

Clinical review

Childhood atopic eczema

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Introduction

Atopic eczema is a common condition that affects more than one in ten children in developed countries, and the incidence is increasing. There are probably several reasons for this, including higher exposure to air pollution, smaller families with less exposure to infections, more pets, higher maternal age, and a wider range of foods. There is clearly also an important hereditary component to atopic eczema. This is complex because not all affected children are atopic, though the genes implicated in atopy are likely to be involved, together with others as yet unknown. Atopic eczema usually presents during the first year of life, and when it is severe it is extremely disabling. It may also cause major psychological problems. Most affected children are also allergic to house dust mite, and this is probably a major cause of exacerbation of the condition. Probably less than 10% overall have IgE mediated food allergy, but some have late phase reactions with positive results on patch tests to foods.

Methods

We searched Medline for entries on atopic eczema and atopic dermatitis in children and adults. We also relied on our personal experience in treating children with atopic eczema over the past 30 years.

Clinical features

Atopic eczema is usually the first manifestation of atopy and may coincide with food allergy; asthma often follows, then allergic rhinitis (fig 1).

There is a wide spectrum of presentations of atopic eczema, from minimal flexural eczema (fig 2) to eryth-

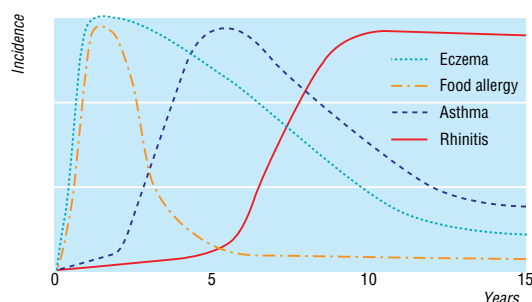


Fig 1 Incidence of different types of atopy by age (adapted with permission from W B Saunders¹)

Summary points

Atopic eczema in children is a complex condition

Four in five children with atopic eczema have IgE mediated allergy to inhalants or foods

House dust mite exacerbates atopic eczema

Food allergy exacerbates eczema in less than one in ten children

To reduce the need for admission to hospital children with severe eczema can be treated with topical or oral immunosuppression

roderma. The skin of a child with eczema is generally dry. The eczema can occur anywhere, but there are particular patterns that are more common at certain ages. The face is usually the first to be affected (fig 3). In crawling infants the forearms, extensor aspects of the knees, and the ankle flexures are often the most affected. In older children the flexor aspects of the elbows and the knees are mostly affected. The eczema may be moist and weeping or may be thickened (lichenified) and dry. In children with darker skin the rash may have a papular nature. Scratch marks are always seen. The course of the condition fluctuates: causes of exacerbations may be evident but usually are not.

Infective complications are common. Staphylococcal infection may manifest as typical bullous impetigo or simply as a worsening of the eczema with increased redness and oozing. Staphylococcal folliculitis may occur as a result of occlusion from greasy emollients or wet dressings. Streptococcal infection may manifest as increased redness and erosion of the skin or as pustular lesions. Atopic children are particularly prone to severe widespread herpes simplex infections; the spread of the condition is mainly systemic but the areas most affected are the areas of active eczema.

Psychological issues

The child's life is limited by the constraints of care of the skin, which can separate the child from his or her peers.² This can include sport, swimming, and dietary restrictions. The child feels unattractive and

different and may have problems with self image and self confidence.

Precipitating factors

There are several possible precipitating factors.

Inhalant allergens

Most children with eczema are atopic and are therefore allergic to inhalants such as house dust mite (*Dermatophagoides pteromyssinus*), grass pollens, and animal dander. Some children develop eczema on the face during the pollen season, and many parents report that their child's eczema is worse after close contact with pets. The highest proportion of IgE is produced against house dust mite, and this must be the most important allergen in the exacerbation of eczema.³

House dust mite is present in large numbers in children's beds and as well as causing asthma causes exacerbations of eczema. Several studies have shown that actions to reduce dust mite numbers are associated with amelioration of eczema.⁴ This is not surprising as in children highly allergic to the mites, skin contact is bound to have a deleterious effect on the eczema. The role of delayed hypersensitivity to house dust mite is also likely to be important. People with atopic eczema have positive results to patch tests⁵ and positive lymphoproliferative responses to the mite. Unfortunately, in everyday life minimisation of house dust mite in bedding is difficult to achieve.

Food allergy and intolerance

In general, food allergy is caused by immunological mechanisms, food intolerance is not. Food intolerance is relatively common: certain chemicals in foods may cause worsening of the eczema—for example, tartrazine or other colourings in food—by mechanisms that are unclear.

Food allergy is age dependent. It may be severe in the infant and become less so with age. Allergy to some foods (such as egg and cows' milk) is relatively transient, whereas allergy to peanuts or shellfish may continue throughout life.

The association between atopic eczema and food allergy is complex, though it is usually children with severe atopic eczema who have food allergy. Probably less than 10% of all children with atopic eczema have IgE mediated food allergy with angioedema and urticaria, when the diagnosis is obvious from the immediacy of the symptoms and can be confirmed by



Fig 2 Flexural eczema in bend of child's leg

a wheal >5 mm in diameter after a skin prick test. Some of these children have multiple food allergies. There is no doubt that IgE mediated food allergy can act as a trigger for exacerbations of eczema,⁶ but most parents recognise the allergy and the food is avoided. What is not clear is the role of late phase food reactions, which cause exacerbations of the eczema without urticaria or angioedema. These can be confirmed by atopy patch tests⁷ and food provocation tests. This is receiving increasing attention.

Irritants

Woollen material in direct contact with the skin is a major irritant. Shiny nylon materials and some acrylics may irritate, but cotton-polyester mixtures are usually well tolerated. Soap in excess and bubble baths



Fig 3 Eczema on face and head

Psychological issues

The relationship of the child and the parents may be adversely affected because:

- The child is not physically attractive
- Touch, which is so important to bonding, is unpleasant as the skin feels rough
- The child avoids physical contact because of their dislike of the application of creams and dressings
- The child uses scratching as a weapon, when crossed or denied something
- Relationships between parents and within the family become strained because of the amount of attention given to one child

Food allergy and atopic eczema

Less than 10% of children with atopic eczema have food allergy or food intolerance as exacerbating factors

Food allergy may be IgE mediated, giving an immediate reaction

Food allergy may be a late phase reaction, as proved by atopy patch tests

Food intolerance to ingested chemicals such as colourings (for example, tartrazine) may occur and are not immunologically mediated

Exclusion diets are helpful in a small proportion of children with atopic eczema.

excessively dry the skin, and many perfumed and “medicated” products applied to the skin will cause irritation. Some of the plant extract preparations favoured by alternative practitioners act as irritants or allergens and a query about the use of these should always be part of the history taking.

Management

Explanation and counselling are a vital part of the successful management of childhood eczema. Parents will have received a barrage of advice from a range of medical, paramedical, and non-medical “experts” and require a clear understanding of the nature of the condition, a long term management plan, and a realistic expectation of the results of treatment.

Terminology is often confusing; the terms atopic eczema and atopic dermatitis are often used synonymously. It is essential to talk in terms of control rather than cure, otherwise parents will search for an end point after which care will no longer be required, and this is an unrealistic expectation. The condition should be explained as a multifactorial disorder, and it must be appreciated that just as there is no “cure” there is no single “cause.” Often no explanation can be found for a particular flare up of the condition, and many factors are probably working in combination at all times.

Dealing with dryness

Bath oils and products containing oatmeal are useful and prevent the drying of the skin that bathing can induce. Bath oils that contain antiseptic may have added benefit in certain cases but have a tendency to overdry and sometimes actually irritate the skin. The child should have either a bath with additive or a short shower. It is essential to find a suitable moisturiser that can be applied all over twice a day whether or not there is active eczema. Creams containing cetomacrogol, emulsifying ointment, and creams or ointments with lanolin can be used. If a product stings the skin it must be abandoned. The most likely irritant in emollient creams is the stabiliser propylene glycol. Products that contain urea almost always sting broken skin and are unsuitable in these children.

Use of wet dressings

Wet dressings are useful in children with severe widespread eczema.⁸ This is essentially an inpatient procedure but can be used for short periods at home. A water based emollient is applied all over; a corticosteroid cream (rather than ointment in this case

because cream is more water miscible) is applied to the areas of active eczema. The creams are covered with a double layer of wrapping, the innermost of which is wetted with tepid water. The material may be cotton sheeting covered with a crepe bandage, though an easier alternative is the use of a double layer of tubular elasticated bandage. The procedure is repeated three times a day. This treatment is usually effective in clearing the eczema in three or four days.

Avoidance of allergens

House dust mite is the most important allergen. Avoidance measures have to be carried out assiduously and must include encasing the mattress and pillows as well as dealing with the top covers, either by encasement or by hot (>60°C) washing.

If food allergy is suspected, the child should be referred to a paediatric dietician. In general, it is children with severe atopic eczema who have food allergy or food intolerance. Children with flexural eczema are unlikely to have food allergy, unless the history suggests otherwise.

Topical corticosteroids

It is often necessary to spend some time counselling the parents that topical steroid preparations used appropriately are safe. The strength chosen depends on the severity of the eczema and the site affected. The frequency of application depends on the individual product.

Topical antibacterials

Staphylococcus aureus is commonly cultured from eczematous skin, and there may be obvious signs of infection. For localised infections, fusidic acid ointment may be effective. To prevent infections it is useful to bathe the child in preparations containing triclosan⁹ or benzalkonium chloride.

Topical immunosuppressants

Tacrolimus is a potent immunosuppressive drug used in organ transplantation. A topical formulation has been shown to be effective in trials in patients with moderate to severe atopic dermatitis. Two studies specifically related to childhood eczema have confirmed its efficacy.^{10 11} The main side effect is a sensation of burning. A concern has been raised as to whether application to skin exposed to sun could increase the long term risk of skin cancer.

Pimecrolimus (an ascomycin derivative) is a newer immunosuppressive agent, similar to tacrolimus. Preliminary studies in children look encouraging.¹²

Oral medications

Immunosuppressive drugs

Severe atopic eczema is a serious condition, with huge loss of quality of life for the child on a par with juvenile rheumatoid arthritis. It is therefore essential that such children are treated adequately.

The use of oral steroids should be avoided because of severe rebound of the eczema on withdrawal, the eczema becoming unstable after several courses, and the long term side effects. There are generally two alternatives for severe eczema, cyclosporin and azathioprine.

Cyclosporin—Recent studies have confirmed the efficacy of cyclosporin in childhood atopic eczema.^{13 14}

Additional educational resource

Brehler R, Hildebrand A, Luger T. Recent developments in treatment of atopic eczema. *J Am Acad Dermatol* 1997;36:983-94

Information for patients

National Eczema Society (www.eczema.org). One of the most established organisations dedicated to the needs of people with eczema, dermatitis, and sensitive skin. The website is a good general site with free information for people with eczema and dermatitis.

Eczema voice (www.eczemavoice.com). This site was set up by parents of a boy with eczema and provides useful information and support for other parents.

Talk eczema (www.talkeczema.com). A free online support service for people with eczema and their families. There is a useful dedicated area for young people.

babyworld (www.babyworld.co.uk). Though this is a general site about pregnancy, birth, and babies, it also contains useful information about eczema in babies, with frequently asked questions and shared experiences.

Regrettably the improvement is often not maintained after withdrawal of the drug. Continuous treatment is rarely justified in view of the long term risks (such as hypertension and renal dysfunction). However, it has a place as an effective, safe, and well tolerated short term option for the management of severe refractory disease in children.

Azathioprine is a safer drug for long term use, though it does have several side effects, including nausea, fatigue, myalgia, and liver dysfunction. It is used by paediatric dermatologists in the United Kingdom.¹⁵ It is essential to assay for thiopurine methyl transferase before treatment starts as children deficient in this enzyme will experience marked bone marrow suppression. In most children it is effective at low dosage. The main long term side effect that could theoretically occur (as with ciclosporin) is the development of lymphoma. The advantage of this drug is that it can be used continuously.

Other possibilities include the leukotriene inhibitors zafirlukast¹⁶ and montelukast,¹⁷ given orally. Chinese herbal medicines have also been used successfully but are not without danger.¹⁸

Antihistamines

Sedating antihistamines such as alimemazine and promethazine given at bedtime are both useful. The sedation is an important feature of their antipruritic action. It is still debatable whether non-sedating antihistamines such as cetirizine and loratadine are useful because generally the role of histamine in eczema is somewhat limited. However, a large study of the use of cetirizine in adults with atopic eczema showed a significant reduction of clinical manifestations in those treated.¹⁹

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One hundred years ago Suicide in Chicago

Chicago is said to be gaining an unenviable reputation as the "suicide centre" of the United States. The weekly health reports show that for the week ending May 10th, there were 13 cases of suicide in Chicago, and for the week ending on the 17th, there were 14 cases. According to the *Philadelphia Press* (which doubts the increase of population claimed since the official census—an increase of 450,425 in less than two years) these figures give a suicide-rate of one in every 3,350 of population. The rate for the whole United States for the year 1901, was one suicide in every

10,750 of population. Therefore Chicago has three times as many suicides in proportion to the population as the country at large. Its rate is higher than that of any other large city in the world. The Chicago authorities say that the suicides are due to influenza, but there does not appear to be such an increase attributable to this cause in other places. The number of suicides in Chicago is more probably due to the severity of the struggle for existence.

(*BMJ* 1902;i:1563)