Rash (Infants and Older Children)

Definition / Supporting Information

A rash is a change in the skin's appearance and / or texture and has a variety of causes.

Recognising and describing skin lesions accurately are essential to diagnosis. The distribution, arrangement and colour of primary lesions, along with any secondary changes, such as crusting or scaling, should be described.

Essential History

Ask about:

- The timing of the appearance of lesions
  - The primary lesion is the earliest and most characteristic of the disease
  - Conditions such as atopic dermatitis have a chronic and relapsing course
  - Others, such as viral exanthems, are acute and self-limited
- Description of primary lesions
  - Flat lesions (Table 1)
    - Macules
    - Patches
  - Elevated lesions:
    - Elevated solid lesions: papules, nodules, wheals, plaques (Tables 2 and 3)
    - Elevated fluid-filled lesions: vesicles, bullae, pustules, cysts (Table 4)
  - Depressed lesions (Table 5)
    - Erosions
    - Ulcers
- The distribution of the lesions
  - Certain disorders have unique patterns of distribution; noting the parts of the body involved helps with the diagnosis
    - Seborrhoeic dermatitis commonly involves the scalp, eyebrows, and nasolabial folds
    - Psoriasis affects the scalp and extensor surfaces
    - Acne is limited to the face, back, and chest
  - Groups or clusters of lesions
    - Vesicles in herpes simplex virus infection
  - Lesions that follow a dermatome
    - Vesicles in herpes zoster infection

  - Lesions forming an annulus or ring
    - Tinea corporis
    - Papules in granuloma annulare
    - Patches in erythema migrans
  - Linear lesions
    - Lesions that follow Blaschko lines are indicative of somatic mosaicism (eg, epidermal naevus, incontinentia pigmenti)
- The colour of the lesions
  - Skin coloured
  - Erythematous (pink or red)
    - Urticaria: compression of the skin causes blanching
    - Petechiae, purpura, ecchymoses: compression of the skin does not cause blanching
  - Hyperpigmented
    - Tan
    - Brown
    - Black
  - Hypopigmented
    - Pigment is decreased but not entirely absent
  - Depigmented
    - All pigment is absent, as in vitiligo
  - Violaceous
    - Purple discoloration
- Presence of secondary changes
  - Crusting (dried fluid)
    - Commonly seen after the rupture of vesicles or bullae (eg, the honey-coloured crust of impetigo)
  - Scaling
    - Fungal infections (eg, tinea corporis)
    - Psoriasis
  - Atrophy
    - Surface depression from the absence of dermis or subcutaneous fat
    - Skin appears thin and wrinkled
  - Lichenification
    - Thickening of the skin from chronic rubbing or scratching (eg, as in atopic dermatitis)
- Factors that worsen or precipitate the rash
  - The malar rash of systemic lupus erythematosus is worsened by sun exposure
  - For many with atopic dermatitis, reduced humidity during colder months is associated with worsening disease

- Associated symptoms
  - A generalised, erythematous, blanching macular eruption associated with fever, nasal congestion, and cough suggests a viral exanthem
  - Fever, petechiae, and purpura in an ill-appearing child may indicate serious bacterial infection, such as meningococcaemia
  - Pruritus is most often a feature of atopic dermatitis, contact dermatitis, urticaria, and infestation (scabies, pediculosis and insect bites)
- Medications
  - Wheals in a child receiving medications might represent urticaria from drug allergy
  - Oral corticosteroids can worsen acne
  - Minocycline may cause hyperpigmentation
  - Neomycin sulfate (used in certain topical antibiotic preparations), diphenhydramine, and certain anaesthetics when applied topically may induce contact dermatitis
- Family history
  - Children with atopic dermatitis often have a family history of atopic disease, including atopic dermatitis, allergic rhinitis, or asthma
  - The risk of psoriasis is 10% if a first-degree relative is affected, or 50% if both parents are affected
  - If a child has multiple café-au-lait macules (Figure 1) and a diagnosis of neurofibromatosis type 1 is being considered, determine whether first-degree relatives are affected
  - If other family members are similarly affected, consider cutaneous infections or infestations
- Sexual activity (adolescents)
  - Secondary syphilis and disseminated gonococcal infection, for example, have cutaneous manifestations
  - Molluscum contagiosum, pubic lice, and scabies may be transmitted through sexual contact
    - Consider sexual abuse (see Child maltreatment: when to suspect maltreatment in under 16s [NICE clinical guideline 89])

‘Red Flag’ Symptoms And Signs

Ask about:

- Risk factors for serious illness:
  - Does not wake or, if roused, does not stay awake
  - Weak, high-pitched, or continuous cry
  - Altered level of consciousness or irritability
  - Non-blanching rash
  - Fever

  - Rigors
  - Joint pains or swelling
    - Consider vasculitis

Look for:

- Evidence of serious illness (see Traffic light system for identifying risk of serious illness [NICE clinical guideline CG160, section 1.2.4, Table 1])
  - Pale, mottled, ashen, blue skin, blue lips, or blue tongue
  - No response to social cues
  - Grunting
  - Respiratory rate greater than 60 breaths per minute
  - Moderate or severe chest in-drawing
  - Tachycardia
  - Prolonged capillary refill ≥ 3 seconds
  - Reduced skin turgor
  - Bulging fontanelle
  - Non-blanching rash
  - Neck stiffness
  - Focal neurological signs
  - Focal seizures
  - Cardiac murmurs (infective endocarditis)
- Pustules and vesicles in a child who is unwell
  - Consider herpes simplex infection
- Congenital widespread desquamation with or without redness (erythroderma)
  - Consider ichthyosis and immunodeficiency (eg, Omenn syndrome)

Differential Diagnosis / Conditions

Types of primary lesions in infants, children and young people (Tables 1–5)

Table 1. Flat lesions

Types of lesion (description)	Frequency	Colour	Examples
Macules (< 1 cm, flat, circumscribed area of colour change)	Common	Erythematous	Viral exanthems
			Drug eruptions
		Hypopigmented	Pityriasis alba (postinflammatory hypopigmentation)
			Tinea versicolor
			Vitiligo
			Halo naevus
		Hyperpigmented	Ephelides (freckles)
			Postinflammatory hyperpigmentation
			Tinea versicolor
			Cafe au lait macules (Figure 1)
			Melanocytic naevus
	Uncommon	Hypopigmented	Lichen sclerosus et atrophicus
			Scleroderma
			Ash-leaf macule
			Piebaldism
Patches (flat, non-palpable lesion ≥ 1 cm in diameter)	Common	Erythematous	Salmon patch (naevus simplex)
			Port-wine stain (Figure 2)
			Atopic dermatitis
		Hyperpigmented	Dermal melanosis
			Becker naevus
	Uncommon	Erythematous	Toxic shock syndrome (diffuse 'sunburn-like' erythema)
		Hyperpigmented	Pigment mosaicism
			Incontinentia pigmenti

Table 2. Elevated, solid, lesions (without scale)

Types of lesion (description)	Frequency	Colour	Examples
Papules (< 0.5 cm in diameter)	Common	Erythematous	Viral exanthem
			Scarlet fever
			Insect bites
			Scabies
			Urticaria (Figure 3)
			Papular urticaria
			Acne
			Erythema multiforme
		Skin coloured	Keratosis pilaris
			Molluscum contagiosum
			Flat warts
		Hyperpigmented	Naevus (intradermal)
	Uncommon	Yellow / tan	Mastocytosis Juvenile xanthogranuloma
Plaques	Common	Skin coloured	Naevus sebaceous
			Epidermal naevus
		Hyperpigmented	Congenital melanocytic naevus

Table 3 Elevated, solid, lesions (with scale)

Type of lesion (description)	Frequency	Colour	Examples
Papules or plaques	Common	Erythematous	Tinea corporis (Figure 4)
			Pityriasis rosea
			Chronic atopic or contact dermatitis
			Psoriasis (Figure 5)
	Uncommon		Dermatomyositis
			Lupus erythematosus
			Lichen planus
Nodules (≥ 0.5 cm in diameter)	Common	Erythematous	Pyogenic granuloma
		Skin coloured	Wart
			Callus
			Epidermal cyst
			Granuloma annulare
	Uncommon	Erythematous	Angiofibroma
		Skin coloured	Neurofibroma
		Yellow / tan	Mastocytosis
			Juvenile xanthogranuloma

Table 4 Elevated, fluid-filled lesions

Type of lesion (description)	Frequency	Colour	Examples
Vesicles (< 0.5 cm in diameter and filled with serous fluid) or bullae (≥ 0.5 cm in diameter and filled with serous fluid)	Common		Contact dermatitis (plant; Figure 6)
			Bullous impetigo
			Varicella (Figure 7)
			Herpes zoster
			Herpes simplex virus infection (Figure 8)
			Hand-foot-and-mouth disease
			Erythema multiforme
	Uncommon		Polymorphous light eruption
			Linear immunoglobulin A dermatosis
Pustules (< 0.5 cm in diameter and filled with purulent material)	Common		Folliculitis
			Scabies
			Acne
			Perioral dermatitis
	Uncommon		Associated with systemic bacterial infection (eg. disseminated gonococcal infection)

Table 5 Depressed lesions

Type of lesion (description)	Frequency	Colour	Examples
Erosions (superficial loss of epidermis with a moist base)	Common		Bullous impetigo (after bullae rupture)
			Herpes simplex virus infection (after vesicle rupture)
			Staphylococcal scalded skin syndrome
			Acrodermatitis enteropathica (Figure 9)
			Epidermolysis bullosa
			Epidermolytic ichthyosis

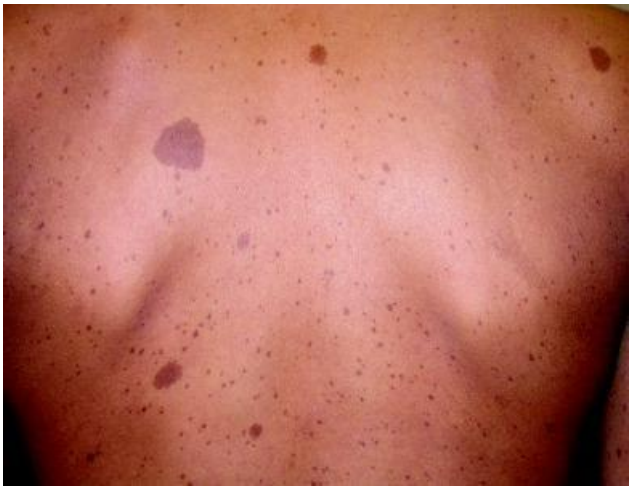

Figure 1: Café-au-lait macules in a patient who has neurofibromatosis type 1

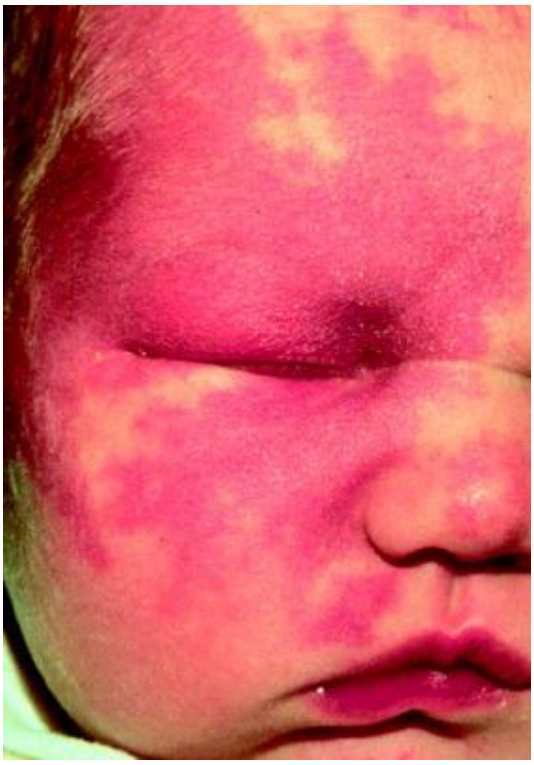

Figure 2: A port-wine stain is an example of an erythematous patch

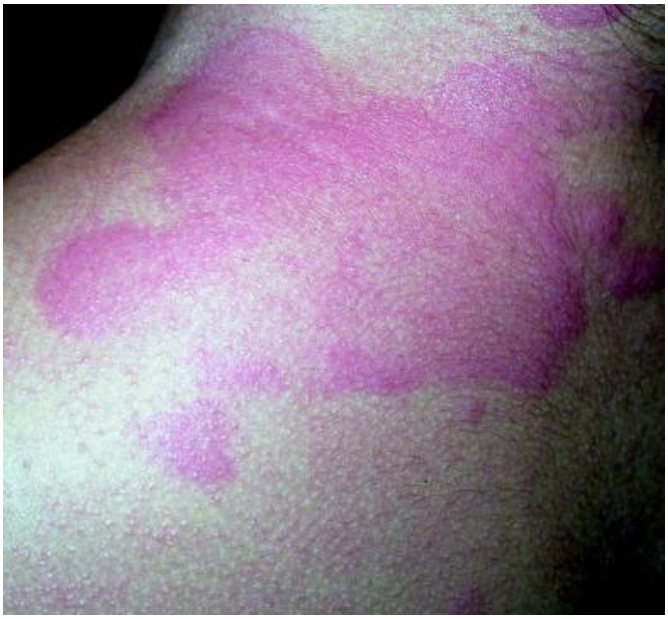

Figure 3: Pink wheals in a patient who has urticarial

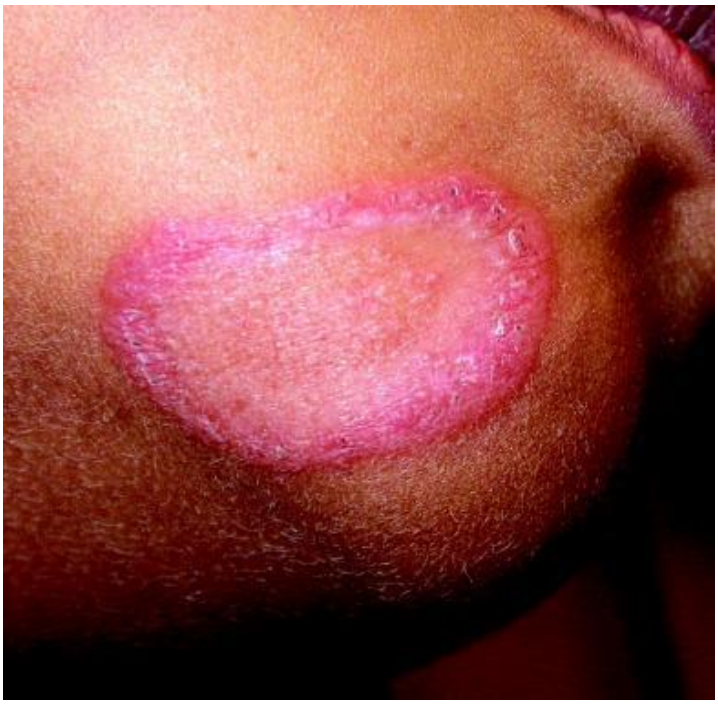

Figure 4: An annular (ring-shaped) lesion is typical of tinea corporis

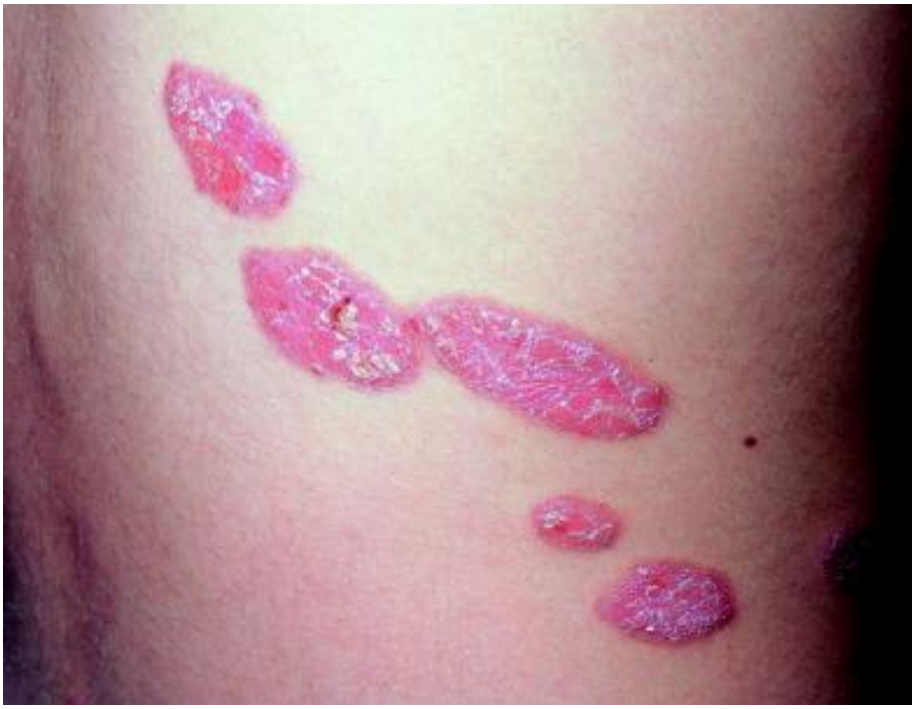

Figure 5: Scaling plaques, plateau-like lesions, are observed in psoriasis

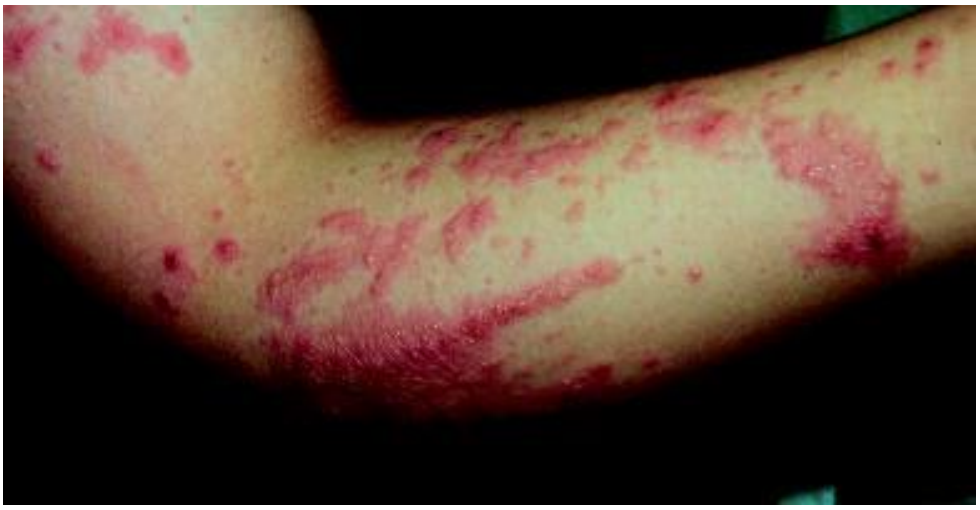

Figure 6: Dermatitis caused by poison ivy (note linear arrangement of papules or vesicles)

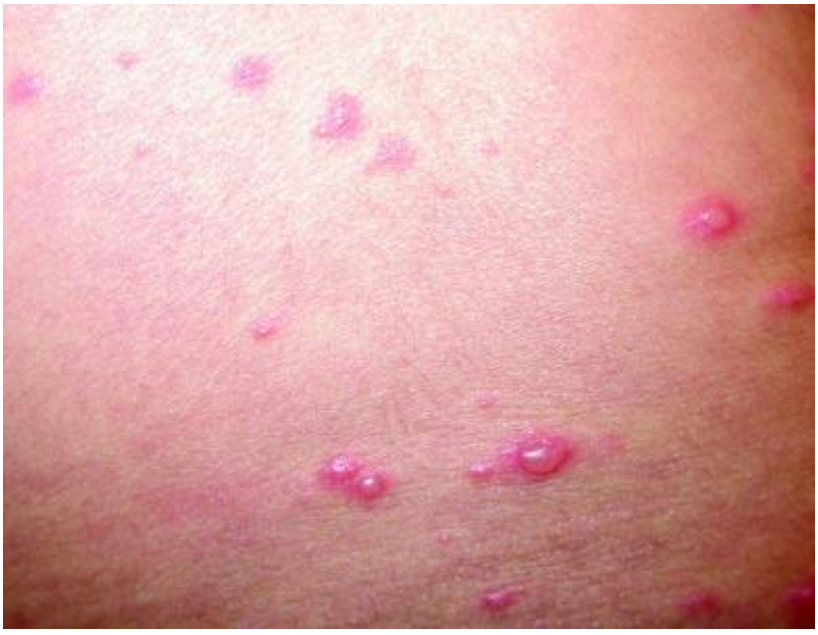

Figure 7: Vesicles, as seen here in varicella, are filled with clear or serous fluid

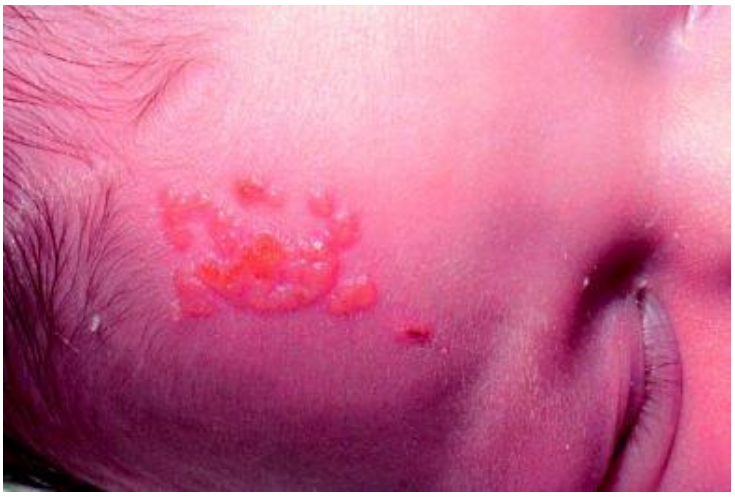

Figure 8: Herpes simplex virus infection

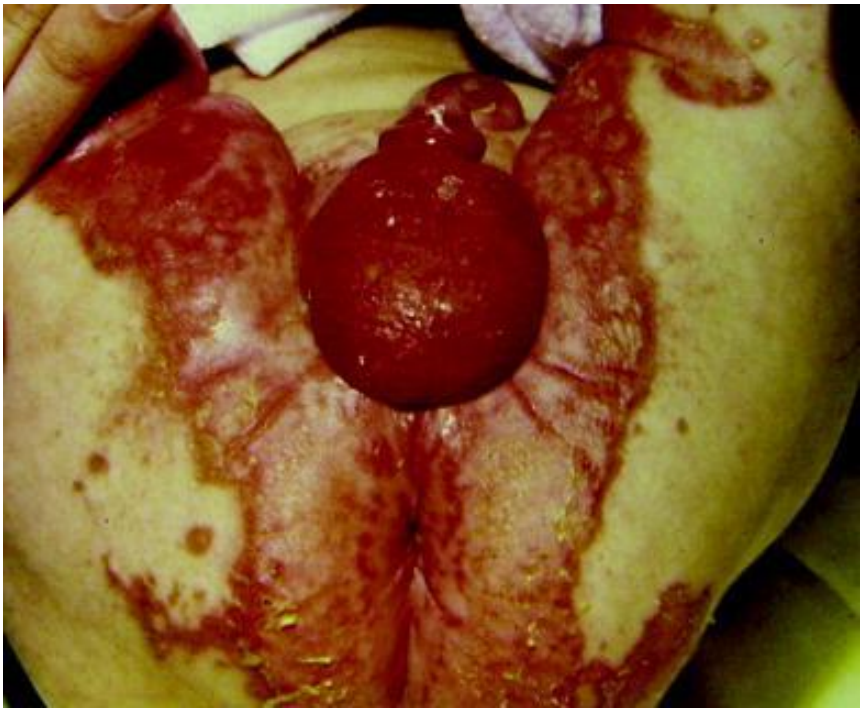

Figure 9: Erosions, as seen in this infant who has acrodermatitis enteropathica, represent a superficial loss of epidermis

Investigations

Investigations are not required for most rashes, if the child is well.

To be undertaken by non-specialist practitioners (eg, GP Team), or specialist practitioners (eg, Paediatric / Paediatric Emergency Department / (Paediatric) Dermatology Team(s)):

- Swab lesion if:
  - *Candida* or bacterial infection is suspected
    - Microscopy, culture and sensitivity (MC&S)
    - Candida nappy rash is often treated without taking swabs in an otherwise well infant; however, if the condition is not responsive to treatment, investigation may be indicated
  - Impetigo that does not respond to therapy
  - Suspected fungal infection (eg, tinea capitis) that does not respond to therapy
    - Fungal culture: skin scrapings
  - Vesicular eruption
    - Lance a vesicle and swab the fluid
    - Test for herpes simplex virus (by polymerase chain reaction (PCR))
    - Test for enterovirus if hand-foot-and-mouth disease is suspected
  - Pustular eruption
    - MC&S, PCR (herpes simplex virus, varicella-zoster virus, cytomegalovirus (CMV)
    - Skin scrapings for scabies
- Consider pharyngeal testing for *Streptococcus pyogenes* if the patient has a scarlatiniform eruption

To be undertaken by specialist practitioners (eg, Paediatric / Paediatric Emergency Department / (Paediatric) Dermatology Team(s)):

- Consider carrying out a full blood count and coagulation studies if the patient has any of the following:
  - A petechial or purpuric rash
    - Consider also a septic screen in an unwell patient
  - Vascular tumours or malformations
  - Multiple cutaneous haemangiomas (more than 5)
- Consider measuring the serum zinc concentration if there are:
  - Erosions and crusting around the mouth and anus, raising suspicion of acrodermatitis enteropathica
- Urinalysis when vasculitis is suspected

Imaging

- Consider magnetic resonance imaging (MRI) if any of the following are present:
  - Segmental (ie, plaque-like, involving a large anatomical area) haemangioma involving the face:
    - MRI of the head and neck with contrast and echocardiography (PHACES syndrome; namely, posterior fossa malformations, haemangiomas, arterial anomalies, coarctation of the aorta or cardiac abnormalities, eye anomalies, and sternal defects)
    - Periorbital infantile haemangiomas are not scanned routinely, depending on the advice of the paediatric ophthalmologist
  - Port-wine stain on any part of the forehead
    - MRI of the head to exclude Sturge-Weber syndrome
  - Multiple (≥ 2) congenital melanocytic naevi or large melanocytic naevus
    - MRI of the brain and spine
  - Infantile haemangioma in a beard distribution
    - To exclude airway haemangiomas, after discussion with the paediatric ear, nose and throat consultant
- Consider ultrasonography if any of the following occur:
  - Multiple cutaneous haemangiomas (more than 5)
    - Evaluate for liver involvement
  - Midline lumbosacral lesions (eg, large haemangioma, congenital melanocytic naevus, port-wine stain, hypertrichosis, lipoma)
    - Ultrasonography (if under 3 to 4 months of age) or MRI of the spine to evaluate for possible spinal dysraphism or other spinal cord defect (LUMBAR syndrome)
    - Ultrasonography of the kidneys

Diagnostic Procedures

Most dermatological problems in children require no diagnostic procedures. Procedures that may be useful in selected circumstances include:

- Potassium hydroxide preparation or fungal culture
  - To confirm fungal infection (eg, tinea capitis)
- Skin scrapings
  - To confirm a diagnosis of scabies (observation of mites, eggs, or faecal material)
- Wood's lamp examination
  - To accentuate hypopigmented lesions (eg, ash-leaf macules) in fair-skinned individuals
  - Shows yellow-gold fluorescence in tinea versicolor
  - Shows blue-green fluorescence of affected hair shafts in tinea capitis caused by *Microsporum canis* (a minority of infections in the UK)

- Consider skin biopsy if:
  - The history, physical examination, and laboratory studies fail to provide a diagnosis
  - A histological diagnosis influences therapy
  - A specimen is needed for microbiological culture or special testing (eg, immunofluorescence, electron microscopy, special stains)
  - There is concern that the patient may have a malignancy (eg, in the setting of a changing melanocytic naevus or suspicion of Langerhans cell histiocytosis)

Treatment Approach

To be undertaken by non-specialist practitioners (eg, GP Team), or specialist practitioners (eg, Paediatric / Paediatric Emergency Department / (Paediatric) Dermatology Team(s)):

- Treat infections with appropriate antimicrobial agents
- Consider prescribing short courses (eg, 4 weeks) of topical corticosteroids for the treatment of inflammatory skin disorders (eg, atopic dermatitis, allergic contact dermatitis, psoriasis)
  - Consider low-potency topical corticosteroids (eg, hydrocortisone at 1% or 2.5%, alclometasone dipropionate) for infants (any body site) or areas where the skin is thin or occluded (eg, face, axillae, perineum)
  - Consider medium-potency topical corticosteroids (eg, clobetasone butyrate, fluocinolone acetonide) for moderate-to-severe disease (treat only areas exclusive of the face, axillae, perineum)
  - Consider high-potency topical corticosteroids (eg, clobetasol propionate, betamethasone dipropionate, betamethasone valerate, used primarily by dermatologists) for severe or lichenified dermatoses or those involving the hands and feet
- Consider prescribing antihistamines for:
  - Urticaria
    - A first-generation agent (eg, hydroxyzine hydrochloride) is often used, but sedation may occur
    - As a result, initiating therapy with a second-generation (eg, loratadine, cetirizine hydrochloride) or third-generation (eg, desloratadine, fexofenadine hydrochloride, levocetirizine hydrochloride) antihistamine may be preferable
    - If a response is not achieved, a first-generation antihistamine may be added at bedtime or the dose of the second- or third-generation drug increased
  - Atopic dermatitis
    - Sedating antihistamines may be beneficial in reducing sleep loss during flares of atopic dermatitis

- Non-sedating agents (eg, second- and third-generation drugs) are not effective

To be undertaken by specialist practitioners (eg, Paediatric / Paediatric Emergency Department / (Paediatric) Dermatology Team(s)):

- Treat infantile haemangiomas involving vital structures (eg, periorbital area, airway) or large, disfiguring haemangiomas with propranolol hydrochloride (starting dose 1 mg/kg/day in three divided doses, increase to 2 mg/kg/day in three divided doses) for at least 6–12 months (until the child is 14 months of age or longer)
- Consider cryotherapy (eg, liquid nitrogen) for warts

When to Refer

Refer urgently to specialist practitioners (eg, Paediatric / Paediatric Emergency Department / Paediatric Oncology / Paediatric Infectious Disease / (Paediatric) Ophthalmology / (Paediatric) Dermatology Team(s)) if:

- The patient has any ‘red flag’ signs or symptoms
- Patients are suspected of having an infiltrative disorder (eg, Langerhans cell histiocytosis, congenital leukaemia)
- There is concern about compromise of a vital organ (eg, periorbital haemangioma), or the potential for malignant transformation (eg, changing acquired melanocytic naevus or a large congenital melanocytic naevus)
- The patient is suspected of having an immunological disorder
- Kawasaki syndrome is suspected
- The patient requires parenteral therapy (eg, streptococcal scalded skin syndrome)
- When concern exists for systemic dissemination of the disease (eg, eczema herpeticum)

Refer to the (Paediatric) Dermatology Team if:

- The patient has a vascular birthmark (apart from non-complicated infantile haemangioma or a small port-wine stain) and large congenital melanocytic naevi
- The patient has a port-wine stain that requires treatment with a pulsed dye laser
- Patients are suspected of having genetic skin conditions (eg, inherited blistering disease such as epidermolysis bullosa, ichthyosis syndromes)
- There is disfigurement (eg, facial haemangioma)
- Diagnostic or therapeutic uncertainty exists
- The disorder fails to respond to appropriate therapy

‘Safety Netting’ Advice

- Advise parents and / or carers to seek urgent medical attention if ‘red flag’ signs or symptoms develop

- Chronic disorders (eg, seborrhoeic dermatitis, infantile haemangioma treated with propranolol) require periodic follow-up to assess response to treatment

Patient / Carer Information

Please note: whilst these resources have been developed to a high standard they may not be specific to children.

- Skin rashes in children (Web page), the NHS website

Resources

National Clinical Guidance

Seborrhoeic Dermatitis. (Web page), NICE clinical knowledge summary, National Institute for Health and Care Excellence.

Eczema – Atopic (Web page), NICE clinical knowledge summary, National Institute for Health and Care Excellence.

Psoriasis: assessment and management (Web page), NICE clinical guideline CG153, National Institute for Health and Care Excellence.

Bacterial sepsis and meningococcal septicaemia: Management of bacterial meningitis and meningococcal septicaemia in children and young people younger than 16 years in primary and secondary care (Web page), NICE clinical guideline CG102, National Institute for Health and Care Excellence.

Urticaria (Web page), NICE clinical knowledge summary 2011, National Institute for Health and Care Excellence.

Impetigo (Web page), NICE clinical knowledge summary 2015, National Institute for Health and Care Excellence.

Acne vulgaris (Web page), NICE clinical knowledge summary 2014, National Institute for Health and Care Excellence.

Whitlow (staphylococcal and herpetic) (Web page), NICE clinical knowledge summary 2015, National Institute for Health and Care Excellence.

Nappy Rash (Web page), NICE clinical knowledge summary 2013, National Institute for Health and Care Excellence.

Medical Decision Support

Child Sexual Abuse (Web page), RCPCH Child Protection Companion

Suggested Resources

Please note: these resources include links to external websites. These resources may not have national accreditation and therefore PCO UK cannot guarantee the accuracy of the content.

Lewis-Jones S, ed. Paediatric Dermatology (Oxford Specialist Handbooks in Paediatrics). Oxford: Oxford University Press; 2010.

Rash (Web page – requires log-in), Spotting the Sick Child.

Interventions for infantile haemangiomas (strawberry birthmarks) of the skin, (Systematic review), Cochrane database of systematic reviews 2011.

Emollients and moisturisers for eczema (in progress), (Systemic review), Cochrane database of systematic reviews 2016.

Oral H1 antihistamines as monotherapy for eczema, (Systematic review), Cochrane database of systematic reviews 2013.

Time to 'Think Kawasaki Disease' (Webinar), Royal College of Paediatrics and Child Health

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