allergic patients, 26 adults (mean age 36.2 ± 10.9) and 55 children (mean age 6.1 ± 4.58) with different clinical manifestations referred to our clinic for food allergy evaluation as a cause of their allergic disease. Diagnosis was based on patient's history, clinical symptoms and laboratory investigations (skin prick tests, total IgE, specific IgE measurements, FeNO, spirometry and etc). Allergic patient's sera samples were tested by a microarray tech-

nology (ImmunoCap ISAC, Thermo Fisher Scientific, ImmunoDiagnostics, Uppsala, Sweden) and specific IgE levels against 112 different allergen components were detected.

Results and their discussion. Polysensitization was seen in 84.6% of subjects. Among investigated mainly species-specific food components IgE reactivity to nGal d 1, nGal d 2 and nBos d 8 was more prevalent correspondingly 11.3%, 10.1%, and 10.1% (Fig. 1).

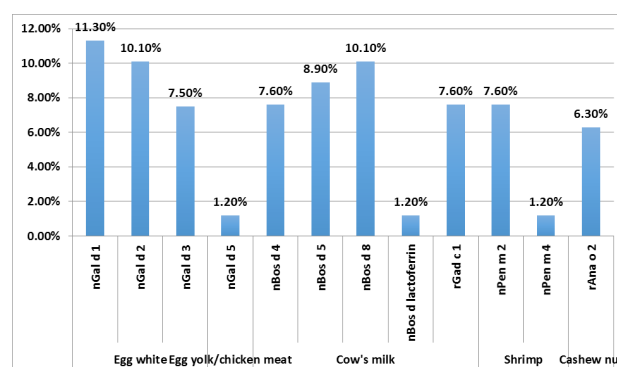


Fig. 1. *Mainly Species-specific Food Components*

All other food components comprised – 1.2% (Brazil nut – rBer 1, hazelnut – nCor a 9, walnut – rJug n 1, nJug r 2, sesame seed – nSes 1 1, peanut – rAra h 1, rAra h 2, rAra h 3, nAra h 6, soybean – nGly m 5, nGly m 6, buckwheat nFag e 2, wheat rTri a 19.0101, kiwi-nAct d 1, nAct d 5).

Concerning pollens, specific IgE antibodies against following aeroallergen components were detected more frequently: 1) grass pollen – Cyn d 1 (35.4%), rPhl p 1 (35.4%) and nPhl p 4 (34.1%), 2) tree pollen – nCup a 1 (26.5%); 3) weed pollen – nAmb a 1 (21.5%). Main allergen component from the mold group was rAlt a 1 (10.1%) and animal group was rFel d 1 (12.6%). Among house dust allergen components sIgE to rDer f 2, nDer p 1 and rDer p 2 showed higher positive rates.

PR-10 reactivity was detected in 56 patients (45%), Profilin reactivity in 53 (43%), and LTP in 36 (29%) (Fig. 2).

IgE reactivity to milk and egg components were more prevalent among the food allergen components and these patients were divided into three age groups: Group A: infants < 2 yrs old (total n-3), group B: preschool children aged 2-5 yrs old (total n- 9); Group C – 6-18 yrs old (total n-2); No positive specific IgE to milk and egg components were observed in adults 18 yrs old and over.

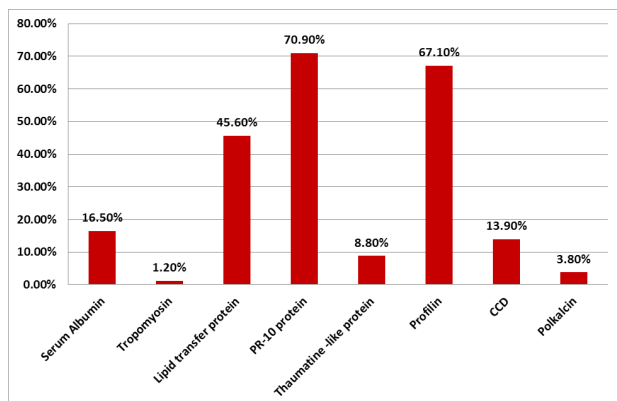


Fig. 2. ImmunoCAP ISAC allergen components

Our study revealed that 92.8% of milk and egg allergic patients were sensitized to other food and inhalant allergens, 71.42% of which had atopic dermatitis, 14.28% - atopic dermatitis, allergic rhinitis and bronchial asthma, 7.14% - atopic dermatitis and allergic rhinitis, 7.14% - urticaria.

In children < 2 years old age group, atopic dermatitis was the only clinical manifestation of allergic disease caused mainly by food sensitization. In preschool children of 2-5 yrs old age group AD was still predominant (77.8%) sensitization to inhalant allergens were increasing manifested by upper respiratory symptoms (allergic rhinitis) and comprised 11.1%. Urticaria encountered in 7.14%.

All the patients of 6-18 yrs age group had skin and respiratory manifestations together: AD, allergic rhinitis and bronchial asthma. These data are well reflecting atopic march in children.

6.3% of milk allergic patients were sensitized to nBos d 6 (cow's milk/meat components) and 1.2% to Livetin (Egg yolk/chicken meat component).

IgE reactivity to nBos d 8 and Gal d 1 were more prevalent among milk and egg components. nBos d 8 and Gal d 1 are resistant to heat denaturation, there is high risk of reaction to all forms of milk and egg (both raw and cooked) and patient unlikely to "outgrow" milk and egg allergy with high levels of specific IgE to casein and ovomucoid [3]. Children with severe allergic reaction must be checked attentively every six month and their dietary modifications and quality of life should be regularly assessed. In case of occasional contact with food product individual action plan against anaphylaxis should be followed, including using of epinephrine auto injector. The patients with high sensitization to Gal d1 and their parents should be warned to visit allergist before vaccination.

Conclusion: Our study revealed that most prevalent food components in Georgian investigated population were Gal d 1 (11.3%), Gal d 2 (10.1%) and Bos d 8 (10.1%). Sensitization to Bos d 8 and Gal d 1 are predictors of allergy persistence in later life and association with systemic reactions.

Most prevalent inhalant components in study population from grass pollen group were Cyn d 1 (35.4%), rPhl p1 (35.4%) and nPhl p 4 (34.1%), from tree pollen components - nCup a 1 (26.5%), nAmb a 1 (21.5%) - from weed pollen components. Main allergen component from the mold group was rAlt a 1 (10.1%) and from animal group was rFel d1 (12.6%). Among house dust mite allergen components sIgE to rDer f 2, nDer p 1 and rDer p 2 were more prevalent.

PR-10 reactivity was detected in 45%, Profilin - 43%, and LTP - 29%.

CRD food and inhalant pattern changes associated with age of children were correlating with the development of atopic march in Georgian population.

Study confirmed that ImmunoCAP Component test results are giving the broad spectrum of patient's individual allergic profile to evaluate patient's potential risk of systemic reaction, manage dietary modifications and medication, address parental anxiety with clear answers and improve patient's quality of life.

REFERENCES

1. Aalberse RC, Aalberse JA. Molecular Allergen-specific IgE Assays as a Complement to Allergen Extract-Based Sensitization Assessment. *J Allergy Clin Immunol Pract*. 2015; 3(6):863.
2. Barocci F, De Amici M, Marseglia GL. Molecular evolution in food allergy diagnosis. *Minerva Pediatr*. 2015; 6.
3. Borres MP, Ebisawa M, Eigenmann PA. Use of allergen components begins a new era in pediatric allergology. *Pediatr Allergy Immunol*. 2011; 22: 454-461.
4. Jacob D, Kattan and Julie Wang. Allergen Component Testing for Food Allergy: Ready for Prime Time? *Curr Allergy Asthma Rep*. 2013; 13(1): 58-63.
5. Lizaso MT, Garcia BE, Tabar AI, Lasa E, Echechipia S, Alvarez MJ, Anda M, Gomez B. Comparison of conventional and component-resolved diagnostics by two different methods (Advia-Centaur/Microarray-ISAC) in pollen allergy. *Ann Allergy Asthma Immunol*. 2011; 107: 35-41.
6. Schussler E, Kattan J. Allergen Component Testing in the Diagnosis of Food Allergy. *Curr Allergy Asthma Rep*. 2015; 15(9):55.
7. Shreffler WG. Microarrayed recombinant allergens for diagnostic testing. *J Allergy Clin Immunol* 2011; 127:843-849.
8. Tuano KS, Davis CM. Utility of Component-Resolved Diagnostics in Food Allergy *Curr. Allergy Asthma Rep*. 2015; 15(6):32.
9. Treudler R, Simon JC. Overview of component resolved diagnostics. *Curr Allergy Asthma Rep*. 2013; 13(1):110-7.
10. Walter Canonica et al. WAO-ARIA-GA2LEN consensus document on molecular-based allergy diagnostics. *World Allergy Organization Journal* 2013; 6:17.

SUMMARY

PATTERNS OF SENSITIZATION BY FOOD AND INHALANT COMPONENTS IN GEORGIAN PATIENTS

Lomidze N., Gotua M.

Center of Allergy and Immunology; Tbilisi State Medical University, Georgia

Molecular-based allergy (MA) diagnostics is a novel approach used to map the allergen sensitization of a patient at a molecular level, using purified natural or recombinant allergen components instead of allergen extracts. The aim of our study was to: 1) investigate sensitization patterns to food and inhalant allergen components in different age groups of Georgian allergic patients 2) evaluate patient's potential risk of systemic reaction and manage dietary modifications. 3) Study food and inhalant components in different age groups in correlation with clinical manifestations of allergic disease. Allergic patient's sera samples were tested by ImmunoCap ISAC and specific IgE levels against 112 different allergen components were detected. The study population was comprising 81 allergic patients, included 26 adults (mean age 36.2 ± 10.9) and 55 children (mean age 6.1 ± 4.58). Results revealed that nGal d 1 (11.3%), nGal d 2 (10.1%) and nBos d 8 (10.1%) were more prevalent among food components. Cyn d 1 (35.4%), nCup a 1 (26.5%), nAmb a 1 (21.5%), rAlt a 1 (10.1%), rFel d1 (12.6%), rDer f 2 (26.50%), nDer p 2 (24%) were more prevalent among inhalant components. PR-10 reactivity was detected in 45%, Profilin - 43% and LTP - 29%. CRD food and inhalant pattern changes associated with age of children were correlating with the development of atopic march in Georgian population. Sensitization to most prevalent food components (Bos d 8 and Gal d 1) are predictors of allergy persistence in later life, in case of emergency individual action plan against anaphylaxis should be fulfilled.

Keywords: food allergy, CRD, atopic dermatitis.

РЕЗЮМЕ

ОСОБЕННОСТИ СЕНСИБИЛИЗАЦИИ К ПИЩЕВЫМ И ИНГАЛЯЦИОННЫМ КОМПОНЕНТАМ У ПАЦИЕНТОВ В ГРУЗИИ

Ломидзе Н.Н., Готуа М.А.

Центр аллергии и иммунологии; Тбилисский государственный медицинский университет, Грузия

Молекулярная диагностика представляет собой новый подход в аллергологии, используемый для определения аллергической сенсibilизации пациента на молекуляр-

ном уровне с использованием очищенных компонентов натурального или рекомбинантного аллергена вместо аллергических экстрактов.

Целью данного исследования явилось: 1) определение особенностей сенсibilизации к пищевым и ингаляционным компонентам в разных возрастных группах аллергических пациентов Грузии; 2) оценка потенциального риска системных реакций и управление диетическими изменениями; 3) исследование пищевых и ингаляционных компонентов в разных возрастных группах в корреляции с клиническими проявлениями аллергических заболеваний.

Сыворотка 81 аллергического пациента, в том числе 26 взрослых (средний возраст $36,2 \pm 10,9$) и 55 детей (средний возраст $6,1 \pm 4,58$) исследованы ImmunoCAP ISAC и определены специфические уровни IgE к 112 различным аллергенным компонентам. Среди исследованных превышали специфические IgE антитела против следующих пищевых компонентов: Gal d 1 (11,3%), nGal d2 (10.1%) и Bos D 8 (10.1%), а среди ингаляционных компонентов - Cyn d 1 (35.4%), nCup a 1 (26.5%), nAmb a 1 (21.5%), rAlt a 1 (10.1%), rFel d1 (12.6%), rDer f 2 (26.50%), nDer p 2 (24%). PR-10 реактивность обнаружена в 45%, профилинов - 43%, а LTP - 29%. Особенности динамики пищевых и ингаляционных компонентов, ассоциированных с возрастом детей, коррелируют с развитием атопического марша. Сенсibilизация к Bos D 8 и Gal d 1 является прогностическим фактором дальнейшего персистирования. В чрезвычайной ситуации должен выполняться полный план индивидуального действия против анафилаксии.

რეზიუმე

კვებითი და საინჰალაციო კომპონენტების სენსიბილიზაციის თავისებურებები საქართველოს პაციენტებში

ნ. ლომიძე, მ. გოთუა

ალერგიისა და იმუნოლოგიის ცენტრი; თბილისის სახელმწიფო სამედიცინო უნივერსიტეტი, საქართველო

მოლეკულური დიაგნოსტიკა ალერგოლოგიაში წარმოადგენს ახალ მიმართულებას, რომელიც სწავლობს ალერგენის მიმართ სენსიბილიზაციის თავისებურებებს მოლეკულურ დონეზე, ნატურალური ან რეკომბინანტული კომპონენტების გამოყენებით, ნაცვლად ალერგენების ექსტრაქტებისა. კვლევის მიზანი იყო: 1) საქართველოს ალერგიული პაციენტების სხვადასხვა ასაკობრივ ჯგუფში საკვები ალერგენების კომპონენტების მიმართ სენსიბილიზაციის თავისებურებების შესწავლა; 2) პაციენტის სისტემური რეაქციის განვითარების

პოტენციური რისკის შეფასება და დიეტის ცვლილებების მართვა; 3) საკვები და საინჰალაციო ალერგენების კომპონენტების შესწავლა ალერგიული დაავადებების კლინიკურ გამოვლინებებთან კორელაციაში. ალერგიული პაციენტების სისხლის შრატში სპეციფიკური IgE 112 ალერგენის კომპონენტის მიმართ იქნა განსაზღვრული ImmunoCap ISAC-ის საშუალებით. საკვლევი პოპულაცია შედგებოდა 81 ალერგიული პაციენტისგან, მათ შორის 26 მოზრდილის (საშუალო ასაკი 36.2 ± 10.9) და 55 ბავშვისგან (საშუალო ასაკი 6.1 ± 4.58). შესწავლილი პოპულაციიდან ძირითადად შემდეგი საკვები კომპონენტები იყო გავრცელებული: Gal D1 (11.3%),

Gal D2 (10.1%), Bos d 8 (10.1%), ხოლო საინჰალაციო კომპონენტებიდან - Cyn d 1 (35.4%), nCup a 1 (26.5%), nAmb a 1 (21.5%), rAlt a 1 (10.1%), rFel d1 (12.6%), rDer f 2 (26.50%), nDer p 2 (24%). PR-10 რეაქტიულობა აღინიშნებოდა გამოკვლეულთა 45%-ში, პროფილინი - 43% და LTP - 29%-ში. ბავშვთა ასაკთან ასოცირებული საკვებისა და საინჰალაციო კომპონენტების თავისებურებების დინამიკა კორელირებდა ატოპური მარშის განვითარებასთან. სენსიბილიზაცია Bos d8 და Gal d1-ის მიმართ არის ალერგიის პერსისტირების პრედიქტორი. გადაუდებელ შემთხვევაში ანაფილაქსიის წინააღმდეგ აუვილებელია დაისახოს ინდივიდუალური სამოქმედო გეგმა.

МЕХАНИЗМЫ РЕАЛИЗАЦИИ ОСТЕОПЕНИЧЕСКОГО СИНДРОМА У ПАЦИЕНТОВ С КОМОРБИДНЫМ ТЕЧЕНИЕМ ХРОНИЧЕСКОГО ОБСТРУКТИВНОГО ЗАБОЛЕВАНИЯ ЛЕГКИХ И ХРОНИЧЕСКОГО ПАНКРЕАТИТА

Железнякова Н.М.

Харьковский национальный медицинский университет, Украина

В свете современных представлений, хроническое обструктивное заболевание легких (ХОЗЛ) рассматривается как системная патология, которая не ограничивается вовлечением в патологический процесс сугубо респираторного тракта, и именно системное воспаление приводит к формированию осложнений и поражению других жизненно важных органов и систем [6].

Согласно последней редакции Глобальной инициативы по ХОЗЛ (GOLD, 2016), ХОЗЛ определяется как «заболевание, характеризующееся персистирующим ограничением скорости воздушного потока, которое обычно прогрессирует и связано с повышенным хроническим воспалительным ответом легких на действие патогенных частиц или газов. Заболевание, которое можно предотвратить и лечить. У ряда пациентов обострения и сопутствующие заболевания могут влиять на общую тяжесть ХОЗЛ» [6], т.е. неотъемлемым признаком ХОЗЛ является постоянное прогрессирование патологического процесса, что неизменно приводит к необратимому ухудшению легочной функции, а наличие коморбидного состояния может негативно влиять на течение ХОЗЛ и усугублять патологические изменения у больных.

Многие факторы риска ХОЗЛ, которые являются факторами риска и для развития других заболеваний внутренних органов, а также наличие системных вос-

палительных изменений могут служить предрасполагающими факторами манифестации и прогрессирования сопутствующей патологии. Именно данным обстоятельством обусловлен тот факт, что при ХОЗЛ достаточно часто наблюдаются коморбидные состояния, которые могут оказывать негативное влияние на течение заболевания [6].

Довольно частым «патологическим тандемом» среди заболеваний внутренних органов выступает сочетание хронического обструктивного заболевания легких и хронического панкреатита (ХП) [2]. Данное коморбидное состояние является не только закономерным следствием значительной распространенности обеих нозологических единиц, но и результатом наличия ряда общих факторов риска, этиопатогенетических звеньев и конечных точек. Среди провоцирующих моментов в инициации обоих заболеваний доказана значительная роль курения, чрезмерного употребления алкоголя, бактериальных и вирусных инфекций, воздействия ряда токсичных веществ и факторов внешней среды [3,6].

Несмотря на тот факт, что в определении ХОЗЛ основной акцент делается на бронхолегочные проявления, в последние годы все большее внимание научной общественности привлекают экстрапульмональные манифестации ХОЗЛ, такие как дисфункция скелетной мускулатуры, сердечно-сосудистые нарушения, снижение массы тела, остеопороз, анемия и другие [6].