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Guidance on the diagnosis and clinical management of atopic eczema

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Summary

This article discusses the effects of atopic eczema, how to diagnose it confidently, and the options available for treatment, especially in primary care. We also suggest when referral to dermatology departments in secondary care should be considered, and try to anticipate some frequently asked questions.

Introduction

Atopic eczema (AE) is the commonest childhood inflammatory skin condition, affecting 15–30% of children and 2–10% of adults. Atopy, the triad of eczema, asthma and allergic rhinitis, is on the increase worldwide for no clear reason, and the prevalence of atopic dermatitis has doubled or tripled in industrialized countries over the past three decades.[1] Approximately 30% of children with AE will develop asthma, and 35% will develop allergic rhinitis.[2]

The International Study of Asthma and Allergies in Childhood (ISAAC) was the first worldwide study carried out with standardized questionnaires, with the aim of creating a reliable global map of childhood allergy. This study showed that the prevalence of AE in children aged 6–7 years old during a 1-year period varied greatly worldwide, from < 2% in Iran and China to approximately 20% in Australia, England and Scandinavia.[3]

Atopic eczema often starts in infancy (45% of cases beginning in the first 6 months of life), and 70% of children are affected before the age of 5 years.[4] Approximately 60% of children will grow out of their AE by adolescence, although up to 50% may then have further episodes as an adult. It is important to remember that adults can present with AE and this probably represents up to 10% of cases seen in secondary care.[5]

The aetiology of AE is complex, and involves both genetic and environmental factors.[6] Twin and family studies have shown that genetic factors are important in the predisposition to AE.[7] AE and other atopic disorders show clustering in families, and children whose parents have AE have a higher risk of developing AE than children of parents with hay fever or asthma.[8] The discovery that null mutations in the filaggrin gene are associated with AE has proved a significant breakthrough in our understanding of the genetic basis of AE.[9] Filaggrin plays a key role in epidermal-barrier function, and the barrier dysfunction resulting from mutations of the filaggrin gene may allow increased exposure to allergens, resulting in hyperreactivity to environmental triggers and the induction of IgE autoantibodies. Studies in migrant populations have shown the importance of environmental factors: for example, children who have moved from Jamaica to London are twice as likely to have AE.[10] A higher incidence of AE is associated with urban and industrial settings, higher socioeconomic status, and smaller family size. These findings have led to many different hypotheses regarding the mechanism of AE.

Effect on quality of life

Having a child with AE can be difficult and affects many aspects of family life.[11] Eczematous skin is dry and itchy, leading to scratching, particularly at night, and hence, the majority of children with AE have a disturbed sleep pattern.[12,13] Infants with moderate to severe AE can have poor weight gain, and problems with play and social interaction. In one study, 23% of preschool children with severe AE had significant behavioural symptoms, compared with only 5% of matched controls.[14]

In school-age children, sleep disturbance has a marked effect on school, social and family life. Sleep

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loss can lead to poor concentration at school and behavioural difficulties, resulting in poor self-esteem. Children can find getting undressed for sports and swimming a particularly vulnerable time, and may get anxious about sleepovers at friends' houses or about school trips away. In fact, childhood AE has been shown to have a greater effect on quality of life than childhood diabetes and asthma.[15]

Children may resent the messy topical treatments, bandages and the restriction of cotton clothing, as well as the time taken to apply treatments. During eczema flares, topical treatments may sting, leading to conflict at bath time and during treatment application, and as children become older and more independent, this resentment can lead to refusal to use their topical treatments.

Siblings and parents of children with AE are often overlooked; parents may lose an average of 2.5 h sleep per night,[12] and 38% of siblings of children with AE also have disturbed sleep patterns.[16] This in turn can produce poor performance at school and work for siblings and parents, causing psychological difficulties for all the family. Caring for a child with AE is time-consuming and costly, with the financial burden including direct costs such as the purchase of special bedding or washing machines, and hidden costs such as loss of parental financial income. These effects are particularly felt by low-income families. It is therefore important to consider the far-reaching effects of AE as it is a disease with a worldwide increasing prevalence, with physical, psychological and social effects on both patients and families, and a high socioeconomic burden to society.

Diagnosis

Many children have dry skin, so how do you know if it is AE? To qualify for the definition of AE, an individual must have an itchy skin condition in the past 6 months, plus ≥ 3 of the following:[17]

- onset before 2 years of age (not applicable if child is aged < 4 years);
- history of flexural involvement;
- history of generally dry skin;
- history of other atopic disease (or history in first-degree relative if child is aged < 4 years);
- visible flexural dermatitis.

A list of useful questions to ask is shown in Table 1.

Atopic eczema is characterized by poorly defined erythema with oedema, vesicles and weeping in the acute stages, and skin thickening (lichenification) in the chronic stage (Fig. 1a). AE commonly starts on babies' cheeks, which can become red and sore (Fig. 1b). As the AE progresses, it may affect the common flexural sites, so the patient should be checked behind the knees (Fig. 1c), in the elbow creases and in the neck folds. A common time for AE to flare is when babies are weaned. At this time, children delight in exploring new foods, and tend to smear these around the face. Many foods are irritant and this, in combination with dribbling, can cause more severe facial (Fig. 1d) and neck flares, particularly in fat neck folds of toddlers. Hands are another site to check, as many preschool activities involve playing with irritant substances such as sand, paint, modelling clay, water or bubbles. Around this time, scratching may have become a habitual activity, and common, easily accessible sites are wrists and ankles, whereas occluded and more protected sites such as the nappy area, abdomen and back are often clearer. However, children with AE can get more severe irritant contact dermatitis in the napkin area (nappy rash), due to direct contact with soiled nappies. This has tended to be less of a problem with the introduction of modern absorbent disposable nappies.

Epidermal barrier dysfunction affects all skin so it is important to check noneczematous skin for dryness. Hyperlinear palms (Fig. 2) are found in some cases of AE, and are associated with filaggrin gene mutations.

Table 1 Useful questions to ask parents.

When and at what sites did the eczema start?
Is there any family history of eczema, asthma or hay fever?
Does your child/baby scratch when he/she is undressed?
How is he/she sleeping? Does he/she wake in the night scratching?
Does your child's skin flare with stressors such as teething, colds and coughs?
Does contact with any pets flare the skin?
Does your child's eczema get worse in summer when he/she is outside near grass/trees?
Do you think any particular foods flare your child's eczema? What about direct contact with foods such as strawberries or tomatoes touching the skin?
Does your child's skin ever get weepy and crusty and look infected?
How long does that big pot (500 g) of emollient last?

Differential diagnosis

In infants, seborrhoeic dermatitis should be considered; this may present as cradle cap or as salmon-coloured scaly plaques in the nappy area.

Discoid eczema can prove more of a diagnostic challenge, and tends to be seen in older children. Patches may be found on the trunk and limbs, and can be confused with psoriasis. Differentiating features are

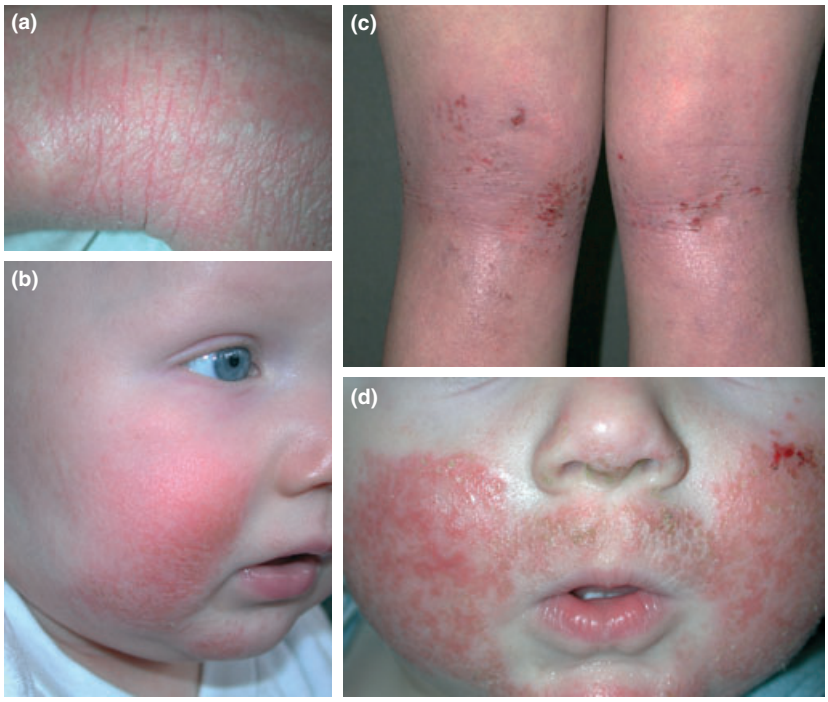

Figure 1 (a) Lichenification (thickening of the skin and exaggeration of skin markings due to prolonged rubbing and scratching); (b) mild early-onset atopic eczema on the cheeks of an infant; (c) flexural eczema: note the erythema, excoriations and lichenification; and (d) more severe impetiginized (infected) facial eczema.

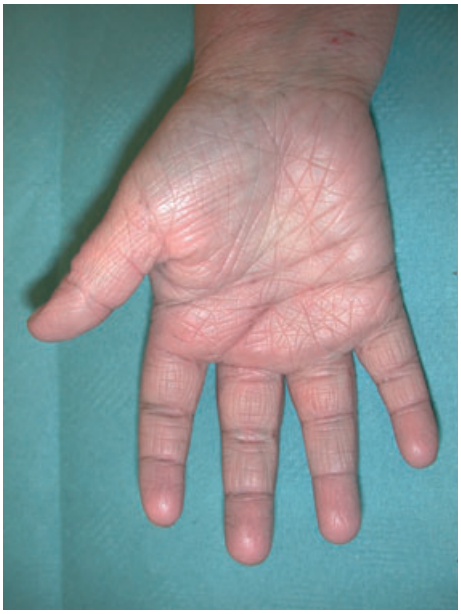

Figure 2 Hyperlinear palms.

the more clearly demarcated plaques and silvery scale of psoriasis, and that discoid eczema tends to be itchier than psoriatic plaques.

Other conditions that can be confused with eczema are keratosis pilaris, which is often associated with AE. This disorder of keratinization of the hair follicles is usually found on the outer surfaces of the upper arms and thighs, but can also occur on the cheeks. It results in a rough texture and appearance, and although it is usually asymptomatic and not itchy, it can cause distress due to its appearance.

Other differential diagnoses to consider are the ichthyoses. Ichthyosis vulgaris is another condition that commonly coexists with eczema. Ichthyosis vulgaris affects one in 250 people, with fine light-grey scales and dry skin developing in early childhood, but there is no inflammation. Rarer conditions such as X-linked dominant ichthyosis may present with larger scales and the 'dirty neck' sign.

Treatment of atopic eczema in primary care

As with many chronic skin conditions, the key to managing AE is education of the patient, parents and family, using a multidisciplinary and holistic approach. The first interview with a child with AE and their family is an opportunity to gain their confidence and understand parental concerns. Parents often feel confused, having seen a multitude of doctors, and it is important to give clear explanations about the disease itself, the disturbed barrier function, and how and why treatments are used. Treatment demonstrations showing the amounts to apply to given sites, along with tips on

application technique, can help to avoid over- and under-treatment, and improve parental confidence. Information about avoidance of irritants and allergens such as soaps, detergents, pollen and house dust mite is useful, and giving parents written information and treatment plans aids understanding and compliance with treatment regimens. Understanding the natural history of AE and the common triggers for flares, such as teething and illness, can enable treatments to be stepped up at these times to gain rapid symptom control. Equally, understanding the importance of continued emollient usage to maintain optimal skin barrier function even when the skin is clear can prevent flares.

We are sure you will be familiar with the 'plastic-bag scenario' when a parent empties out pots and tubes on to your desk stating that none of them work, and your heart sinks!

Emollients

Emollients are available as bath additives, creams, ointments, lotions, gels and aerosol sprays. These are the mainstay of both treatment for AE and of maintenance of remission from flares. The key is to find the right emollient for the patient, and giving a 'bounty pack' with four or five different samples to try can be helpful. Ointments can be more effective than creams, as they are greasier and do not contain preservatives, which may cause stinging when applied to inflamed skin. However, patient preference is important, and using a greasy ointment at night under an old pair of pyjamas and a cream for daytime use before going to school can ensure a twice-daily regimen. Newer preparations such as emollient sprays can be used at school (where 'no-touch' policies for staff may be in place) and can be fun at bath time. Application of an emollient to the scalp, left overnight, can reduce itching and scalp eczema. The order in which emollients and topical corticosteriods should be applied is not known, so it is advisable to leave a short interval between their application where practicable. We suggest applying emollient 10–15 minutes before the topical corticosteriod as this may enhance corticosteroid absorption. Regular emollient usage may reduce the need for topical corticosteroid application by reducing flares.

Topical steroids

A concern of parents, patients and doctors is that topical steroids cause irreversible skin thinning. Although thinning is possible, the concern is often well out of proportion to the true risk. However, such concern can result in children being inadequately treated with daily mild steroids, which never clear the eczema. The potency of topical steroids is classified as mild, moderate potent and very potent, reflecting the potential for vasoconstriction. In general, weak preparations should be used on the face and genital areas, whereas moderate or potent strengths can be used elsewhere on the body. Topical steroids are generally used in bursts of 3–5 days to gain control, and for up to 2 weeks in moderate to severe AE. In fact, prolonged intermittent use of potent steroids in a maintenance regimen (2 consecutive days per week), together with daily emollient use, can reduce the frequency of flares compared with emollient only.[18] The newer-generation once-daily topical steroid applications tend to have a more favourable side-effect profile. There is little evidence that a twice-daily application is more effective than once-daily application, and more frequent usage may cause more local side-effects. Short-term usage of topical steroid under occlusion (with dressings changed every 2–3 days) for 1–2 weeks can be useful for stubborn scratched areas such as wrists, ankles and fingers, then emollient under occlusion can be used to prevent further problems. There are topical steroid scalp applications available, including a shampoo, which can be useful in scalp eczema. As with emollients, steroid ointments rather than creams should be prescribed, as they are greasier and there is reduced stinging on application, which aids compliance.

Topical immunomodulators

Topical calcineurin inhibitors were developed following the success of oral ciclosporin as a treatment for eczema. According to guidance from the National Institute for Clinical Excellence (NICE) topical pimecrolimus and tacrolimus should only be initiated by doctors with a special interest and experience in skin diseases, for short-term or intermediate term usage in patients who have moderate to severe eczema that is unresponsive to conventional first-line treatment.[19] Tacrolimus 0.1% may be equivalent in strength to potent topical steroids, whereas pimecrolimus is equivalent to mild topical steroids. These immunomodulators are licensed for use in children over 2 years of age, and are useful as steroid-sparing agents in sites such as the face and flexures, and for patients who are need frequent applications of potent steroids to control their eczema. The most common side-effect of immunomodulators is a transient stinging or burning sensation at the application site.

Topical immunomodulators have shown a good safety profile, but there is a theoretical risk of increased skin cancer, so it is advisable to minimize exposure to strong

sunlight while using these agents. A maintenance regimen of tacrolimus on two consecutive days per week can be used,[20] and recent studies have tried to assess whether twice-weekly tacrolimus or topical steroid is more effective for preventing flares.[21]

Garments and paste bandages

Cotton and silk garments for eczema are now available for children and adults. These are useful in moderate to severe cases, as they can be comfortably worn at night or under clothes during the day, and tend to reduce scratching and aid emollient absorption. A double layer can be used as an emollient wrap instead of wet wrapping. Paste bandages can be useful in occluding chronically excoriated areas such as arms and legs.

Oral antihistamines and antibiotics

Sedating antihistamines at night can be useful for helping to break the itch–scratch cycle, but should not be used on a long-term basis. Secondary infection with *Staphylococcus aureus* is common, and can be treated with short courses of oral flucloxacillin. *S. aureus* nasal carriage can be eradicated by nasal ointments, which can prevent recurrent infection.

Treatment options in secondary care

Phototherapy with narrowband ultraviolet B light can be helpful in improving AE and maintaining improvement, but there is a potential future risk of skin cancer. Phototherapy is not suitable for young children, and the need to attend for treatment three times per week can be disruptive to schoolwork for older children.

Oral immunosuppressive agents are used for severe, nonresponsive cases of AE. Oral ciclosporin and azathioprine are both effective systemic treatments. Ciclosporin has a quicker onset of action, but sustained improvement tends to be seen for at least 3 months after stopping azathioprine. Careful monitoring is required with both agents, and side-effects may occur (e.g. dose-dependent nausea in azathioprine and nephrotoxicity in ciclosporin, but fortunately this is rare in children).

When to refer

Patients should be referred to a specialist under the following conditions:

- Diagnostic uncertainty.
- Poor compliance or over- or under-usage of topical steroid.
- Parental concern.
- Need for treatment demonstration/education.
- Treatment failure with appropriate topical therapy regimen.
- Need to use potent topical steroid every day or every other day.
- Involvement of sites that are difficult to treat, e.g. face.
- Frequent infections.
- Poor sleep or excessive scratching.
- Psychological disturbance or marked deleterious effects of the disease on the child or family.

Frequently asked questions

Can my child have allergy tests to see what they are allergic to? I have switched them to soya milk; should I cut anything else out of their diet?

There is a common misconception that eczema is caused by allergies, particularly to food. Prevention of AE by exclusive breastfeeding and avoiding solids until 6 months of age has been advocated, but the evidence is not conclusive. The best guide to the relevance of a dietary allergen is clear and consistent parental history of exacerbation of the eczema after ingestion of the particular food product. If food allergy is suspected, then referral to secondary care is needed for further investigation and to ensure a healthy diet for the child. If cow's milk is withheld, then hydrosylated products [e.g. Nutramigen® (Mead Johnson, Uxbridge, Middlesex, UK) or Neocate® (SHS international Ltd, Liverpool, UK) should be substituted rather than soya or goat's milk.

The eczema completely cleared with your treatment, but came back when I stopped using it. What should I do?

This can happen for a variety of reasons. Sometimes parents stop all treatments including emollients once the eczema clears. Explain that twice-daily emollient application is a maintenance treatment, and prevents future flares. Ask about concomitant triggers such as upper respiratory tract infections or teething. If the eczema is moderate to severe, then regular treatment with moderate to potent topical steroid may be necessary in 3–5 day bursts or at weekends to maintain control.

I don't want to use steroids on my child's skin; can I use this herbal preparation instead?

A full discussion about topical steroids and their side-effects can reduce parental concerns. Some herbal

creams have been found to contain undisclosed potent topical steroids. Other 'natural' products may contain multiple plant extracts, which may cause contact allergies in the future.

Further information

Further information and patient information leaflets are available on the website of the British Association of Dermatologists (http://www.bad.org.uk). Information and support is available from the National Eczema Society (http://www.eczema.org). Please also see the review by Shams *et al.* in an earlier issue of this journal.[22]

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