

## “THE ALLERGIC CHILD”\*

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ALLERGY is a word that in recent years has come into everyday usage in the English language (everyone is allergic to something!). The magazines, newspapers, and movies have made the public allergy conscious. According to Webster's Dictionary, Allergy is defined as disagreeably sensitive; exaggerated or pathological reaction (as by sneezing, respiratory embarrassment, itching or skin rashes) to substances, situations, or physical states that are without comparable effect on the average individual. People differ as to the things to which they are sensitive. Even the same individual may be allergic one year to one thing, and a few years later to something else.

It has been said that about 60 per cent of the population has allergies, but only about 10 per cent has it severe enough to require medical attention. The allergic child inherits a susceptibility to allergic disease, but not necessarily to the same offending agents or the same pattern of disease as the parents. As a general rule, the more allergic individuals there are in a family, the more intense the allergic symptoms, and the more susceptible the offsprings. This is especially true if both the parents contribute to the allergic inheritance.

The substances capable of producing allergy are called allergens. They enter the body by various routes: 1) by being swallowed — foods, drinks, drugs; 2) by inhalation — dust, pollens, fumes; 3) by external contacts — clothes, skin, applications, environment; 4) by injection — bites, drugs, serum. In the case of the unborn child, the allergen or the antigen (that substance which is capable of producing an antibody) reaches the fetus via the placenta. When a particular allergen is absorbed by the body, the minute cells in the tissues manufacture special substances — antibodies — which interact with it. This antigen-antibody interaction results in the release of 'chemical mediators' like histamine, serotonin, leucotrienes which produce irritation in the susceptible tissues — the skin, nose, eyes, bronchial tubes, and even the internal organs. During these "interactions," a great deal of tissue damage takes place. The sensitization of the fetus by having incompatible blood antigen to its mother, and its resultant sequelae or even death, is an example par excellence of this interaction.

Fortunately other reactions are not always so disastrous.

There are many disorders which may occur in allergic children: Eczema, bronchitis, asthma, frequent upper respiratory infections, hay fever, colics, headaches, hyperactivity, bed wetting in older children, epilepsy, migraine, etc. An early diagnosis and successful treatment will depend on *the high index of suspicion*. Even with all the facilities for diagnosis available, a period of observation may be necessary. It is a general rule that the earlier a patient is treated and the younger the patient, the better is the result of allergic management. Allergies, especially in children, change as time goes on, but only a minority of children *outgrow their illness*. Most of those who are undiagnosed or untreated grow progressively worse.

The literature on the natural history of allergic rhinitis in children suggests that from 30 to 60% of children with seasonal allergic rhinitis of any degree subsequently develop asthma.<sup>1</sup> Rackemann and Edwards from Boston (1952)<sup>2</sup> studied 688 patients who had asthma in childhood. Only a few of these had been treated with immunotherapy (a specific injection treatment for allergies). After 20 years, over 50% were still suffering from asthma and other allergies. The conclusion was that the age of cure depended on how promptly allergenic substances could be found and removed, and how thoroughly the children were treated for the underlying causes.

DIAGNOSIS: In the diagnosis of any medical condition, the *history* is of utmost importance. It is of no less importance in diagnosing an allergic child. A positive family history should alert the physician even before the symptoms develop in the infant. Indeed allergy, to a great extent, is a preventable condition. It is part of the defense mechanism of the body. If the system is challenged too often or too strongly, it reacts in such a way as to harm the body. The expectant mother can be warned that her indulgence in certain allergenic foods can and does sensitize the unborn child. Breast feeding has been shown to prevent the development of allergies to cow's milk (cow's milk is for the calf!). Sometimes the history of allergies may be found in the grandparents, and not necessarily in the parents — the allergy, like many inheritable conditions, can skip a generation. There may also be

history of early introduction of solids in the baby's diet; history of intestinal colics, and hyper-irritability. The new born may have been given several different formulas, because 'nothing seems to suit the infant'.

Next comes the "Physical Examination." As mentioned above, the infants with cow's milk allergy are very cranky, they fail to thrive, develop skin rashes, and cause a lot of unhappiness among the young parents. Usually, the target organs in the allergic process are the upper respiratory organs. These babies have constant nasal obstruction which hinders sucking. The infant tires easily during the feeding and may be suspected of having serious cardiac or respiratory problems. The older child is found to have dark circles under the eyes, 'the allergic shiners.' These are due to the impedance of blood flow from the periphery to the midline. With a gaping habitus, the child is often labelled as stupid, or not as bright as other siblings. The child appears tired and lethargic, due to lack of proper sleep caused by nasal obstruction.

The allergic child also develops certain facial mannerisms: mouth and nose-wrinkling (rabbit-nose), constant rubbing of the nose to relieve the itching, and the 'allergic salute'. During the last mentioned maneuver, the child pushes the tip of the nose upwards and backwards with the palm of the hand in an effort to increase the flow of air through partially obstructed nostrils. When this habit persists for a long time (1 to 2 years), it produces a permanent transverse nasal crease. The internal examination of the nose will reveal swollen and pale or cyanotic nasal turbinates, with excess mucus on them. There is also nasal and post-nasal discharge, bouts of sneezing, and nose bleeds. The allergic child snores and snorts a lot. The sore throats may be from constant post nasal discharge.

The allergic shiners are seen in both sexes and in children of all races. Frequently, there are 'bags' under the eyes, due to edema formation and from spasm of the unstriated muscle of Muller. Orofacial dental deformities are very common in allergic children.

Some degree of conjunctivitis almost always accompanies nasal allergy. Occasionally, the conjunctivae may be involved specifically, like the 'pink eye' of spring catarrh or grass pollen allergy. The lesion is usually bilateral, but may be unilateral. Other forms of eye involvement are vernal conjunctivitis and blepharitis. Extra skin folds under the lower eyelids — Dennie's sign — are also commonly seen in allergic children. The paranasal sinuses and the middle-ear cavities are secondarily involved in the children with chronic nasal obstruction. There may be frank sinusitis, recurrent otitis media or evidence of fluid behind the ear drums (serious otitis media or the 'glue ears'). The middle ears are usually affected because of the obstruction in the Eustachian tubes. There is increasing loss of hearing and if the treatment is

delayed, there is permanent deafness. The child may be labelled as disobedient, as the response to the commands is delayed or completely ignored. Audiometry will confirm a conductive hearing loss.

Atopic dermatitis or eczema is the most common skin condition seen in infants. Its exfoliative and pruritic nature, involving the cheeks, trunk and limbs, is characteristic. It can be a severe and protracted condition causing a lot of distress in the infant and to the parents. It was first described in Europe by Besnier in 1885 as prurigo. In 1934 Coca in United States used the term atopic dermatitis to describe this condition. Male infants are affected more often than the females. The condition improves by 2 years of age only to recur in a certain percentage of children in later life. Other system involvement generally takes place. "Eczema-asthma" syndrome is a well known entity.

The most common etiology of infantile eczema is cow's milk allergy, which is described as 0.3%<sup>3</sup>,<sup>4</sup> to as high as 38%.<sup>5</sup> High levels of IgE are found in the blood of children with eczema. The most common complication of atopic dermatitis is secondary bacterial infection of the skin. Eczema vaccinatum used to be a dreaded and often fatal complication in the days of compulsory vaccination. Cataract formation during the third decade of life is more frequent in patients with atopic dermatitis than in the general population.

The lesions of urticaria or hives are easily recognizable. The following is a list of the causes of urticaria.<sup>6</sup>

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|----------------------|--|
| 1. Infections:       | Bacterial (focal & chronic)<br>Fungal (monilia & trichophyton) |
| 2. Infestations      | Helminth, protozoa, scabies.                                   |
| 3. Drugs & Chemicals | Medicinal, non-medical, processed foods.                       |
| 4. Foods             | Common & exotic.   |
| 5. Contactants       | Household, industrials, animal saliva.                         |
| 6. Osmylogens        | Odors — good & bad.  |
| 7. Inhalants         | Pollens, animal danders.                                       |
| 8. Insect bites      | Hymenoptera, mosquito, deer fly.                               |
| 9. Endocrine         | Hormones — "the pill", menstruation.                           |
| 10. Psychogenic      | Stress, anger, frustration.                                    |
| 11. Physical         | Pressure, light, heat, cold.                                   |
| 12. Systemic         | Connective disease diseases.                                   |
| 13. Idiopathic       | Cause not yet determined.                                      |

According to Arbeiter<sup>7</sup>, transient hives or urticaria are the most common manifestations of food allergy in the young child. Food hypersensitivity is rarely a static, permanent condition. We, therefore, carry out periodic re-evaluation of food sensitive patients. Not unlike Feingold's observations<sup>8</sup>, many of our patients were found to react to canned and preserved foods. We

firmly believe that the chemicals and preservatives play an important role in causing allergic reactions. The same chemicals, particularly the food dyes have now been shown to cause hyperactivity in children.

Other signs which are usually associated with food allergies are 'geographic tongue', and aphthous ulcers.

The most significant and serious complication of allergy in childhood is the development of asthma. It is still a potentially fatal condition, and requires all the care and expertise in management. Even in the early years, the child with upper respiratory allergy may show chest deformities in the form of pectus excavatum, and pigeon-breast deformity. Later on the child may show barrel shaped deformity and hyperinflation. The wheezing may be triggered by exercise, infection, pollens, dust, animal danders, molds, emotional stresses, etc. Many of these children present with attacks of bronchiolitis or croups in early infancy. Later on they show rounded shoulders, poor air entry in the lungs, prolonged expirations and expiratory wheezes. Their exercise tolerance is low, and they tend to avoid strenuous exercise and competitive sports. Eventually, these children become withdrawn and introspective. They regard themselves *different* from other children, and they are treated differently. With repeated hospitalizations and strict regimen of medications, their physical and mental development suffers. They can later produce wheezing at will, and manipulate their parents into submission to their demands. A great deal of time, money and effort are used up in looking after these unfortunate children. In many instances this scenario can be prevented if early detection and proper management is carried out. It is a useful axiom to remember that the asthma in childhood is always due to allergies ('extrinsic'), unless proven otherwise.

**INVESTIGATIONS:** The laboratory investigations are used to confirm what has already been suspected by the history and physical examination. The increased levels of serum IgE in the allergic child has already been mentioned. However, this high level may not be detected until some years after birth. The total and differential eosinophil counts are increased both in the blood, and in the nasal secretions. A positive stool test for ova and parasites will demonstrate another cause for high eosinophil counts. Positive findings in the radiological examinations of the para-nasal sinuses and chest will confirm if these organs are also involved.

The allergy skin tests are useful in detecting the specific allergens causing the sensitivity. To be meaningful, these positive reactions should correlate with a positive clinical history. The skin tests, however, are less useful in diagnosing food allergies. In food sensitive patients, elimination of suspected items of foods from the diet for several days, and re-challenging with subsequent production of symptoms

on more than one occasion is more definitive. In very small children, especially those with extensive eczema, in-vitro test for the detection of antibody, radio-allergosorbent test (RAST) can be successfully used. P-K test can be used in some cases.

Other provocation tests are nasal and bronchial, for the inhalant allergens. Records of pulmonary function studies should be kept periodically in children with bronchial involvement.

Persistent wheezing in a child can be due to other causes besides asthma. In a toddler, the possibility of a foreign body (e.g. peanut) in the airways should always be kept in mind. Similarly, sweat chloride estimation and soft tissue roentgenogram of the neck may be required in certain patients.

**MANAGEMENT:** There are three basic methods of treating allergy. First, the removal of the allergen(s); second, an attempt to build up the child's resistance to specific allergens by immunotherapy (hyposensitization); and thirdly, symptomatic therapy.

The elimination of the offending allergens from the child's environment is the method of treatment that is to be preferred. This method is attempted in many ways. If the allergen is animal hair, the offending animal is removed from the house. If it is a food, the food is restricted or eliminated. If it is housedust, an attempt is made to dust-proof the sleeping area and as much of the rest of the house as possible. In such cases the amount of relief from symptoms is directly proportionate to the thoroughness with which the allergens are eliminated.

The second method, which is referred to as hyposensitization by injection, is necessary when the offending allergen(s) cannot be eliminated. This type of treatment is utilized when the sensitivity is to airborne seasonal pollen grains, mold spores and dust. The clinical improvement after adequate hyposensitization is accompanied by three distinct immunologic changes.<sup>9</sup>

1. Production of blocking antibody.
2. Decrease in histamine release.
3. Decrease in the production of specific IgE.

The subject of hyposensitization therapy in allergic disease has been reviewed previously.<sup>10</sup>

Immunotherapy alone may not give optimum benefit to the allergic child unless attention is paid to other measures like general health, environmental control, dietetic regulations and proper use of symptomatic therapy in the initial and acute phase of the disease.

The availability of Cromolyn sodium (INTALR), as a prophylactic drug in the management of allergic diseases<sup>11-15</sup> has helped many allergic children by eliminating the need for other drugs which may have serious side effects. However, whilst prescribing any

medications, full therapeutic dosages should be utilized. Drug combinations should be avoided. The aspirin and penicillin sensitivities are real hazards in allergic individuals, and this fact should be kept in mind.

Corticosteroids are very useful in the treatment of asthma and other allergies. Their indiscriminate use is to be criticized, because of their potential serious side effects. On the other hand, failure to use them when indicated may result in unwarranted morbidity and mortality. The delivery of the corticosteroid medications by intranasal and bronchial routes has reduced some of their side effects. In life-threatening asthma, corticosteroids are essential, but because of their delayed onset of action they cannot replace other necessary emergency measures including epinephrine, aminophylline, patent airway, oxygen and hydration.

The use of vasoconstrictive nasal drops should be avoided in children. Their effect at best is transitory, and their prolonged use damages the delicate mucociliary nasal lining. The itching of atopic dermatitis and urticaria can be helped by judicious use of hydroxyzine, diphenhydramine or cyproheptadine.

Every method of treatment is aimed at producing an

allergic equilibrium or balance. Avoidance or immunotherapy produces this balance, but other factors play a part in disturbing the equilibrium by adding additional burdens which will allow an allergic attack to develop. The most common contributors to such a destruction of balance are infections (the common cold), fatigue, emotional excitement, family discord, over exertion, dramatic changes in temperature and humidity. These factors must always be taken into consideration.

Most of the scientific knowledge about allergic diseases has been gathered since the isolation of sensitizing antibody (immunoglobulin) IgE less than 15 years ago.<sup>16,17</sup> This means that there is room for a great deal of research and investigation in this field. Accurate data about the prevalence of allergic diseases in different countries are scarce. The public, especially the parents of allergic children, have a great deal of information about allergic diseases, but we need better teaching of this subject in our medical schools and in post-graduate programs. The clinical allergist and pediatrician need the help and cooperation of immunologists and other scientists working in the laboratories, to provide optimum care to the allergic children.

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