An Approach to the Allergic Child*  
- Prof E G Weinberg

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.

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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

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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, Penicillium, 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

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specific allergens is also age related. Foods account for most gastrointestinal 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
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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 slabling' of the mucosa found in allergic conjunctivitis.
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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, House dust, Exposure to animals.  

Past medical and surgical history:  

Previous allergy tests and hypo sensitization:  

Past medical and surgical history:  

Parents occupation:  

Emotional Status:  

When and where free of symptoms:  

Physical examination:  

Food suspect:  

Laboratory: Blood count  

Exercise: Nasal smear  

Known sensitivities: IgE Level  

Other immunoglobulins  

Drug sensitivities: Penicillin, Sulphas, Aspirin, Others.  

Rast  

Home environment: X-Rays  

Skin test results:  

Age of House:  

Inhalants  

Area:  

Ingestants  

Pets: Cats, Dogs, Birds, other  

Diagnosis:  

Pillow:  

1.  

Carpets:  

2.  

Mattress:  

Houseplants:  

Bedcover:  

Trees near house:  

Management:  

Heaters:  

1.  

Hobbies:  

2.  

Parents’ smoking habits:  

3.  


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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

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

<table>
<thead>
<tr>
<th>Diagnostic Test</th>
<th>Positive result</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood eosinophils:</td>
<td>Above 6% on peripheral count or 440 cells/mm³ on total count.</td>
<td>Suggests allergy but is not specific. Parasitic infestation will cause elevated counts.</td>
</tr>
<tr>
<td>Nasal eosinophils:</td>
<td>Clumping of cells on slide.</td>
<td>Probably nasal allergy. Normal in infants to 3 months.</td>
</tr>
<tr>
<td>Nose and throat cultures:</td>
<td>Variable.</td>
<td>No assistance.</td>
</tr>
<tr>
<td>Sweat test:</td>
<td>Raised sweat chloride above 70 mEq/l.</td>
<td>Suggests cystic fibrosis, useful in different diagnosis.</td>
</tr>
<tr>
<td>Immunoglobulins:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IgA</td>
<td>Range for age.</td>
<td>Repeated respiratory infections.</td>
</tr>
<tr>
<td>IgE</td>
<td>Age related.</td>
<td>Allergy or worm infestation.</td>
</tr>
<tr>
<td>X-Rays:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest:</td>
<td>Hyperinflation in quiescent periods.</td>
<td>Chronic asthma. (Always in acute attacks.)</td>
</tr>
<tr>
<td>Paranasal sinuses:</td>
<td>Mucosal thickening or opacification.</td>
<td>Associated with nasal allergy or chronic infection.</td>
</tr>
<tr>
<td>Skin Tests:</td>
<td>Wheal and flare reaction developing within 10 minutes and fading by 30 minutes.</td>
<td>Suggestive of a causative factor if done correctly. No absolute guarantee that skin positivity reflects nasal or bronchial sensitivity.</td>
</tr>
<tr>
<td>Office Pulmonary Function Studies:</td>
<td>Depends on child's height; read off nomogram.</td>
<td>If co-operation and technique good, reflects airways obstruction.</td>
</tr>
<tr>
<td>FEV₁, FVC, FEV₁/FVC and PEFR.</td>
<td></td>
<td>Asthma.</td>
</tr>
<tr>
<td>Exercise challenge:</td>
<td>Fall of 15% or more compared to pre-exercise PEFR and FEV₁ values.</td>
<td></td>
</tr>
<tr>
<td>Free-range running:</td>
<td></td>
<td></td>
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</tbody>
</table>