

Assessing skin disease in children

Jonathan M Batchelor

Nigel P Burrows

Abstract

Skin diseases often affect children, and it is important to develop a systematic approach to the assessment of a child presenting with a skin complaint. This article covers aspects of the history-taking, examination and investigation of skin diseases in children. It also gives clinical examples of important skin diseases likely to be encountered by those providing medical care in the paediatric setting.

Keywords child; diagnosis; differential diagnosis; examination; investigation; skin

Introduction

Developing a structured approach to the assessment of skin disease in children is important because skin diseases are very common in children. For example, atopic dermatitis affects between 5% and 20% of children. Some skin diseases (e.g. transient neonatal dermatoses) affect only children of a particular age group, the manifestations of some skin diseases (e.g. psoriasis) vary depending on the age of the child, and certain skin eruptions can be associated with serious underlying diseases (discussed elsewhere in this issue). When assessing a child with skin disease, it is therefore important to adopt a clear and systematic approach in order to be able to recognise important skin diseases and to know when is it appropriate to seek an expert opinion.

The first half of this article seeks to provide busy paediatricians and other child health professionals with a robust framework to use when assessing a child with skin disease. The second half provides examples of how this framework can be applied.

Note: At times in this article, we shall for the sake of simplicity use the term 'rash' to describe any abnormality of the skin, although skin disease can manifest as anything from a solitary lesion to a widespread eruption affecting the whole skin.

Jonathan M Batchelor MRCP is Specialist Registrar at the Department of Dermatology, Addenbrooke's Hospital, Cambridge, UK.

Nigel P Burrows MD FRCP is Consultant at the Department of Dermatology, Addenbrooke's Hospital, Cambridge, UK.

History-taking in a child with skin disease

As with all areas of clinical medicine, taking a good history from a patient with skin disease is a key step towards making the correct diagnosis. When asking about a child's skin rash, the following key questions should include:

- When did the rash start, and how old was the child when it started?
- Which areas of the child's skin are affected?
- Is the rash changing in any way (e.g. spreading, becoming darker or lighter or altering in its morphology)?
- Has the child complained of any symptoms from the affected areas of skin (e.g. itching, burning, pain)?
- Are there any aggravating (e.g. sun exposure, heat, pressure) or relieving factors?
- Is the child well or unwell in him/herself?
- Is there any previous history of skin disease in the child?
- Is there any history of skin disease in other family members, either currently or in the past?

Further questions should focus on the child's specific skin complaint and are mentioned within the clinical cases appearing later in this article.

In addition to the history of the child's skin complaint, a *general medical and surgical history* should also be sought. A thorough *maternal/pregnancy history* is important (especially for neonates and infants), along with a developmental history. The *social history* should include questions about pets at home (especially relevant in children with eczema and where insect bites are suspected) and also a travel history. It is important to ask who the child's main carers are, as this may have implications for which treatments are recommended. Enquiring about diet is also helpful. A *drug history* – including over-the-counter medications – is important as drugs can precipitate many skin rashes, some of which can be very severe.

Examination of a child with skin disease

General examination

This starts with an end-of-the bed assessment of the child, followed by a general physical examination.

- Is the child well or unwell?
- Is there evidence of systemic upset (e.g. fever, lymphadenopathy)?
- Is there any other evidence of internal disease (e.g. organomegaly)?

Although most skin diseases are not life-threatening, a small number can such an extent that a child becomes systemically unwell and needs admission and intensive treatment.

Skin examination

Adequate lighting is necessary to ensure an accurate assessment of the skin disease. Ideally, this should be natural light, although this is not always possible.

A full skin examination should be performed in any child with a generalised rash. Even if the child has only an apparently solitary skin lesion, a full skin examination is advisable, although this may not always be possible or acceptable to the child and his or her parents. The oral mucosa and teeth, ocular mucosa, hair and nails should also be examined.

Describing the clinical appearance of skin disease in children

Description of a skin abnormality should start with a statement about its *distribution*:

- Is the rash generalised or localised to a particular area?
- Is the rash symmetrically distributed (suggesting an endogenous cause) or asymmetrical (suggesting an exogenous cause)?
- Does the rash preferentially affect particular areas such as flexures (e.g. antecubital fossae, neck, groin creases), extensor surfaces or weight-bearing areas?

If there are multiple skin lesions, are they arranged in a particular *configuration*?:

- annular (ring-shaped)
- arcuate (arc-shaped)
- dermatomal (in the distribution of a skin dermatome)
- grouped
- linear
- polycyclic (multiple rings, arcs or swirls)
- serpiginous (winding or 'snake-like').

Finally, what is the *morphology* of the individual skin lesions? In making this assessment, try to differentiate between *primary lesions* (those which were earliest to appear) and *secondary changes*. The history may help in making this distinction but it can be difficult, and sometimes only secondary changes may be seen by the time the child presents:

- The size of individual lesions.
- The colour of the lesions, for example, pink, red, purple, violaceous (lavender), brown, black, blue/grey, yellow, green, hyper- or hypopigmented.
- Palpation:
 - Are the skin lesions palpable?
 - If palpable, are they hard or soft?
 - Do they have a smooth or rough surface?

The following [Table 1](#) lists some terms used in dermatology to describe skin lesions. It is by no means exhaustive, but it includes the most commonly used descriptive terms. It is important for health professionals to be able to use these terms accurately when describing skin lesions as it greatly helps in their communication with dermatologists when their opinion is being sought.

Investigations in children with skin disease

Although many skin diseases occurring in children can be diagnosed simply through history-taking and examination, laboratory investigations are sometimes needed to confirm the diagnosis.

- *Skin swabs*. Bacterial and swabs should be taken from any area of skin that is exudative or crusting. Throat swabs (bacterial and viral) may be useful if a child's rash is preceded by a sore throat (such as guttate psoriasis and Stevens–Johnson syndrome (SJS)). Viral swabs should also be taken from fluid of vesicular lesions suggestive of herpes simplex infection.

- *Skin smears of blister fluid*. These are useful in conjunction with viral swabs. Electron microscopy may reveal viral particles.

- *Skin scrapings*. When a fungal infection is suspected, skin scrapings from affected areas should be sent for fungal culture. If a child presents with severe itching and scabies is suspected, it may be useful to take a scraping from the end of a burrow to look for the *Sarcoptes scabiei* mite.

- *Plucked hairs*. A number of plucked hairs may need to be sampled in order to investigate hair disorders. Suspected fungal infections of the scalp should be investigated by sending plucked hairs for fungal culture.

Terms used to describe skin lesions

Atrophy	Loss of substance of the skin (epidermis, dermis or both), leaving thin, wrinkled, translucent skin
Bullae/vesicles	Fluid-filled blisters. A vesicle is less than 5 mm in size, a bulla more than 5 mm
Crust	Dried exudate (serous, purulent or haemorrhagic) on the surface of the skin
Erosion/desquamation/ulcer	An erosion is a superficial area of loss of part of the epidermis. Desquamation is full-thickness detachment of the skin from the underlying dermis. Ulceration is skin loss extending into the dermis.
Erythema	Pink/red colouration of skin due to blood vessel dilatation
Excoriation	An eroded area of skin due to scratching
Lichenification	Thickening of skin with an exaggeration of skin markings, caused by persistent scratching or rubbing
Macule/patch	A flat, non-palpable area of abnormal skin. Macules are less than 5 mm in size, patches more than 5 mm
Papule/nodule	Raised, firm, palpable lesions. Papules are smaller than 5 mm in size and nodules over 5 mm
Petechiae/purpura	Petechiae are macular, non-blanching punctuate haemorrhages measuring less than 2 mm in diameter. Purpura denotes larger lesions.
Plaque	A raised, plateau-like, palpable thickening of skin, over 10 mm in size
Pustule	A vesicle filled with purulent fluid
Reticular	Showing a net-like pattern
Scale	Fragments of keratin shed from the skin surface. May be fine or large
Sclerosis	Induration or hardening of the skin
Targetoid	Target-shaped, with concentric rings
Telangiectasia	Dilated superficial capillaries
Umbilicated	Dome-shaped with a central depression
Wheal	A transient, compressible papule or plaque of dermal oedema and erythema; looks similar to nettle rash

Table 1

- Wood's light examination for fluorescence. This may not be available on paediatric wards and requires a darkened room. It is a useful means of diagnosing some bacterial (e.g. *Corynebacterium* spp. in erythrasma) and fungal (e.g. *Tinea* spp. in scalp ringworm) skin infections.

- *Skin biopsy*. This is usually carried out by the dermatologist. Skin samples may be sent for histology, immunofluorescence, culture or electron microscopy. The choice of anaesthesia (local or general) will depend on the age of the child.

When to admit?

As mentioned previously, the majority of skin diseases in children can be managed in the outpatient setting, but occasionally inpatient admission is necessary. Some of the clinical cases outlined below give examples of when admission is advisable. This will usually be fairly obvious to the assessing doctor as such children will be systemically unwell or have extensive skin abnormalities.

Clinical examples

Giving an account of all possible skin diseases is obviously beyond the scope of this article, but we shall now consider some important diagnoses while also demonstrating some of the descriptive terms outlined above.

Important infective skin diseases

The 3-year-old child in [Figure 1](#) presented with crusting of the skin in the perioral region. A number of friends at school had been similarly affected. The child was well in himself. Examination revealed the classic golden yellow crusts of impetigo. In more severe cases, this can lead to bullous lesions and it may also progress to staphylococcal scalded skin syndrome (SSSS; see below).

The 3-month-old child in [Figure 2](#) presented with crops of vesicles and erosions all over her body. She had had a history of eczema since birth. Her mother had recently been suffering from a cold sore. Examination revealed widespread erosions and some intact vesicles. A viral swab of the vesicle fluid cultured herpes simplex virus, confirming the diagnosis of eczema



Figure 2 Eczema herpeticum in a 3-month-old infant.

herpeticum. This required treatment with intravenous aciclovir and optimising hydration. Occlusive dressings should be avoided to prevent further spread of the lesions.

The 6-week-old child in [Figure 3](#) presented with a 2-day history of fever and irritability and patches of erythema around the umbilicus and on the back. The parents had also noticed that the child did not like to be held. The erythematous areas of skin rapidly formed into large, flaccid bullae that ruptured, leaving large areas of desquamated skin typical of SSSS. Children with SSSS usually require admission for treatment with intravenous antibiotics. A dermatological opinion should be sought in severe cases.

Desquamation of skin

In addition to SSSS, there are other rare but important causes of skin desquamation in children that should be considered.

The 2-week-old child in [Figure 4](#) presented with areas of fragile skin that sheared off with minimal trauma. Initially, the hands were affected and then the pressure-bearing areas, followed by a sheet-like desquamation of skin from the back. A clinical diagnosis of epidermolysis bullosa was confirmed on skin biopsy. Children with suspected epidermolysis bullosa should be referred immediately for a dermatology opinion, preferably to a centre specialising in the management of epidermolysis bullosa patients.



Figure 1 Perioral crusting of the skin in a 3-year-old child with impetigo.



Figure 3 Staphylococcal scalded skin syndrome in a 6-week-old child.



Figure 4 Epidermolysis bullosa in a 2-week-old baby.

Involvement of the mucous membranes in skin disease

The 10-year-old boy in [Figure 5a](#) presented with a 5-day history of sore throat and cough, for which he had been taking antibiotics and ibuprofen over the previous 48 hours. Two days after the onset of his initial symptoms, he developed a widespread rash affecting his trunk and limbs. He also had sore eyes and mouth. Examination revealed multiple targetoid lesions on the trunk and limbs, conjunctivitis ([Figure 5b](#)) and ulceration of the oral and genital mucosae, with haemorrhagic crusts on the lips ([Figure 5c](#)). This was consistent with a diagnosis of SJS. Over the next few days, many of the lesions became bullous ([Figure 5d](#)). The precipitating factor in this patient was *Mycoplasma pneumoniae* infection. In severe cases, SJS can degenerate into toxic epidermal necrolysis with widespread skin desquamation, so inpatient management is usually advisable.

Petechial/purpuric lesions

The 8-year-old child in [Figure 6](#) presented with a 7-day history of upper respiratory symptoms, malaise, arthralgia, abdominal pain and a non-blanching rash affecting the legs and buttocks. Examination revealed numerous dark purple petechial lesions, some of which coalesced to form areas of purpura. A diagnosis of Henoch-Schönlein purpura was made. A few days later, some of these lesions became bullous in nature. This is a rare but recognised phenomenon in Henoch-Schönlein purpura.



A 10-year-old boy with Stevens-Johnson syndrome. Initial examination revealed (a) targetoid skin lesions, (b) conjunctivitis and (c) haemorrhagic crusts on the lips. (d) Over the next few days, the skin lesions became bullous.

Figure 5



Figure 6 Henoch-Schönlein purpura in an 8-year-old boy.



Figure 7 The inherited skin disorder ichthyosis.

Genetic skin disorders

On eliciting the family history from a child with skin disease, a potential genetic aetiology for the disease can become apparent. The parents may be aware of this already in more obvious cases, but some genetic skin disorders may skip generations or arise as new mutations. One example of an inherited skin diseases is ichthyosis (Figure 7).

Wheals

The child in Figure 8 presented with widespread raised, itchy skin lesions. The lesions cleared in less than 24 hours, leaving normal skin. Examination revealed blanching, erythematous, oedematous dermal swellings consistent with a diagnosis of urticaria. The wheals of urticaria last for anywhere between a few minutes and several hours. Urticaria is usually idiopathic, but the history may reveal precipitants such as viral infection, drugs (e.g. antibiotics, non-steroidal anti-inflammatory drugs, opiates), foods (e.g. dairy products, fish, eggs) and physical agents (e.g. pressure, cold, heat).

Common transient skin diseases of the newborn

Some skin diseases tend only to affect children of a certain age group. In particular, there are a number of conditions that affect only neonates or young infants. It is important to bear these diagnoses in mind when presented with a very young child with a skin rash. Many of these diseases are self-limiting and no specific treatment is indicated:

- *Cutis marmorata*. A reticular mottling of the skin on the trunk and limbs of newborns. It is a physiological response to cooling and resolves with warming.



Figure 8 A child with wheals resulting from urticaria.

- *Erythema toxicum neonatorum*. Generalized *macular erythema* with small yellow or white papules seen in first week of life. Contrary to what its name suggests, it is a benign condition and clears within a week.
- *Transient neonatal pustular dermatosis*. Scattered sterile pustules present anywhere on the child's body (especially the trunk and neck) at birth or in first few weeks of life. It is benign and self-limiting and resolves within weeks.
- *Miliaria*. Erythematous papules and vesicles, usually over the face, neck and torso. It is caused by blockage of the sweat ducts and can be treated by avoidance of overheating and occlusive clothing.

Conclusion

Using the systematic approach outlined in this article when assessing children with skin disease, the health professional will be much closer to establishing the diagnosis and will be able to communicate more effectively with dermatological colleagues when seeking a further opinion. ◆

FURTHER READING

Bayliss Mallory S, Bree A, Chern P. Illustrated manual of pediatric dermatology. Oxford: Taylor & Francis, 2005.

Harper J, Oranje A, Prose N, eds. Textbook of pediatric dermatology. Massachusetts: Blackwell Publishing, 2006.

Higgins E, du Vivier A. Skin disease in childhood and adolescence. Oxford: Blackwell Science, 1996.

Verbov J. Handbook of paediatric dermatology. London: Martin Dunitz, 2000.

Practice points

- A structured approach to the assessment of skin disease in children is important
- The assessment of children with skin disease should include taking a good history, performing a thorough skin examination (including hair, nails, mucous membranes and teeth) and performing focused investigations where appropriate
- The ability to describe skin conditions accurately is important in enabling good communication with dermatologists and other health professionals
- Many skin diseases in children can be managed in an outpatient setting, but some can be very severe and require inpatient management