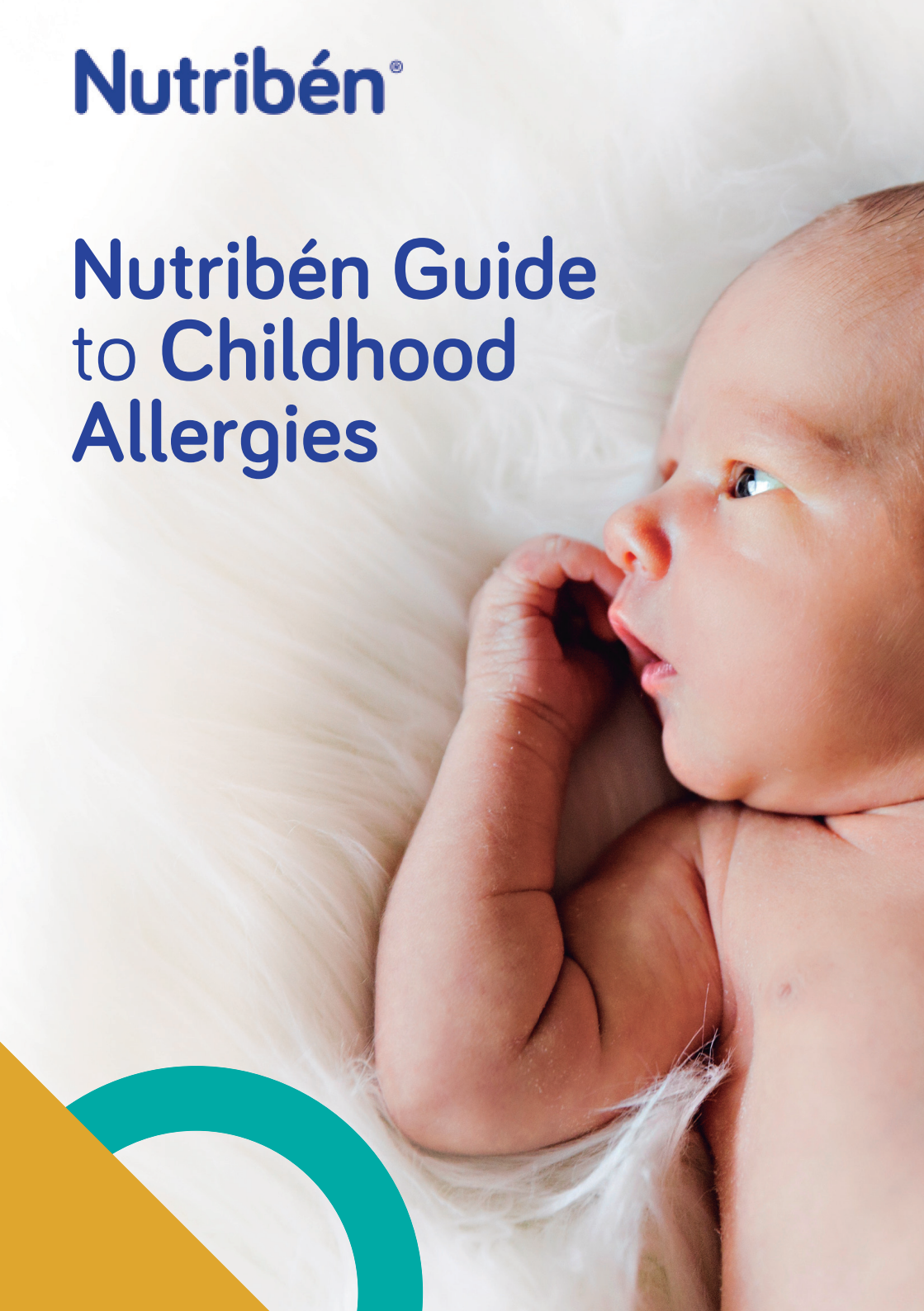
Nutribén®

Nutribén Guide to Childhood Allergies



Nutribén®

What is allergy?

Allergy is a term of Greek origin meaning altered reactivity, that the immune system expresses excessively when it identifies a substance called allergen as an element or molecule harmful to the body, but in reality, it is not.

The clinical manifestations of allergy in the child are expressed as a large group of possible symptoms produced by that abnormal hyper-immune response occurring in the allergy. Depending on the type of substance that acts as an allergen and the way of exaggerated activation of the immune system, the child will manifest symptoms of greater or lesser severity, extent and duration.

In developed and emerging countries it is one of the most common chronic diseases in the child stage.

The increase in prevalence has been related to more environmental pollution and increased temperature, determinants for higher concentrations of pollens, insects, fungi, etc..

Approximately 20% of children have some form of allergic disease.

01

Causes of allergy

The risk of suffering an allergic reaction may be determined by the presence of a high genetic predisposition to develop hypersensitivity responses to substances that are harmless to patients who lack that predisposition. On the other hand, the environmental influence is another of the determining factors that converge in the causes of allergic disease development in a child.

In the appearance of this allergic reaction, there are several stages:

Initial

Consists of sensitisation to the allergic substance in the first contact that the organism has with it.

Second

Once the substance has been erroneously recognized by the defense system as a potentially harmful element, the body will prepare to "attack" it in the successive exposures to that substance.

In general, the physiological cause of the allergy can be catalogued according to the activation pathway that is triggered in the immune system:

Allergic reaction mediated by IgE antibodies: this antibody is an immunological substance that recognizes the allergen and activates the immune system. It is the cause of most allergic reactions that start immediately after contact with the allergen (about two hours after contact).

Allergic reaction not mediated by IgE: in which other immune mechanisms are involved and in which the appearance of the symptomatology is more delayed.

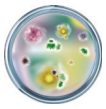
Thus, generally and according to the classification of Gell and Coombsse, they are described:

Type I hypersensitivity	reactions or immediate, produced through the activation of an IgE-type antibody. They are usually triggered rapidly, from the first few minutes to the next two hours after contact with the allergen.
Type II hypersensitivity	reactions, which produce the manifestation of symptoms several hours after exposure to the allergen, through the activation of immune system cells that produce the destruction of other blood cells, in which IgM and IgG type antibodies are involved.
Type III hypersensitivity	reactions, which appear hours after exposure to the allergic substance, as a consequence of the activation of another immune pathway that uses one of its components called complement. This produces the deposit of antigen complexes (particles derived from the allergen) and antibodies in sites such as the skin, joints, kidneys or blood vessels.
Type IV or delayed hypersensitivity	reactions, which take 2 or 3 days to cause clinical manifestations, produced by the activation of a type of immune system cell, the cytotoxic T lymphocytes. These cells originate cell damage to the skin and mucous membranes (lining of the body's cavities) through a substance called tumor necrosis factor (TNFα). Within this type of reaction, there is a subdivision differentiated by the activation of several immunological molecular processes that, in general, are the reactions produced by a drug allergy.

The substances that can be recognised as allergens by the child's body are diverse:


Pollens


Mites


Fungi


Food


Animal epitheliums


Medicines


Latex


Insect poisons (bees, wasps)


Anisakies

With regard to medicines, betalactamic antibiotics are the drugs that usually produce the most allergic manifestations in children, and after them, non-steroidal anti-inflammatory drugs. Because children usually take less medication than adults, drug allergies occur less frequently in them.

One of the allergic reactions that must be taken into account in the health field is the one that a child may manifest when medical attention is required, such as in the case of surgeries etc., since at that time allergies may appear to components such as latex (by contact with gloves, for example), or drugs such as muscle relaxants, hypnotics, morphics, anaesthetics, contrast media for radiological tests, etc. Allergic reactions may also appear in children after the administration of vaccines, due to the presence of some components (adjuvants), stabilizers, preserving agents, any molecule of the infectious agent, etc.).

One of the most frequent allergies in the first years of life is produced by food, especially milk and eggs. Allergic reactions caused by other foods such as nuts, fish, shellfish, etc. also appear in early childhood; and, in children of major age, vegetables stand out as one of the most frequent allergenic foods.

Allergy symptoms

The same type of allergen can trigger different types of symptoms depending on the type of substance, the way in which the body comes into contact with it and the mechanism of activation of the immune system that develops in the allergic reaction.

The most common forms of allergy in children and young people are:

- **Asthma**
- **Rhinitis** (common in older children)
- **Conjunctivitis**
- **Atopic dermatitis** (very common in babies)
- **Urticaria and digestive allergy.**

The chronology of the manifestation will depend on the type of hypersensitivity developed by the immune system:

They may appear after the first **15 minutes** in type I reactions and up to several days later in reactions not dependent on IgE antibodies.

Dermal symptoms may appear in detail indevices and systems:

Redness or erythema, itching, urticaria (erythematous or reddened lesions, bean or rash), raised, (evanescent and itchy); or, angioedema (swelling or edema in the skin, mucous membranes and subcutaneous tissue usually in eyelids, lips, and genitals).

It is usual for children to present intermittent chronic skin manifestations in the form of atopic eczema, with reddened lesions that may have desquamation and dryness; or, the appearance of small blisters or vesicles, which produce intense itching, especially in areas of flexures. Less frequently, contact eczema may appear on children caused by contact with metals, leathers, perfumes, colonies, etc.

Symptoms and signs of conjunctivitis are possible in the eyes, such as redness of the conjunctiva, itching, palpebral edema, constant tearing, a sensation of a foreign body, etc.

Affectation of the respiratory tract is very common and may manifest as upper respiratory symptoms with nasal congestion, runny nose (runny), sneezing, nasal and pharyngeal itching, dysphonia or hoarseness and dry cough. When the lower airways are affected, asthmatic symptoms appear such as shortness of breath or dyspnea, persistent cough, a sensation of oppression in the thorax, self-hearing of respiratory sounds (wheezing).

Symptoms such as abdominal pain, nausea, vomiting, diarrhoea, gastroesophageal reflux, as well as tongue or palate edema may be triggered in the digestive tract. Other digestive disorders may include eosinophilic esophagitis, enterocolitis, or allergic proctocolitis.

The cardiovascular system can be affected by changes such as tachycardia (increased heart rate), decreased blood pressure (hypotension) which can trigger dizziness and loss of consciousness.

The most serious clinical manifestation is anaphylaxis, a medical emergency that must be treated immediately. It is a generalized and immediate hypersensitivity reaction in which an affectation of the general state appears in the following minutes -or a few hours- after the contact with the allergic substance, altering one or several of the systems or organs of the body in a rapidly progressive way.

There is discomfort, weakness, sweating, and warmth. All the above symptoms may develop singly or in combination. In its most severe expression, anaphylaxis can manifest as an anaphylactic shock with a multiorgan failure that can cause the death of the patient.

The expression of new symptomatology, the same as that previously suffered after an allergic manifestation or with a greater affectation and severity, will depend on the symptoms presented by the child in the previous allergy episodes, the degree of exposure to the given allergen and the child's age.

Allergy diagnosis

The diagnosis of allergy is made on the basis of the clinical manifestations presented by the patient, the signs observed in the physical examination and the realization of complementary tests according to the suspicion that exists about the activation pathways of the immune system. It is essential in this clinical medical evaluation to determine the severity of the allergic condition and the risk of suffering other more serious manifestations later on.

As an alternative diagnostic test when direct contact with the allergen may represent a great risk for the child, the identification of total and/or specific IgE antibodies against the studied allergen (e.g. insect venom, food, etc.), or other components of the immune system such as specific IgG antibodies, complement, tryptase, histamine, etc. or the combination of several of these techniques can be carried out by performing a blood test.

Occasionally, as in the case of delayed reactions, provocation tests with exposure to specific allergens are required to confirm the diagnosis. This is done by causing direct contact with the allergen by administering it, depending on the type, in a controlled and progressive manner orally, conjunctivelly, nasally or bronchially.

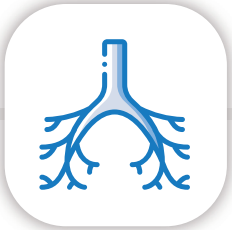
Respiratory study tests may be done when children are old enough to collaborate:

Spirometry

A test that measures lung capacity and the presence of airflow obstruction reversible or not with bronchodilators test, bronchoprovocation test, etc.

Rhinomanometry

To objectify airflow in the nose and possible resistances in the nasal airway



Or other techniques to evaluate bronchial inflammation, etc.

In addition, the detection of other analytical parameters helps to make a differential diagnosis, such as the determination of thyroid hormones, basic biochemistry, hemogram, glomerular sedimentation rate, performing serologies for viruses, parasites..., etc. Sometimes it is necessary to carry out other types of tests such as a chest x-ray, and less frequently, a biopsy for the analysis of a small portion of the tissue in the pathological anatomy laboratory, among others.

Allergy treatments

There is a wide range of drugs that can be utilised to control allergy symptoms. They are used in different combinations, administration routes (oral, intramuscular, inhalation, intravenous and to a lesser extent, topical), doses and patterns, depending on the type and seriousness of the manifestations presented by the child. All therapies and indications must always be established by a doctor, who has previously evaluated and diagnosed the child, who will establish the degree of severity of the allergy and the possibilities of worsening with new exposures to the allergen.

In this way, antihistamine drugs, powerful anti-inflammatory drugs such as corticoids, bronchodilator drugs, adrenaline in serious cases and other types of drugs that act in different ways of immune activation (chromomas such as cromoglycate or nedocromil, anti-leukotrienes such as montelukast, zafirlukast, and zileuton, or immunomodulators such as tacrolimus, or pimecrolimus, etc.) can be used.

On the other hand, there is a type of treatment that affects the cause of the allergy: these are commonly known as "allergy vaccines", which consist of gradual exposure and progressive doses at specific concentrations of the allergen substance by subcutaneous injection of purified extracts of the allergen or allergens, until the specific maintenance dose is reached. This exposure is carried out in order to provoke a gradual tolerance on the part of the immune system, which in the long term avoids an exaggerated reaction on contact with that substance. This specific desensitization is carried out for at least three years and one year after the disappearance of the symptoms.

In the case of anaphylaxis, adrenaline is the drug that should be administered to the child immediately upon diagnostic suspicion, administered by intramuscular injection in the lateral face of the thigh. There are presentations of self-injection in stable doses on the market that can be used early by the parents or caregivers of the child when guided by the doctor and on suspicion of severe cases of anaphylaxis. In addition, doctors may employ other drugs to stabilise the patient, such as bronchodilators, serums, antihistamines, corticoids, etc.

Allergy prevention

The primary prevention of allergy in patients who have not yet shown any allergic manifestations is difficult and controversial.

It is advisable to avoid certain foods when it has been determined analytically that there is previous sensitization to them.

Once the patient presents allergic symptoms and the possible cause is identified, the fundamental prevention is to limit exposure to the allergen, taking the necessary environmental and hygienic measures whenever possible. It is essential that parents and carers and all those involved in the education and care of the child (school environment, etc.), are aware of the mechanisms of action against possible allergic reactions that the child may present, as well as the elements to be avoided in each event.

In all cases, depending on the type of allergen causing the disease, it is advisable to obtain a list of utensils, food, environments, etc., where the substances to be averted can be found.

On other occasions, exposure is environmental and contact should be reduced by minimising exposure to the open air, avoiding possible areas and situations in which insects such as wasps or bees appear (swimming pools, ponds, etc.), use of sunglasses, appropriate clothing, preventing contact with domestic animals, etc.

In all these cases health education by doctors in the prevention and management of the disease to family members, caregivers and educators, as well as the child itself as it grows and matures, is a priority. In addition, it is fundamental to identify the allergy that the child presents in all areas (with identification posters, individual badges, etc.).

If there is a need for pharmacological treatment, healthcare professionals should always be informed when there is a known allergy. If it is suspected that an allergic reaction to a drug may occur, a study must be carried out to determine the diagnosis as well as to establish which pharmacological alternatives can be utilized if necessary.

Bibliography

- Martin Mateos, M.A., Fontán Domínguez, M. et al. (2013). Allergology and Clinical Immunology Protocols. Series: Protocols of the ASP. Spanish Association of Pediatrics. Spanish Society of Clinical Immunology and Pediatric Allergy.
- M. Cruz. (2013). Pediatrics manual. Ergon.
- Muñoz Calvo, B. et al. (2013). Cliniguía, diagnostic and therapeutic update. EviScience.
- Rodríguez García, J.L et al. (2011). Diagnosis and medical treatment. Marban.
- Pawankar R. et al. (2010-2011). WAO White Paper on Allergy. Executive
- Summary. World Allergy Organization.
- Garrote A., Bonet R. 2004. "Allergy and anti-allergy. Causes, types and treatment." OFFARM, Vol. 23. No. 3. p. 82-92.
- Peña Martínez, J. (1998). Immunology. Pyramid.
- Martin Square. A. M. 2016 "Food allergy in paediatric age, current concepts". Pediatric Annals. Vol. 85. No. 1. p. 1-58.
- https://www.seaic.org/profesionales/blogs/alergia-infantil.
- Dr. Ana Rivera Gómez-Arevalillo. M.E. Family and Community Medicine. Collegiate No.: 280502438

Nutribén®