

# Allergic disorders of childhood

A guide to diagnosis and management

— E G Weinberg



**E G Weinberg, MB ChB, FCP(SA)**  
Allergy Clinic  
Red Cross Hospital  
Klipfontein Rd  
Rondebosch 7700

## Curriculum vitae

Dr Eugene Weinberg is Senior Specialist and Senior Lecturer in the Department of Paediatrics and Child Health at the Red Cross War Memorial Children's Hospital and the Institute of Child Health at the University of Cape Town. He has a special interest in paediatric allergy and is head of the Allergy Clinic at the Children's Hospital. Dr Weinberg has studied at the National Asthma Centre in Denver, Colorado, has lectured in Britain, Ireland, Israel, Japan and Hungary. He has done extensive research and published widely on paediatric allergy.

Allergy is a common cause of chronic disease in childhood. Over 20% of the paediatric population are affected. Problems related to allergy account for approximately 40% of the patients seen in a typical paediatric practice. In developed countries allergy is the leading cause of school absenteeism and often interferes with psycho-social development. It creates serious social and financial problems for parents and families of affected children. The subject is often poorly understood by doctors and unfortunately still suffers from a stigma which became attached in the days when allergy was an empirical field with little scientific backing. To this day it is often overlooked as a major cause of illness.

## Summary

*The author discusses several studies done in South Africa and abroad on the complex issue of patient compliance. He concludes that a good doctor-patient relationship where the doctor takes heed of the expectations and fears of the patient, involves him in deciding on the treatment and where the patient understands the treatment, could influence compliance favourably.*

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The word "Allergy" was first used by the Austrian paediatrician Von Pirquet in 1906 to describe an unexpected or unusual reaction. In the 1920's Coca and Cooke coined the word "atopy" (from the Greek *atopos*) meaning a strange disease. This was used to describe a group of diseases (allergic rhinitis, asthma, atopic eczema) that share features suggesting a common basis.

The greatest advance in the field of allergy occurred in 1967 when the husband and wife team, the Ishizakas, described IgE antibody. Since then IgE mechanisms have been shown to be responsible for symptoms in the majority of patients with allergic rhinitis, atopic eczema, food allergy and insect allergy.

IgE attaches itself to the surface of mast cells in the mucous membrane of the nose, respiratory tract, gastrointestinal tract and eyes and also to mast cells in the skin. When an allergen comes into contact with the IgE antibody which is specific for it, the mast cells are triggered to release very potent chemical mediators which result in smooth-muscle constriction, mucus hypersecre-

tion and vasodilatation. This in turn results in the physical symptoms of sneezing, wheezing and dyspnoea, abnormal cramps, vomiting, urticaria and angioedema which are associated with allergic reactions. It has recently been realised that the effects of these reactions, which form part of the so called Type 1 or Immediate hypersensitivity reaction of Gell and Coombs, are much more long lasting than originally suspected. Mast cell membrane derived mediators are responsible (in particular) for very marked inflammatory changes in the mucous membranes of the respiratory airways. These last for a prolonged period.

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*In a typical paediatric practice about 4 out of every 10 problems are allergy related*

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### **Mast cell mediators**

Histamine  
Eosinophil chemotactic factor (ECF)  
Neutrophil chemotactic factor (NCF)  
Prostaglandins  
Leukotrienes  
Thromboxane  
Platelet activating factor (PAF)  
Heparin  
Bradykinin

### **Diagnosis**

There can be no substitute for a careful history in establishing the diagnosis of allergic disease. This must be followed by thorough physical examination and consideration of the results of allergy testing. None of the diagnostic tests establish unequivocally whether a patient is affected by the test allergen - most only detect the presence of specific IgE. Test results must be correlated with the history and physical findings to confirm the diagnosis.

*Skin testing* is the most common method of allergy testing. The presence of specific IgE is determined by placing a series of minute amounts of allergen extract on the skin of the forearm. A superficial prick is then made through each drop using a sharp instrument such as a blood lancet. Within 10 to 15 minutes a wheal or flare

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*Allergy comes from a Greek word which means 'a strange disease'*

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reaction occurs at the site of positive tests. These reactions correlate well with allergens which affect the target organs and with the allergic history.

Skin testing is affected by medication. Antihistamines may suppress skin tests for up to 96 hours. The skin on the upper part of the back is more sensitive than

that of the forearm for use as a site of skin tests. Extracts should always be obtained from a reputable company, should be dependable in terms of potency and should not produce unwanted irritant effects.

A broad range of allergens for skin tests is available. This includes food extracts which may be more useful than generally acknowledged when testing suspected food allergy in children.

The RAST is less sensitive than skin tests and costs more. A minimum of 48 hours must elapse before a result is obtained. However the RAST is safer than skin tests and is not affected by the patient's clinical status or medication. There is evidence that patients with high total serum IgE levels (>500 IU/ml) may have false-positive RAST results because of non-specific binding.

Skin testing is the first choice in allergy diagnosis because it is less costly and more dependable. The RAST is a second choice. Results of either of these tests must be correlated with the patient's history and physical findings before any conclusion can be drawn regarding a particular allergen's role in the patient's symptoms.

### **Treatment**

The aim of treatment in allergic conditions is to relieve symptoms without the burden of unwanted side-effects and without causing problems for the child in future

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*The best is still a careful allergic history followed by a thorough physical examination*

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such as growth retardation or damage to the elasticity of the skin. The first steps are to identify the offending allergen and to limit the exposure if possible. This involves the use of techniques to control environmental exposure to dust, fungal spores and animals. The child with a food allergy can be spared many symptoms if the offending food is consistently eliminated from the diet. This involves the reading of product labels to ascertain that processed foods do not contain quantities of unwanted allergenic substances.

Medications provide relief depending on the organ involved. Desensitization is reserved for patients in whom unavoidable allergens are clearly implicated and in whom environmental control and medication does not provide adequate relief. In practice desensitization is reserved for patients with pollen sensitive allergic rhinitis or mite sensitive rhinitis and bee-venom hypersensitivity.

### **Common Allergic Problems — An Update**

#### **1. Asthma**

Asthma is a reversible obstructed airway disease characterised by cough, wheezing and dyspnoea. The basic abnormality is hyperreactivity of the airways thought to be caused by autonomic dysfunction and

aggravated by allergens, irritant factors, respiratory infection, weather changes, exercise and air pollution. Emphasis in asthma over the past few years has been directed towards unravelling the reasons for hyperreactivity of the airways. Also the finding that the mucosal swelling of the airways is not simple oedema but is now regarded as inflammation is of great importance. Much emphasis in the literature has been directed towards the

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### *Skin testing is the first choice in allergy diagnosis*

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large number of patients, both adults and children, in the community who have asthma but remain undiagnosed and undertreated.

Deaths from asthma have also been a source of much controversy with the reports of an increase in asthma deaths from New Zealand setting the ball rolling. Many possible causes have been discussed including the possible overuse of home nebulizers and the role of the long-acting theophylline preparations. Underuse of steroids is certainly a major factor in a majority of asthma deaths.

Two major developments have taken place in the treatment of asthma in children. A swing to the inhaled forms of preventative and  $\beta$ -agonist bronchodilators has occurred. Controversy still occurs regarding the emphasis in some quarters on very early use of inhaled steroid preparations in childhood asthma, even in children who would be regarded as having no more than moderate perennial asthma.

The goal of asthma therapy is adequate control of symptoms so that the child does not miss school, sleeps well at night and can take part in sporting activities. Treatment programmes should be tailored to individuals needs. The patient should not be burdened with complex medication regimes or handicapped by the side-effects of medicines.

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### *A patient should not be burdened with complex medication which could handicap his normal life*

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#### **2. Allergic Rhinitis**

Approximately 20% of children have allergic rhinitis. This may be seasonal which is usually due to pollen allergy or more commonly in Southern Africa, the perennial form due to housedust, mites, animal dander or fungal spore allergy. Once the offending agent has been identified, usually by a careful history and skin tests, avoidance can often bring relief. Occasionally the child may benefit from using a combination antihistamine and decongestant. Side effects such as irritability and drowsiness are a problem

in many cases as is the rapid development of tolerance to the effects of these drugs. There are several preparations available and if one does not work, another can be tried. A promising development is the anticipated availability of new non-soporific antihistamines in this country in the very near future. Much interest has been shown in one of these preparations, astemizole, in several overseas studies.

Intranasal sodium cromoglycate is very effective in seasonal rhinitis and comes in a variety of forms to suit children in various age groups. Steroid nasal sprays remain the most effective current forms of treatment for perennial allergic rhinitis especially the more severe cases encountered. The recently available aqueous form of beclomethasone dipropionate nasal spray with its smaller nozzle and gently spray action is particularly useful in children.

Desensitisation is very effective in allergic rhinitis especially where pollen allergy is the cause.

#### **3. Atopic Dermatitis**

Atopic dermatitis is a pruritic, papular, vesicular skin condition that affects about 5% of children. The cause is not clear but it is the result of abnormal skin physiology and IgE mechanisms. Patients with atopic dermatitis have poor heat tolerance. Reduced excretion of sweat and poor sebum production result in dry, itchy skin. Allergens may play a role in the causation of this condition in many but not all, cases.

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### *Urticaria is very common in children*

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Treatment of atopic dermatitis consists of avoiding skin irritants such as soap and detergents and keeping skin moist with lubricants. Dilute steroid ointments and creams provide relief. Many patients have underlying staphylococcal infection in the excoriated areas and antibiotics often help these patients.

Relief from itching is best provided by hydroxyzine (Aterax) or oxatomide (Tinset).

#### **4. Urticaria**

Urticaria with or without angioedema is a common primary care problem in children. As many as 20% of all children have one or more episodes. The most common causes include infection, drugs, foods and insect bites. However, at present, the exact cause is identified in only about 20% of cases.

Treatment is symptomatic with hydroxyzine or any one of the many antihistamine preparations. Occasionally it may be necessary to use a short course of prednisone to clear the rash.

#### **5. Food Allergy**

Food allergy is an adverse reaction following the ingestion of food which is mediated by an immunological mechanism. The exact incidence of food allergy in

children is unknown but ranges between 3 and 10%. Most patients present with nausea, vomiting and/or diarrhoea but others may have asthma or skin rashes such as urticaria or atopic dermatitis.

Many non-immunological mechanisms may cause adverse food reactions which may be mistaken for food allergy. An example of this is lactose intolerance due to lactase deficiency.

Skin tests and RAST may be helpful in food allergy diagnosis but the most effective diagnostic approach is the use of a special diet. Usually the most common allergenic foods (wheat, eggs, cow's milk, peanuts and citrus fruits) are avoided for 3 weeks. Following this each avoided food is sequentially introduced into the diet and the effect carefully monitored for at least 72 hours. If an offending food is identified then treatment must include avoidance.

Recently oral sodium cromoglycate (Nalcrom) has been found useful in the prevention of food allergy in many children. Ketotifen (Zaditen) has also shown promise in a recent study.

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## From the Journals

### Change in Physician Perspective on Cholesterol and Heart Disease Results from two national surveys

BETH SCHUCKER, et al

Reprint requests to Lipid Metabolism — Atherogenesis Branch, Division of Heart and Vascular Diseases, National Heart, Lung and Blood Institute, National Institutes of Health, Bethesda MD20892 (Dr Rifkind)

JAMA 1987; 258: 3521-6.

**Abstract** The National Heart, Lung, and Blood Institute sponsored national telephone surveys of practicing physicians in 1983 (N = 1610) and 1986 (N = 1277) to assess attitudes and practices regarding elevated serum cholesterol levels. The 1983 survey was conducted just before the release of the results of the Lipid Research Clinics Coronary Primary Prevention Trial, which showed that a reduction in the blood cholesterol level reduced coronary heart disease. In 1986, 64% of physicians thought that reducing high blood cholesterol levels would have a large effect on heart disease, up considerably from 39% in 1983. Whereas in 1983, physicians attributed considerably less preventive value to reducing the cholesterol level than to reducing blood pressure or smoking, this disparity was substantially smaller in 1986. The median range of blood cholesterol at which diet therapy was initiated was 6,21 to 6,70 mmol/L (240 to 259 mg/dL) in 1986, down from 6,72 to 7,21 mmol/L (260 to 279 mg/dL) in 1983; the median for drug therapy was 7,76 to 8,25 mmol/L (300 to 319 mg/dL) in 1986 and 8,79 to 9,28 mmol/L (340 to 359 mg/dL) in 1983. In 1986, 87% of physicians surveyed felt that medical evidence warranted the recommended treatment levels set forth in the 1984 National Institutes of Health Consensus Conference on Lowering Blood Cholesterol. These changes indicate that by 1986, physicians were more convinced of the benefit of lowering high blood cholesterol levels and were treating patients accordingly. The data also suggest areas for continued educational initiatives.

### Change in Public Perspective on Cholesterol and Heart Disease Results from two national surveys

BETH SCHUCKER, et al

Reprint requests to Lipid Metabolism — Atherogenesis Branch, Division of Heart and Vascular Diseases, National Heart, Lung and Blood Institute, National Institutes of Health, Bethesda MD20892 (Dr Rifkind)

JAMA 1987; 258: 3527-31.

**Abstract** The National Heart, Lung, and Blood Institute, Bethesda, Md, and the Food and Drug Administration, Washington, DC, sponsored two national probability telephone surveys (n = 4000) of adults to assess attitudes and knowledge about heart disease risk from high blood cholesterol levels and the public's efforts to lower blood cholesterol levels. The first survey was conducted in 1983, before release of the results from the Lipid Research Clinics Coronary Primary Prevention Trial, which showed that a reduction in the blood cholesterol level reduced coronary heart disease; the second survey was conducted in 1986. The percentage of adults who believed that reducing high blood cholesterol levels would have a large effect on heart disease increased from 64% in 1983 to 72% in 1986, so that the importance attached to reducing high blood cholesterol levels approached that attributed to reducing smoking and high blood pressure. In 1983, 35% of adults reported that they had their cholesterol level checked vs 46% in 1986. In both years, diet changes were most frequently chosen (>60%) as ways to control the blood cholesterol level; reducing dietary fat was believed to be as important as reducing dietary cholesterol. By 1986, 23% of adults reported that they made dietary changes specifically to lower their blood cholesterol level, up from 14% in 1983. These comparative data show gains in public awareness and action relating to high blood cholesterol level risk. The data can be used to develop education programs.