NEW TREND IN PREVENTION, DIAGNOSIS, TREATMENT AND MANAGEMENT OF ALLERGIC DISEASES

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ABSTRACT

Currently, it is lack of proactive in clinical practice, patients come to seek medical attention only when they have symptoms, leading to late diagnosis or the disease may progress seriously which affects their health and quality of life.

New approaches in Allergy today include primary prevention: individual genetic research, prenatal and newborn screening to detect diseases before they develop. The scientific evidence for preventing allergic diseases has been proved, such as new intervention strategies on genetics and epigenetic such as environment, diet, gut microbiota, and build up oral tolerance. Thanks to many new molecular techniques in genetics, biochemistry, hematology, molecular immunology, immunofluorescence and imaging diagnosis, allergic diseases determination has been improved.

Regarding allergic diseases treatment, in addition to symptomatic treatment and general immunosuppression, new approaches have also been used which can be mentioned as specific immunotherapy, desensitization to specific respiratory allergens, tolerance induction in treatment of food allergies, and targeted therapy with biological products.

Integrated Practice Units (IPU), a comprehensive management of allergic disease according to a patient-centered model, is a tendency of centers of excellence around the world. Furthermore, the increasing ability to connect patients with doctors and the healthcare system through information technology applications will improve the quality of life for patients as well as reduce the burden on family and society.

I. INTRODUCTION

Non-communicable diseases such as allergies tend to increase and have a great impact on the socio-economics of every country. Recently, scientists around the world have applied many new techniques at the molecular level in studying the pathogenesis in the field of allergy and immunology. Every year, clinical experts from the World, American, European, and Asia-Pacific Allergy and Immunology Societies have updated new achievements in pathogenesis, new diagnostic methods, and targeted treatment approaches for allergic diseases. In particular, the 4.0 information technology revolution has helped to spread and rapidly change new approaches in the diagnosis, treatment, and management of chronic diseases, including allergies.

Through the synthesis of the latest articles and guidelines of the Allergy Associations in the world, the Vietnam Pediatric Allergy and Immunology Association shares new information with all members with the goal of improving knowledge and clinical skills for all members, thereby helping to detect early and treat patients promptly.

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II. NEW TRENDS IN PREVENTION, DIAGNOSIS, TREATMENT AND MANAGEMENT OF ALLERGIC DISEASES

2.1. Trends in the rate of allergic diseases

The rate of allergies is increasing in both children and adults, affecting public health worldwide. In Vietnam, after decades of implementing the national expanded vaccination program, the rate of children with infectious and contagious diseases has decreased, but on the contrary, the rate of allergic diseases is increasing, for example, atopic dermatitis accounts for 20% of the population, bronchial asthma accounts for 5-10%, allergic rhinitis 20% of the population, the rate of food allergies accounts for about 2%, etc.

At the US CDC, in 2021, according to the center's statistics, up to 30% of the adult population and 20-25% of children were recorded to have respiratory allergies, atopic dermatitis, urticaria, food allergies, drug allergies, chemicals and insect venom.

The environmental pollution (climate, water sources, air, microflora, food, chemicals, etc.) plays a particularly important role in the development of allergic diseases.

2.2. Some new points in the 2023 allergy classification of the European Society of Allergy and Immunology [2]

- Previously, the list of allergic diseases was based on symptoms and damaged organs, which prolonged the time to detect drugs and treatment methods.

- The new classification is based on the pathogenesis, which speeds up the process of targeted treatment as well as personalized treatment

- Focus on the role of immune cell components, changes in tissues, the role of infection, as well as genetic and epigenetic factors, etc. All of these factors affect the protective barrier of the skin mucosa, respiratory tract and digestive tract.

- The exponential development of precise diagnostic methods including omic techniques, molecular diagnostics, imaging, genetic and epigenetic analysis, nanotechnology, etc. has greatly helped in the diagnosis and treatment of allergic diseases

- Targeted therapy based on immune mechanisms is a new highlight, biological preparations, desensitization treatment with allergens as well as strategies to modify the composition of the body's microbiome

- The new classification of allergic diseases by the European Society of Allergy and Immunology will help medical staff and patients find a way to better manage allergic diseases or possibly cure

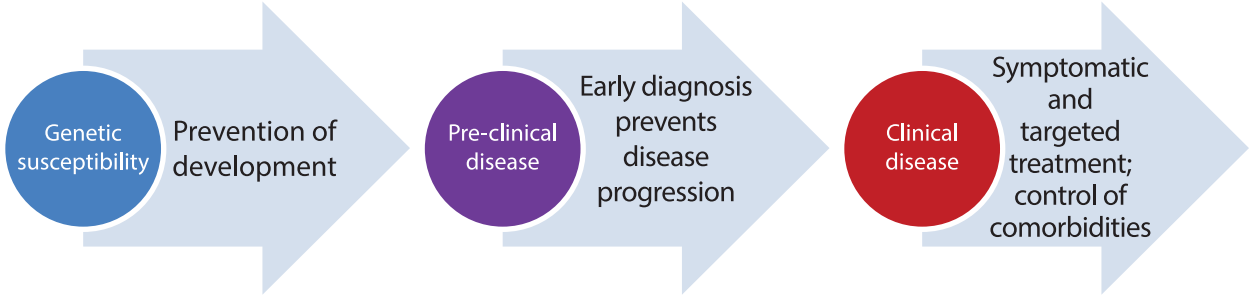
2.3. New trends in the approach to allergic diseases

New approaches to allergies today include:

- Prevention of the development of level 1 allergic diseases: Individual genetic research, prenatal and neonatal screening to detect diseases before the disease develops.

- Applying advanced techniques to help diagnose allergic diseases early to prevent the development of the disease.

- When the disease has developed, in addition to treating symptoms, targeted treatment according to the pathogenesis mechanism, it is also necessary to treat concomitant diseases to comprehensively control the patient to improve the quality of life.



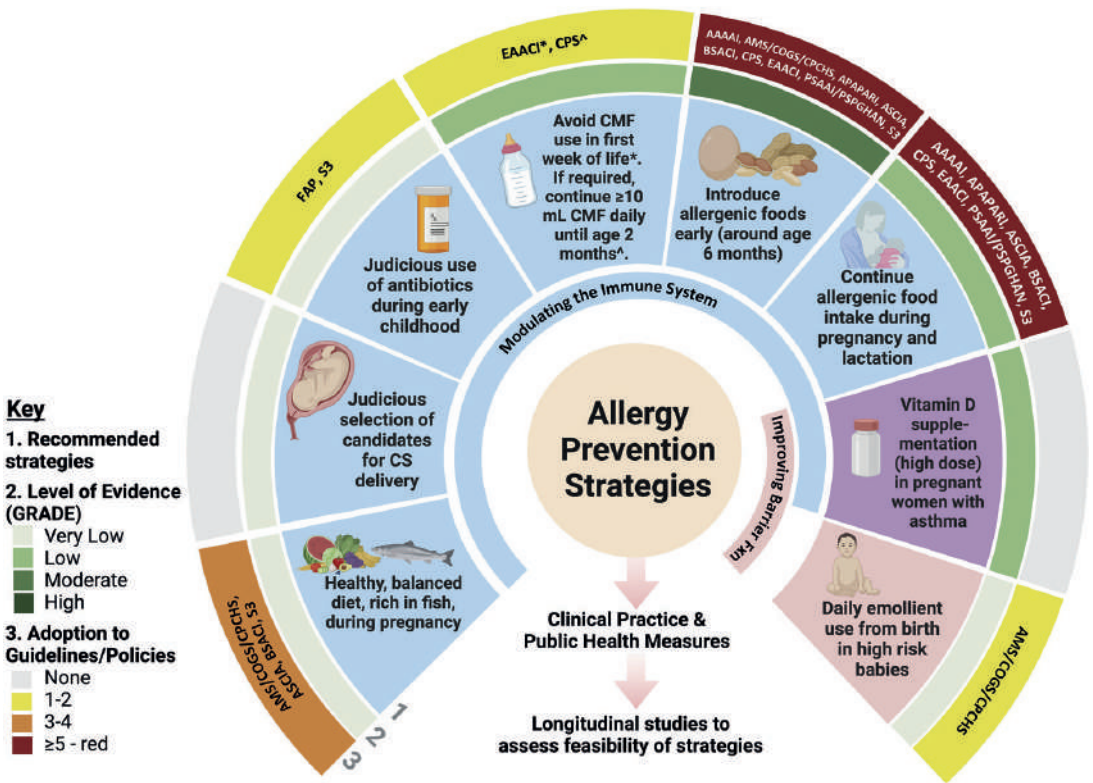
2.4. New perspectives in early prevention [1]

Global environmental change and changes in people's lifestyles are new challenges for society and in the medical field. In order to comprehensively care about current and future allergy prevention, many theories have recently been proposed about the role of microorganisms, viruses (hygiene theory, large families or daycare, internal and external microbiome) and protective mucosal barriers, diet, allergen exposure and vitamin D theory.

These hypotheses have been studied in clinical trials on allergy prevention methods during the "first thousand days of life - from the fetus to 2 years old". One of the most meaningful interventions in food allergy prevention is to change the model from avoiding allergen exposure to early exposure to allergenic foods, especially eggs and peanuts around the 6th month. These recommendations have been widely accepted worldwide and allergy prevention guidelines.

Other strategies with lower evidence for allergy prevention include: pregnant mothers need to eat a balanced and varied diet, eat more fish; do not strictly abstain from allergenic foods during pregnancy and breastfeeding; provide vitamin D, omega 3 for women with asthma during pregnancy; balance the microbiome system by limiting cesarean sections; use antibiotics appropriately for young children; breastfeed for at least the first 6 months, avoid using formula milk in the first week after birth. In case of needing to feed with cow's milk immediately after birth, continue to feed the baby at least 10 ml of cow's milk per day for 2 months of age. In addition, it is necessary to strengthen the skin barrier with daily moisturizing from birth for children at high risk of allergy.

Applying these prevention strategies in clinical and community practice is ongoing. Long-term follow-up studies in the community are important to evaluate the feasibility of allergy prevention methods.



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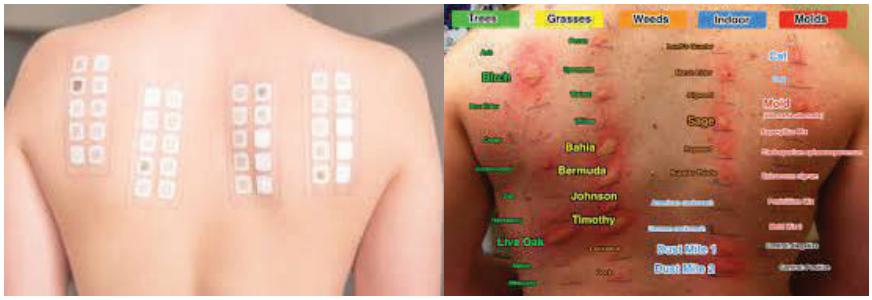
2.5. Early diagnostic approach helps prevent severe progression [3],[4]

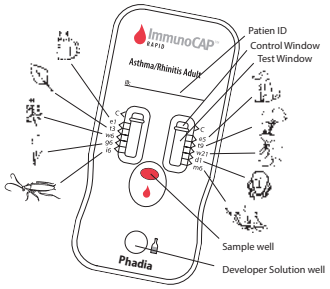
The multidisciplinary nature of medicine is recognized in the field of allergy such as basic immunology, molecular biochemistry, pharmacology, epidemiology, respiratory medicine, dermatology, otolaryngology, gastroenterology, pediatrics and even neuropsychiatry, etc.

In the new perspectives on the pathogenesis of the disease, in addition to dendritic cells, the interaction between lymphocytes, mast cells, eosinophils and neutrophils, there are also factors affecting the clinical picture of allergy such as immune status, neurological and psychological factors. In practice, we focus on common diseases such as asthma, allergic rhinoconjunctivitis, atopic dermatitis, food allergy, occupational allergy and anaphylaxis.

- Allergy tests are increasingly specialized

Today, there are many revolutionary new advances in the standardization of allergy tests that help clinicians quickly find the cause. In medical facilities, testing centers not only use traditional allergy tests such as skin tests with specific allergens, increasingly standardized allergens, but also molecular-level specific IgE tests, with wide access to multiplex assays. Molecular allergy has participated and can open up high accuracy in allergy diagnostic tests. Skin prick test and Enzyme linked immunosorbent assays (ELISA) are applied as routine diagnostic tests. Standardization of Basophil activation (BAT) method and some other biomakers in predicting the severity of allergic reactions. Challenge tests (in food allergies, drug allergies) have been applied more routinely in clinical practice safely.





2.6. What's new in allergy treatment [5],[6]

Good allergy control is based on medical history, molecular allergy testing, and assessment of phenotypic symptom expression.

Recent treatment strategies include:

- Avoidance of allergens: Very specific patient education methods

- Use of new drugs to treat symptoms: New generation antihistamines

- Desensitization treatment with specific immune allergens such as house dust mites, peanuts (Palforzia), sesame, etc. by increasingly diverse methods such as subcutaneous injection, eye drops, nasal drops, under the tongue, food trial, etc.

- Nowadays, the trend of using biological drugs (Anti-allergic biologics) in severe allergic diseases that are difficult to control with conventional methods is being applied such as Anti IgE indicated for increased IgE, severe asthma; Dupilumab, Baricitinib tested in atopic dermatitis, etc.

2.7. New model in managing allergic patients [7]

The model of developed countries building centers of excellence (multidisciplinary) to manage patients - focusing on patients, educating on prevention.

The application of information technology in the management of allergic patients has been transforming from a model in practical application in the community.

In the future: Applying artificial intelligence (AI) programs such as ChatGPT grows in many medical fields, including the field of chronic

diseases such as allergies - immunology, will help patients access faster, easier and more effectively.

III. CONCLUSION

The rate of diseases related to immune system disorders is increasing, possibly due to changes in the environment, lifestyle as well as scientific advances that have helped diagnose more diseases than before.

Applying new achievements in molecular hematology, molecular biochemistry and molecular genetics has helped to understand the pathogenesis clearly, knowing which components are affected in different diseases.

Early preventive approach prevents the development of the disease; Applying many new techniques in early diagnosis is a trend being applied in modern medical facilities. Targeted treatment according to the pathogenesis at the cellular level, molecular level and personalized treatment is a new trend in medicine today.

Management of allergic patients will follow the IPU model with patients as the center, multidisciplinary doctors will work together to treat. Applying information technology in the 4.0 era will help patients quickly access increasingly effective medical services.

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