An Approach to the Allergic Child*

– Prof E G Weinberg

Prof E G Weinberg
MBChB; FCP(SA)
Allergy Clinic
Red Cross Hospital
Klipfontein Road
RONDEBOSCH
7700

Curriculum Vitae

Professor Weinberg is Senior Specialist and Associate Professor, Department 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. Professor Weinberg has studied at the National Centre in Denver, Colorado, and has lectured in Britain, Ireland, Israel, Japan and Hungary. He has done extensive research and published widely on paediatric allergy.

Summary

Childhood allergies make up fully one third of all children seen in any general practice, but the GP does not get enough teaching in this field at Medical School. He is often left to flounder in this unfamiliar area until he/she can build up some measure of confidence. In this review the common allergic disorders are discussed with emphasis on the diagnostic and therapeutic approach, the technique of a good history-taking is illustrated and the main diagnostic tests with their interpretations are summarised.

S Afr Fam Pract 1990; 11: 412-16

KEYWORDS:
Hypersensitivity; Child; Diagnosis; Physicians, Family; Medical History Taking.

Immunologic defence against infectious micro-organisms, toxins, neoplasms and tissue grafts requires the recognition of the foreign nature of the antigens and the activation of cellular and humoral mediators of inflammation. Allergy results from the same immunologically mediated mechanism of inflammation, but it usually involves environmental antigens that are not intrinsically harmful. Allergy is usually defined as the acquired, specific, altered capacity to react (Von Pirquet 1906).

Allergic disorders have been classified by Gell and Coombs into 4 types, based on the nature of the immunologic reaction. In practise, childhood allergic disorders are usually the result of Type I Allergic reactions. Here IgE antibodies fixed to mast cells react with antigen triggering the release of histamine, leukotrienes, prostaglandins, neutrophil chemotactic factor (NCF) and eosinophil chemotactic factor (ECF-A). The antigens reach the tissues by direct contact, by ingestion or inhalation, eg pollen, mold spores, housedust, mites, animal danders and certain foods. The resulting reaction may appear as a skin eruption eg urticaria, atopic eczema or angioneurotic oedema, as a digestive upset or most commonly as bronchial asthma, hay fever and perennial allergic rhinitis. Drug and insect allergies are other manifestations of allergic disorders. In all cases the antigens, usually termed Allergens, are protein substances which in similar amounts are completely innocuous to most people.

It is estimated that 2 out of every 10 children suffer at some time from one or other allergic condition. There is a strong hereditary tendency and frequently two or more conditions occur in the same patient eg allergic rhinitis and asthma.

Allergens

The allergic child may be sensitive to one or many allergens, and success of treatment usually depends on their identification.

1. *Inhalants:*

Plant pollens, fungal spores, animal danders and housedust and mites are the most common inhalant allergens.

Wind-pollinated plants discharge large quantities of lightweight pollen grains into the air. These pollens are

**Update paper presented at the 7th GP Congress, 11 June 1990 at the Wild Coast Sun.*

buoyant and can be dispersed by wind currents over a wide area. Within each geographical area the common allergenic trees, grasses and weeds pollinate each year during a specific and predictable season.

Plants with attractive flowers are generally insect-pollinated and therefore not important in allergy because they produce small amounts of sticky, heavy pollen which does not become airborne and is usually not inhaled.

Fungal spores in the soil and on decaying vegetation are important allergens and are found in air samples in significant quantities right throughout the year. Although sensitivity to fungi is less common than pollen allergy, the spores of Alternaria, Cladosporium, Aspergillus, Epicoccum, Botrytis, Penicillum, Mucor and Rhizopus and others are important allergens for some patients. Rusts and smuts that infect certain crops and grasses also produce allergenic spores.

In certain areas insect debris has been identified as the cause of allergic

Often two or more conditions occur in the same patient

symptoms in some patients eg moths, butterflies and sewage filter flies.

Housedust is the most common indoor allergen. For most dust-sensitive children the housedust mite is the major allergen. These mites, usually of the Dermatophagoides spp flourish on human skin scales and are found mostly in dust from pillows or mattresses. Feathers in down pillows and eiderdowns or sleeping bags may be allergenic.

Animal danders, saliva and urine from cats, dogs, hamsters, guinea pigs, horses and farm stock may also cause allergic problems.

2. *Ingestants:*

Absorption of allergens from the alimentary canal can lead to IgE-antibody production with subsequent allergic symptoms to foods, additives

Insect debris has often been the cause

and drugs. The commonest offenders include cow's milk, eggs, wheat, nuts, berries, fish, shellfish and drugs such as penicillin, sulphas or aspirin.

3. *Contactants:*

Direct skin contact with a pollen or food can cause localised urticaria or systemic allergic symptoms in a highly sensitive child although this is usually very rare, eg shellfish or fish contact.

The sensitivity of the three systems usually involved in allergic disorders, the skin, gastro-intestinal and respiratory tracts, appears to be age related. Eczema and gastro-intestinal allergic symptoms occur more commonly in infants than in older children. Respiratory tract allergies such as asthma, hay fever and perennial allergic rhinitis occur less frequently in infants but account for most allergic symptoms in older children.

The responsiveness of the child to specific allergens is also age related. Foods account for most gastro-intestinal and cutaneous allergic symptoms in infancy, with cow's milk and eggs heading the list. Inhalants account for most respiratory allergic symptoms in children from 2 years onwards. Contactants and drugs also play a more important role with age.

Signposts to underlying allergic disorder

1. Heredity - the infant or child with allergic parents or siblings is at risk of developing an allergic disorder.
2. Facial or flexural itchy rashes especially in infancy.
3. Stuffy nose and irritability in infancy and excessive colic.
4. Constant or recurrent upper respiratory infections or "colds".
5. Recurrent attacks of bronchitis or episodes of wheezing.
6. Allergic facies and mannerisms eg allergic salute.
7. Investigations showing elevated total serum IgE levels, raised eosinophil count in peripheral blood and clumps of eosinophils in nasal mucus.

Respiratory tract allergies account for most symptoms in older children

Identification of allergen

(a) Detailed allergic history

(b) Skin tests

(c) The Radioallergosorbent test (RAST)

(d) Direct provocation studies on nasal mucosa or by bronchial inhalation challenge are seldom performed.

Technique of taking an allergic history

This is something which comes with experience, demands lots of patience and often has to be adapted for the particular area in which one lives. It is important to be systematic when taking the history and nothing should be left out. The allergic history is still the most valuable diagnostic tool today.

A simplified history form is presented. This is shorter and less complex than for a history taken by an allergist but many of its salient features are retained. See Table I.

There are many conditions that may mimic allergic disorders in children. This is especially the case with respiratory allergy, with asthma being particularly difficult to diagnose in some children. Special investigations are directed towards establishing that the child is indeed an atopic individual and also towards excluding some of the more common conditions that should be included in the differential diagnosis of allergic conditions. See Table II.

The RAST is becoming increasingly popular as an investigation in allergic children. It detects specific IgE antibodies to a range of inhalant and ingestant allergens.

It should be realised that this test has certain advantages, but also certain disadvantages.

Advantages of RAST

1. Serum sample only required.
2. Avoids possible transfer of serum hepatitis (P-K tests).
3. Useful in patients with dermatographism.
4. Patients with severe skin disease.
5. Patients who cannot be taken off bronchodilator or antihistamine medication for the period necessary for skin tests to be done.
6. Patients less than 2 years of age, where skin tests are generally inaccurate.
7. Avoids skin testing with potentially hazardous allergens (insects, shellfish, fish, nuts, animal danders).
8. Eliminates "false" positive skin tests.
9. Samples can be saved for follow-up studies.
10. Possibility of knowing when to stop immunotherapy.
11. Will be useful for studying antibiotic sensitivity eg Penicillin.
12. Can be used to standardise allergenic extract.

Disadvantages of RAST

1. Not as sensitive as intradermal tests.
2. More purified antigens still have to be developed.
3. Need laboratory trained technician and a gamma counter.
4. Proper controls for handling radio-activity.
5. Questionable as an "office" procedure.
6. Not yet a complete substitute for skin tests.
7. Requires to be made more sensitive and simpler.
8. It is very expensive.

A few points about the clinical examination

Clinical examination of the allergic child requires special attention to be paid to growth and development with careful monitoring of height and weight. Children with marked nasal obstruction or chronic asthma are often small for their age and those with chronic atopic eczema often markedly underweight. The children are often irritable or hyperactive and many of them have the typical allergic facies with pallor and allergic 'shiners'. A nasal crease is often present. Mouth breathing or gaping is commonly found. Allergic mannerisms eg salute occur.

The ENT and Respiratory systems should be examined very carefully. Develop experience in assessing the nasal mucosa, look for post-nasal drip, mucoid hyperplasia of the posterior pharyngeal wall and check for dental abnormalities. Serous otitis media should not be missed.

Chest deformities are common. Hyperinflation of the chest is often present even between attacks in asthmatics. Unless the chest is carefully auscultated, with the child breathing out forcibly in expiration, an expiratory wheeze is commonly missed.

The conjunctiva should be checked for 'pavement slabbing' of the mucosa found in allergic conjunctivitis.

... the Allergic Child

Table I. Sample routine history form

Name: .....

Address: .....

Date: ..... Age: ..... Sex: ..... Birth Date: .....

Chief complaint: Asthma, Cough, Hay fever, Eczema, Urticaria, Blocked nose, Nasal discharge, Croup, Headache, Colic, GI upsets, Sinus infections.

Onset and course: .....

Season: .....

Family History: .....

Aggravating factors: Weather change, Dampness, Heat, Cold, Humidity, Pollution, Housedust, Exposure to animals.

Parents occupation: .....

When and where free of symptoms: .....

Food suspect: .....

Exercise: .....

Known sensitivities: .....

Drug sensitivities: Penicillin, Sulphas, Aspirin, Others.

Which medicines help?: .....

Home environment: .....

Age of House: .....

Area: .....

Pets: Cats, Dogs, Birds, other .....

Pillow: ..... Carpets: .....

Mattress: ..... Houseplants: .....

Bedcover: ..... Trees near house: .....

Heaters: ..... Hobbies: .....

Parents' smoking habits: .....

Previous allergy tests and hyposensitization: .....

Past medical and surgical history: .....

Emotional Status: .....

Physical examination: .....

Laboratory: Blood count .....

Nasal smear .....

IgE Level .....

Other immunoglobulins .....

Rast .....

X-Rays .....

Skin test results:

Inhalants Ingestants

Diagnosis: 1. .....

2. .....

Management: 1. .....

2. .....

3. .....

... the Allergic Child

Special note should be taken of the skin, notably the flexures, feet and "nappy" areas.

Poor posture is frequently found in children with chronic asthma and is worthwhile noting so that if it fails to improve with treatment of the underlying problem, special exercises and physiotherapy can be advised.

Recommended reading

Mygind N. Essential Allergy. Oxford: Blackwell, 1986

Table II: Summary of Diagnostic Tests and their Interpretation with special reference to Nasal Allergy and Asthma in Children

Diagnostic Test	Positive result	Interpretation
Blood eosinophils:	Above 6% on peripheral count or 440 cells/mm^3 on total count.	Suggests allergy but is not specific. Parasitic infestation will cause elevated counts.
Nasal eosinophils:	Clumping of cells on slide.	Probably nasal allergy. Normal in infants to 3 months.
Nose and throat cultures:	Variable.	No assistance.
Sweat test:	Raised sweat chloride above 70 mEq/l.	Suggests cystic fibrosis, useful in different diagnosis.
Immunoglobulins:		
IgA	Range for age.	Repeated respiratory infections.
IgE	Age related.	Allergy or worm infestation.
X-Rays:		
Chest:	Hyperinflation in quiescent periods.	Chronic asthma. (Always in acute attacks.)
Postnasal space:	Enlarged adenoids.	Common cause of nasal obstruction.
Paranasal sinuses:	Mucosal thickening or opacification.	Associated with nasal allergy or chronic infection.
Skin Tests:	Wheal and flare reaction developing within 10 minutes and fading by 30 minutes.	Suggestive of a causative factor if done correctly. No absolute guarantee that skin positivity reflects nasal or bronchial sensitivity.
Office Pulmonary Function Studies: FEV_1, FVC, FEV/FVC and PEFR.	Depends on child's height; read off nomogram.	If co-operation and technique good, reflects airways obstruction.
Exercise challenge: Free-range running:	Fall of 15% or more compared to pre-exercise PEFR and FEV_1 values.	Asthma.