Atopic dermatitis

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Abstract
Atopic dermatitis (atopic eczema) is a chronic, relapsing, and intensely pruritic inflammatory skin condition that usually affects infants, children and young adults. The rash is characterized by itchy papules and patches that become excoriated and lichenified, and typically has a flexural distribution. In most cases it is associated with a personal or family history of atopy (seasonal rhinitis, asthma or eczema).

Keywords atopic dermatitis; atopic eczema; management

What's new?

- The discovery of null mutations in the filaggrin (FLG) gene, which result in loss of filaggrin production, and may alter skin barrier and predispose to atopic dermatitis

Epidemiology

Atopic dermatitis is a major public health problem worldwide; the lifetime prevalence is 10–20% in children and 1–3% in adults. The prevalence has increased two- to three-fold over the last 30 years in industrialized countries, but remains much lower in agricultural regions such as parts of China, Eastern Europe and rural Africa.[1] Wide variations have been identified within countries inhabited by similar ethnic groups, suggesting that environmental factors determine expression of atopic dermatitis.

Patients with atopic dermatitis account for 30% of skin consultations in general practice and 10–20% of all referrals to dermatologists.[2]

Aetiology

Recent interest has focused on the filaggrin gene, mutations in which result in the loss of filaggrin protein production. This protein plays a key role in maintaining skin barrier function and abnormalities of it predispose to atopic dermatitis and penetration of environmental allergens/pathogens.

Hereditary background

The aetiology of atopic dermatitis is believed to be multifactorial. About 70% of patients have a family history. Cases without family history do not differ clinically from the others, but have a better prognosis. Recent interest has focused on the filaggrin (FLG) gene. Null mutations (i.e. mutations that inactivate the gene completely) of FLG have been shown to underlie atopic eczema.[3] Profilaggrin is found in keratohyalin granules and is cleaved to form filaggrin which is expressed in the granular layer of the stratum corneum. It condenses the keratin cytoskeleton, leading to the flattening of squames and thereby providing a barrier to water, microorganisms and allergens. This finding emphasizes the importance of barrier dysfunction in the pathogenesis of eczema. It is estimated that 11–15% of eczema may be attributable to absence of filaggrin.[4] To date, FLG mutations have been found in all cases of eczema associated with ichthyosis vulgaris. The presence of palmar hyperlinearity is also a strong marker of filaggrin abnormalities. FLG mutations are also more commonly seen in patients with eczema and asthma and, independently, allergic rhinitis.

Immunological abnormalities

Genetic factors lead to IgE-mediated sensitization with environmental allergens and/or food in some patients. Damage to the skin through scratching releases cutaneous autoantigens, provoking IgE autoantibody production in up to 25% of patients, which may potentiate the eczema.[5]

Pathology

The histological changes are not specific. Affected skin shows acanthosis and sometimes spongiosis, oedema of the dermis and infiltration with lymphocytes, histiocytes, plasma cells and eosinophils.

Clinical features

Atopic dermatitis has a wide clinical spectrum ranging from minor forms such as pityriasis alba (dry, depigmented patches) to major forms with erythrodermic rash. It is slightly more common in boys than in girls. The age of onset is commonly 2–6 months. Clinical features include:

- pruritus
- macular erythema, papules or papulovesicles
- lichenification and excoriation
- dryness of the skin
- secondary infection.

The distribution of eruption varies with age. In the infantile phase, the lesions most commonly start on the face (Figure 1) and often spare the 'napkin area'. When the child begins to crawl, the extensor surfaces of the knees can be involved. The disease has a chronic, fluctuating course, varying with factors such as teething, infections, emotional upset and climate changes. In the childhood phase, lesions commonly involve the elbow (Figure 2) and knee flexures, the sides of the neck (Figure 3), the wrists and the ankles. Hand involvement is sometimes associated with nail changes

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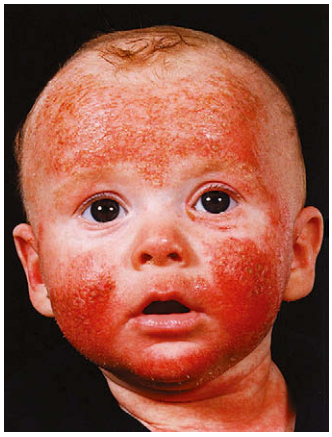

Figure 1 Atopic dermatitis. Infantile phase with erythema, scaling and crusting on the face.

(pitting and ridging). Acute vesiculation should always suggest the possibility of bacterial or viral infection. The adult phase is similar to the childhood phase, although erythroderma is more common. Points to cover in the history are listed in Table 1.

Differential diagnosis

In the first few months of life, differentiation of mild seborrhoeic dermatitis from atopic dermatitis may be difficult. Scabies should always be excluded because it can cause confusion when superimposed on pre-existing atopic dermatitis. Immunodeficiency states should be considered in infants with severe eczema, recurrent ear or systemic infections, and failure to thrive. In adults, flexural eczema may be a consequence of secondary dissemination of other types of eczema (e.g. nickel contact allergy). Rarely, particularly in adults, agammaglobulinaemia and mycosis fungoides may resemble atopic dermatitis. Investigations including skin biopsy may be useful in these situations.

Investigations

Diagnosis of atopic dermatitis is seldom aided by investigations. Serum IgE, specific radioallergosorbent tests (RASTs) and prick tests usually only confirm the atopic diathesis. However, remember that 20% of individuals with atopic dermatitis have normal IgE levels and negative results on RASTs, whereas 15% of healthy individuals have raised IgE.[6]

If immunodeficiency is suspected, immunoglobulin levels should be checked.

Bacteriology and viral swabs are useful for identifying potential causes of deterioration of the condition of the skin. Although the skin in atopic dermatitis is often colonized by *Staphylococcus aureus*, bacterial culture can be used to identify potential antibiotic resistance and the presence of β-haemolytic streptococci. It is important to request viral cultures if herpes simplex infection (eczema herpeticum, Figure 4) is suspected.

Patch-testing is particularly useful in adults to identify contact allergens responsible for deterioration of atopic dermatitis.

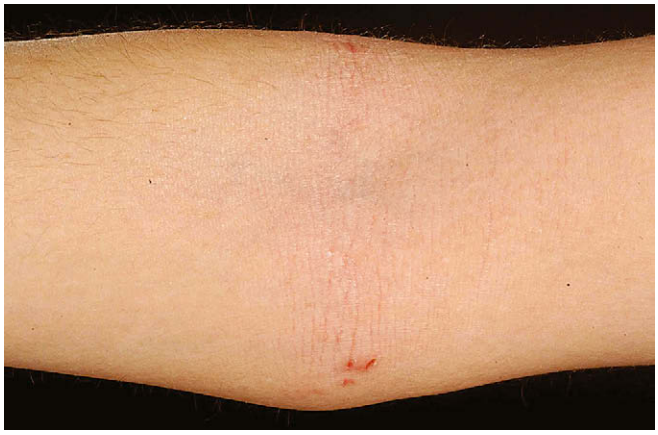

Figure 2 Adult flexural (elbow) eczema with lichenification.

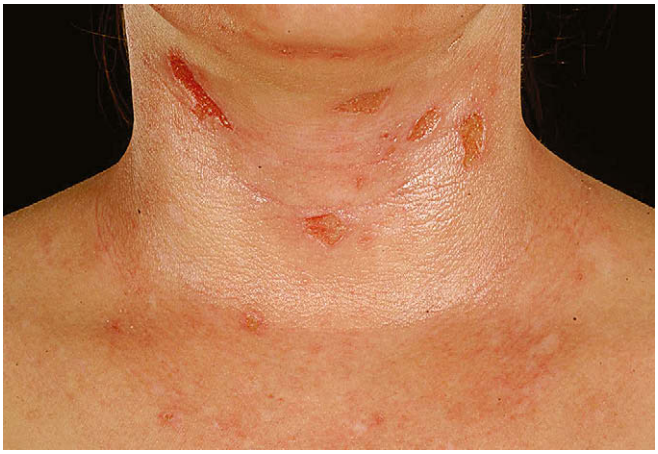

Figure 3 Excoriated dermatitis on the neck in an adult.

Management

In December 2007, the National Institute for Health and Clinical Excellence (NICE) published comprehensive guidelines on the management of atopic eczema in children from birth to 12 years.[7] Treatment should be tailored to individual needs, taking into account the patient's age and social circumstances, the severity and sites of involvement of the disease, the presence of infection, and previous response to treatment.

The history in atopic dermatitis

- Duration of disease, age of onset
- Distribution of rash
- Frequency of exacerbations
- Triggering and relieving factors
- Family and personal history of atopy
- Known contact allergy
- Exposure to allergens or irritants
- Previous successful or failed therapies (topical and systemic)
- Compliance with therapy
- Interference with sleeping pattern and daily activities
- Interference with school or home activities
- Patient's/parent's expectations

Table 1