

ALLERGY IN CHILDHOOD: ITS PATTERN, CONTROL AND SIGNIFICANCE IN ADULT PROPHYLAXIS*

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A study of the clinical history of the middle-aged sufferer from bronchial asthma reveals either that his symptoms commenced in later life or that allergic manifestations, including nasal allergy, eczema, urticaria or asthma itself, were already present in infancy or early childhood and continued into adult life directly or after some years of freedom. These two types are significant in that the latter—referred to as the 'extrinsic' type—is, in general, aetiologically associated with allergic sensitivity to extraneous factors such as pollens, dusts, animal danders, feathers, foodstuffs, etc., which can, as a rule, be sought out and controlled. In the type where symptoms commence in adult life the pattern of causation is much more complex; physical, endocrine and psychological agencies must, in addition, be invoked for its unravelling. It is indeed a question whether this so-called 'intrinsic' asthma has a true allergic basis in the sense that symptoms result from specific antigen-antibody reactions. One of the difficulties in the clinical differentiation of these two varieties of asthma is that patients generally and physicians often do not realize that the symptoms in early life were in fact manifestations of allergy and, unless the sufferer is specifically questioned on the point, information about childhood allergy will not become available.

The purpose of this study is to draw attention to the advisability of controlling the allergic state in early youth in order to prevent the occurrence of similar or more serious symptoms in the patient's adult life. There is evidence that such precautionary measures are likely to be of benefit. In the 'extrinsic' form of respiratory allergy symptoms will develop when the specific allergens are encountered. When these are looked for, found and controlled, or the patient is desensitized against them, it is reasonable to believe that there will be a subsequent diminution of symptoms or even freedom from them. The knowledge acquired regarding his sensitivities will place the patient in a position to guard against the responsible allergens. Hurst,¹ an asthma sufferer himself and deeply versed in childhood asthma, was satisfied that the more completely attacks were prevented by removing all known and exciting causes the less irritable would the bronchial system become.

It is true that some child sufferers from allergic con-

ditions appear to 'outgrow' their symptoms. Indeed Rackemann and Edwards² in a follow-up study of 449 children who had developed asthma before the age of 13 years found that 30% outgrew their symptoms at the average age of 15 years. The reasons probably lie in changed circumstances of physiological or psychological living involving diminished contact with specific allergens, dietary modifications and improved domestic circumstances or relationships. But reliance upon 'growing out of it' in a particular case is unwarranted, for in the majority of instances this does not occur and the hope does not justify withholding the necessary allergic investigation and control from an allergic child.

FORMS OF CHILDHOOD ALLERGY

The allergic conditions of childhood are similar to those in the adult and, in the main, referable to the upper and lower respiratory tract, the skin and the gastro-intestinal tract. As the control of childhood allergy depends primarily upon its recognition, a brief review of its manifestations follows:

Respiratory Allergy

Respiratory allergy in the child is obvious when bronchial asthma or vasomotor rhinitis occurs. But even the diagnosis of bronchial asthma in infants may not be easy, for it is not always marked by typical wheezing and prolonged expiration but may be manifested by noisy breathing and moderate dyspnoea.

The upper respiratory allergic symptoms in childhood include sneezing, nasal congestion, rhinorrhoea and post-nasal drip. More commonly they are much milder and appear as sniffing, coughing or 'colds'. The parents as well as the patient become so accustomed to these gradually-developing minor symptoms that medical advice may not be sought. When, however, the persistence of these symptoms does eventually lead to medical attention, it all too frequently happens that their allergic significance is not appreciated.

Repeated attacks of 'bronchitis' may similarly pass without medical recognition of their allergic origin and the condition is treated on an infective basis. A typical letter from a physician reads: ' . . . For the past 2 years Albert, aged 5 years, has suffered from attacks of asthma. These attacks nearly always follow a mild upper respiratory infection. The attacks are relieved by an injection of adrenalin. On a few

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occasions he has had bronchitis in addition and has been treated with penicillin . . . The 'mild upper respiratory infections' and 'bronchitis' were doubtless allergic manifestations. It can be taken as almost axiomatic that persistent or recurrent upper or lower respiratory conditions in infants and children, however mild, are, in the absence of some definite explanation on an organic basis, of allergic origin. The finding of eosinophiles in the nasal or bronchial secretions or in the blood, as well as history of allergy in the parents or their relatives, would lend support to such a diagnosis.

The essential differences between allergic and infective respiratory conditions must be emphasized. In allergic conditions the attacks are usually recurrent and between bouts the symptoms may be mild or absent, in contrast to the single attack of an infection where, in addition, constitutional disturbances are present and may be marked. In nasal allergy the mucous membrane is oedematous and pale, with a watery discharge showing eosinophiles, while nasal infection is characterized by a hyperaemic mucous membrane with a purulent discharge. It must be remembered that this allergic picture is less clear-cut when infection is superimposed. The allergic 'cold' is of course not contagious, and the child will probably have an allergic family background. The respiratory symptoms in allergy can usually be controlled by an anti-histamine preparation, which will not help in a bacterial infection.

The question of 'infective asthma' often arises and in some cases, especially in adults, an attack of asthma may be precipitated by a true infection in the respiratory tract, as indeed it may be precipitated by any form of physiological or psychological trauma.

Eczema

It is equally important to remember that eczema in infants and children is commonly an allergic manifestation, and so also is urticaria. If this fact is recognized then treatment of childhood eczema will commence early with proper allergic investigation and appropriate therapy. But, more important, eczema is frequently a forerunner of respiratory allergy. This is now well-established and the pattern of 'eczema-rhinitis-asthma' from infancy onwards should be familiar to all. The warning should be heeded. It is true that not every child with respiratory allergy has an associated eczema, but the correlation is a close one. Confirmation of this was obtained in a study of 495 children in the 0-20 years age-group in South Africa suffering from respiratory allergy. There was an incidence of 57.1% of eczema (and urticaria) in this group.

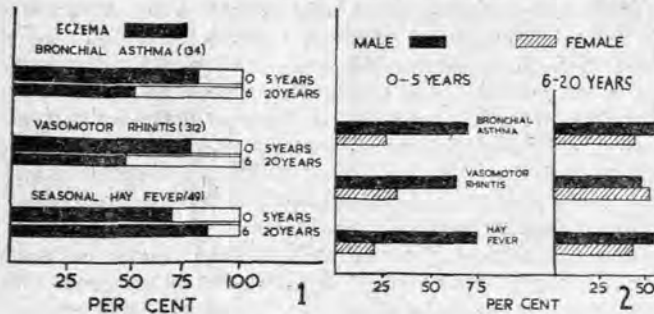


Fig. 1. Analysis of the incidence of Eczema (and urticaria) in 495 cases of respiratory allergy in the 0-20 year age-group.
 Fig. 2. Analysis of the Sex Distribution in 936 cases of respiratory allergy in the 0-20 year age group.

An analysis of the incidence of eczema in the different forms of respiratory allergy is shown in Fig. 1.

Every effort should be made to find the causative factors of either eczema or urticaria, for its control may well be a factor in the prevention of respiratory symptoms later. Purdy³ found in a long-term study of prognosis in infantile eczema that between one-third and one-half of 93 cases had sequelae sufficient to encumber them for at least their first 15-20 years of life, with asthma as the leading sequel. Ratner *et al.*⁴ discussing this allergic dermal-respiratory syndrome in 750 cases of allergy in children, stated that 59% of those who had suffered from allergic eczema at one time later developed respiratory allergy. They urged that every case of dermal allergy should be regarded as a potential case of asthma or hay fever.

Gastro-intestinal Allergy

The numerous causes of gastro-intestinal difficulties in young infants will not be discussed here; but if no obvious infection or other definite cause is found then the question of an allergic basis for the condition should be borne in mind. Vomiting, diarrhoea and abdominal pain may occur shortly after the infant has been weaned. Suspicion then naturally falls on one or other of the freshly-introduced foods, especially cow's milk. Clein⁵ found the following conditions in the study of 140 infants all allergic to cow's milk: Colic 29%, diarrhoea 24%, mucus in stools 6%, blood in stools 5%, chronic constipation 5%, anorexia with refusal of milk 4%.

RESPIRATORY ALLERGY IN SOUTH AFRICAN CHILDREN

A study has been made of more than 900 infants, children and young persons in the 0-20 year age-group in South Africa

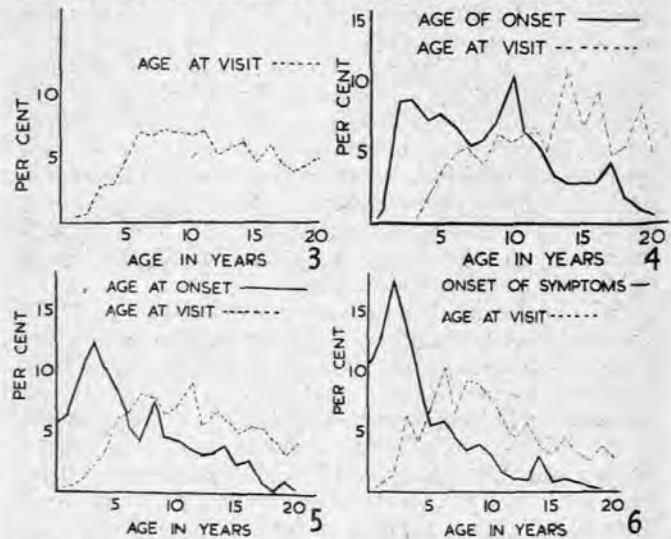


Fig. 3. Respiratory allergy—all forms (939 cases) in the 0-20 year age-group. The ages at which visits were made for allergic investigation are shown in percentages.

Fig. 4. Seasonal hay fever (210 cases) in the 0-20 year age-group. The age of onset of symptoms and the age at which visits were made for allergic investigation are shown in percentages.

Fig. 5. Vasomotor rhinitis (447 cases) in the 0-20 year age-group. Age of onset of symptoms and age at which visits were made for allergic investigation are shown in percentages.

Fig. 6. Bronchial asthma (270 cases) in the 0-20 year age-group. Age of onset of symptoms and age at which visits were made for allergic investigation are shown in percentages.

suffering from some form of respiratory allergy. These patients were in the main referred to the Allergy Department of the Institute for skin testing. For purposes of analysis the patients have been classified into 2 age-groups, viz. (a) 0-5 years and (b) 6-20 years, and the condition of 'respiratory allergy' into (a) *seasonal hay fever (pollinosis)*, (b) *vasomotor rhinitis (nasal and paranasal allergy)*, and (c) *bronchial asthma*. It will be seen from Fig. 3 that the great majority of these young patients was brought for allergic study from the age of 5 years onwards, more especially in the 6-11 year period.

The *sex distribution* of respiratory allergy in the children is shown in Fig. 2. It strikingly confirms findings elsewhere that the incidence of respiratory allergy in boys of the 0-5 year age-group is 2-3 times that in girls. After the age of 5 years the incidence is approximately the same in both sexes.

The *age of onset* of symptoms of respiratory allergy is shown graphically in Fig. 4 (seasonal hay fever), Fig. 5 (vasomotor rhinitis) and Fig. 6 (bronchial asthma.)

Hay Fever. It will be observed from Fig. 4 that the earliest onset of symptoms of hay fever was at 2 years of age and by the age of 12 years 80% of the patients had already developed symptoms. Most of these children were not brought for study until they were 5 years old. It is possible that with proper allergic handling before that age subsequent symptoms might have been prevented.

Vasomotor Rhinitis. A study of Fig. 5 reveals that symptoms of vasomotor rhinitis commenced before the age of 1 year, but the commonest age of onset was in the 2nd to the 4th year of life. By the age of 5 years, 53.1% of the children had already developed symptoms. Allergic study, however, was not commenced in the majority of the cases until the 5th year.

Bronchial Asthma. It will be seen in Fig. 6 that bronchial asthma, like vasomotor rhinitis, became manifest before the age of 1 year and that asthma had already developed in 64.4% of the children by the time they were 4 years old. It is interesting, however, to note that there was a sharp drop in the onset of asthma from the age of 5 years. This group of children was brought for allergic study mainly when 3-11 years old.

THE CONTROL OF CHILDHOOD ALLERGY

The responsibility of the physician to his allergic child patients is a considerable one, not only in the alleviation of immediate symptoms but also in the attempt at prophylaxis against future and possibly more severe symptoms. Every clinical means available should be used to keep an allergic child free from symptoms, especially asthma, for as long a time as possible. The longer he remains free the greater will be his chance of escaping allergic episodes in the future.

As the newborn infant from an allergic family, more especially if there is double parental heritage, is likely to carry with him the allergic tendency, it has been suggested that the prevention of allergic symptoms might commence with the foetus. There is evidence that allergens in the mother's circulation may traverse the placenta and sensitize the child *in utero*. This possibility is not unequivocally established; the occurrence of food allergy has been reported in only one of identical twins. Nevertheless it may be a wise precaution to limit the pregnant mother's intake of highly allergenic foods

such as milk and eggs which will later form an important part of the growing infant's diet.

Foodstuffs are the commonest cause of allergic symptoms in infancy and early childhood. The diet at that time consists largely of a few simple foods and the opportunities for the detection of the causative agents are greater than in the adult. Milk, eggs and cereals as well as fruit and vegetables may prove to be the responsible agents. The physician should ascertain by trial diets which particular food or foods should be eliminated in order to control the symptoms. When it is suspected because of a significant family history that the infant is likely to be allergic it is advisable to introduce new foods into the dietary gradually and in small quantities and to note any reactions. Even simple rejection of a food by a child should be treated with respect. Persistence in coaxing babies or physical or moral persuasion in children to take the food is inadvisable and substitute foods should be provided. Mothers often disguise milk by flavour or colour to induce the child to drink it, with undesirable results in cases of hypersensitivity.

Many of the allergic disturbances in the newborn are due to cow's milk. Grulee and Sanford⁸ have reported that infants fed exclusively with cow's milk develop eczema 7 times more frequently than the exclusively breast-fed. Breast-feeding continued for as long as possible may thus be a prophylactic measure against allergic manifestations later.

If cow's milk is found to be responsible for symptoms it should be removed from the diet until subsequent trials reveal that it is tolerated. The difficulty in milk allergy is often overcome by feeding with evaporated or heated cows milk, when the specific allergenic albumin is denatured. Glaser^{7,9} has shown that soya-bean milk or strained meat soups constitute effective substitutes for cows milk. He postulates a period of a few months of physiological and immunological immaturity in the newborn child when food sensitivities are much more common than in later years. The suggestion is also made that egg should be withheld for at least a year in children with an inherited allergic tendency.

Inhalants play a lesser aetiological role in young infants, but they assume a much greater significance in the older child. Skin testing may have to be carried out to confirm clinical suspicions of allergic sensitivity to pollens, animals or feathers. Children may be affected also by the handling of hairy or furry toys. Sensitivity to house dust may occur as well as to the inhalation of mould spores in damp houses or in coir or other mattresses.

The appropriate measures should of course be taken to avoid the responsible inhalant substance or to be desensitized against it.

Randolph⁹ suggested that in children allergic sensitivity may be a causative factor of fatigue, irritability and behaviour problems. Speer¹⁰ has more recently stated that there may be little other evidence of allergy in children than such forms of what he called 'allergic tension' and 'allergic fatigue'. Allergic tension is manifested as a general hyper-irritability, the patient being nervous or highly-strung, with difficulty in adjustment and given to tears and tantrums. In contrast allergic fatigue is shown in listlessness, sluggishness and tiredness. He finds that food sensitivity is important in these types of cases especially to milk, chocolate, egg, and wheat. He rightly, however, stresses the importance of thorough

preliminary differential diagnosis before an allergic basis is assigned to these conditions.

It not infrequently happens that the administration of vaccine or other immunizing antigen or therapeutic serum precipitates respiratory allergy, especially asthma, in children. It is thus of considerable importance to submit children to the usual immunizing agents as soon as possible, preferably before the age of 1 year.

The great importance of psychological influences in both adult and child allergic conditions is well known and needs no emphasis here. It is, however, often overlooked. Emotional disturbances are all too frequently precipitating factors in respiratory and other allergies and should be corrected whenever possible.

The question of removing children with severe or intractable asthma from their homes to boarding schools or special institutions has frequently been considered and in some countries it has proved a success. Separation from home has often been effective in completely controlling asthma, and in most cases definite improvement has resulted. In institutions the precipitating factors can be more easily observed and domestic emotional complexities avoided.

Ordman¹¹ has shown that there is a group of sufferers from respiratory allergy in South Africa who maintain good allergic health inland but who develop more or less severe vasomotor rhinitis or bronchial asthma at the coast, more especially on the eastern shores of the Union. A study of these cases reveals that symptoms may be aggravated or actually initiated when living at the coast or during a vacation visit there. In these patients pollens, atmospheric moulds and other exogenous allergens were not found to be aetiologically responsible. There is evidence, however, that the precipitation of symptoms at the coast is due to climate factors, more especially the combination of high temperature and high relative humidity in the characteristically narrow diurnal and annual range of each; i.e. continuous warm, damp weather. The high temperature-humidity climate of the coast probably promotes the growth and development of air-borne bacteria and fungi which in turn act upon the local house dust, rendering it more highly allergenic.¹²

There are many children born at the coast or brought there on holiday who fall into this 'climate group' of respiratory allergy. These children suffering from nasal allergy or bronchial asthma lose their symptoms or are greatly improved when taken away from the coast to regions, not necessarily far from the sea, with an inland climate pattern characterized by a wide diurnal and annual range of temperature and relative humidity. Indeed there are schools inland where most of the pupils come from coastal areas in which they have never enjoyed a symptom-free life.

In the therapeutic handling of these children it may be wise, even imperative, to recommend their removal inland. Such advice, which may involve profound domestic disturbance socially and occupationally, would obviously be given only after the deepest consideration following thorough clinical and laboratory studies and psychological investigation to ensure that the child does, in fact, belong to the 'climate group' of allergic patients.

Because of the high allergenicity of coastal house-dust, investigations¹² have been carried out to determine whether desensitization with its extract would be effective. So far,

in a number of patients the results have been successful and this approach appears to be a reasonable and promising one. In view of this it is suggested that 'climate group' child sufferers be given the benefit of coastal house-dust desensitization before more drastic steps are taken.

SUMMARY

1. The manifestations of childhood allergy—respiratory, dermal and gastro-intestinal—are briefly reviewed.

2. An analysis is presented of more than 900 allergic children in South Africa in the 0-20 year age-group:

(a) The great majority were brought for allergic investigation from the age of 5 years.

(b) The incidence of respiratory allergy in boys is 2-3 times that in girls in the 0-5 year age-group but thereafter the incidence is approximately the same in both sexes.

(c) The age of onset of *seasonal hay fever* is generally at 2 years and by the age of 12 years symptoms have already been established in more than 80% of the patients.

(d) In *vasomotor rhinitis*, symptoms commence before the age of 1 year and mostly at 2-4 years. More than 50% of the children have already developed symptoms by the 5th year.

(e) In *bronchial asthma* symptoms begin largely before the age of 1 year and more than 60% developed symptoms by the age of 4 years. Onset of symptoms however dropped sharply from the age of 5 years.

(f) *Eczema* (and *urticaria*) was present in nearly 60% of children in the 0-20 year age-group suffering from respiratory allergy.

3. Attention is drawn to the desirability of controlling allergic symptoms in children not only to relieve present suffering but also to prevent the occurrence of possibly more serious symptoms in adult life.

4. The control of childhood allergy is discussed with special reference to the search for and elimination of allergenic foodstuffs, the avoidance of inhalant allergens or specific desensitization against them and the importance of psychological influences.

5. An account is given of children in South Africa in the 'climate group' of respiratory allergy where the symptoms are initiated or aggravated at the coast. The climate factors—high temperature and high relative humidity—are suggested as responsible for the highly allergenic coastal house dust. The handling of these children is discussed and the question of desensitization with coastal house-dust extract is considered.

REFERENCES

- Hurst, A. (1943): *Brit. Med. J.*, **1**, 403.
- Rackemann, F. M. and Edwards, M. C. (1952): *New Engl. J. Med.*, **246**, 815.
- Purdy, M. J. (1953): *Brit. Med. J.*, **1**, 1366.
- Ratner, B., Collin-Williams, C. and Untracht, S. (1951): *Amer. J. Dis. Child.*, **82**, 666.
- Clein, N. W. (1951): *Ann. Allergy*, **9**, 195.
- Grulee, C. G. and Sandford, H. N. (1936): *J. Pediat.*, **9**, 223.
- Glaser, J. and Johnstone, D. E. (1952): *Ann. Allergy*, **10**, 433.
- Glaser, J. (1953): *J. Pediat.*, **42**, 734.
- Randolph, T. G. (1947): *Ibid.*, **31**, 560.
- Speer, F. (1954): *Ann. Allergy*, **12**, 168.
- Ordman, D. (1955): *S. Afr. Med. J.*, **29**, 173.
- Idem* (1956): *Int. Arch. Allergy*, **9**, 129.