

Common skin problems in children

Part 3: infectious rashes and infestations

Cutaneous infections and infestations are common in children; the key to their diagnosis is a positive culture or scraping to confirm infection and/or response to anti-infective agents.



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The third part in this series of articles on common skin problems in children focuses on cutaneous infections and infestations. Few children will escape having a *Staphylococcus aureus* skin infection of some sort, a viral exanthem, warts, molluscum contagiosum, head lice or scabies at some time in their childhood. Although most children with a rash are assumed to have an infection or a bite, this is not always the case, and many non-infectious rashes also affect children (see Parts 1 and 2 of this series of articles in the March and April issues of *Medicine Today*, respectively). Positive cultures or scrapings are needed to confirm the diagnosis of an infectious rash or infestation.

Bacterial infections

Impetigo

Impetigo presents most often in children, although it may be seen at any age. It is caused most often by *S. aureus* and less often by *Streptococcus pyogenes*,

but both organisms may occur together. Certain racial groups, particularly Aboriginals and South Pacific Islanders, appear to be more susceptible to *S. pyogenes* infections. Impetigo is contagious, and if it is due to *S. pyogenes*, glomerulonephritis may follow within eight weeks. It is always helpful to confirm the diagnosis by a skin swab to define the infective organism and establish antibiotic susceptibility.

Impetigo presents in three ways:

- crusted or nonbullous impetigo, presenting as yellow crusts and erosions that are itchy or irritating but not painful; this is the most common presentation and is often subacute
- bullous impetigo (Figure 1), which is always caused by *S. aureus*, and presents as mildly irritating blisters that erode rapidly leaving a brown crust
- ulcerative lesions, which are always caused by *S. pyogenes*.

IN SUMMARY

- Although impetigo is usually due to *Staphylococcus aureus*, certain racial groups (including Aboriginals and Pacific Islanders) are particularly susceptible to group A *Streptococcus* infections.
- Children with recurrent *S. aureus* infections are usually carriers of this bacterium.
- Not all cases of folliculitis are due to *S. aureus*; *Pseudomonas aeruginosa* acquired from contaminated water or bath toys may be responsible.
- Most acute genital infections in children are due to group A *Streptococcus*.
- Genital warts are not all sexually acquired in children but should always be a cause for concern.
- Scabies is often a very difficult diagnosis to make; it is often mistaken for dermatitis.

continued



Figure 1. Brown crusts of bullous impetigo.

Until culture results are available, it is reasonable to suspect *S. aureus* as the pathogen and to treat accordingly. Minor lesions may be successfully treated with topical antibiotics.

Community acquired methicillin-resistant (but not multiresistant) *S. aureus* (MRSA) is becoming more common. Treatment should be guided by susceptibility testing. These strains are generally susceptible to clindamycin (Cleocin, Dalacin C) or trimethoprim plus sulfamethoxazole as well as the drugs normally chosen for the multiresistant strains,



Figure 2. Folliculitis on a typical site. Note the pustules on an erythematous base.

such as vancomycin (Vancocin). It is always helpful to ask for expert advice from the laboratory or an infectious diseases physician before treating patients infected with any form of MRSA.

It is not uncommon for impetigo to become recurrent or resistant to treatment. Sometimes this is due to an underlying dermatosis, but usually it is due to chronic carriage of *S. aureus*. This can be confirmed by taking a nasal and/or perineal swab for culture, depending on the location of the impetigo lesions. If swabs are positive, the whole family and close

contacts need treatment. Mupirocin 2% nasal ointment (Bactroban Nasal Ointment) should be used intranasally twice daily for seven days and an antiseptic wash containing triclosan (Oxy Skin Wash, pHisoHex, Sapoderm) or chlorhexidine should be used for four weeks. During this time, clothes, towels and sheets should be washed in hot water. If lesions continue to recur despite these measures, treatment with a combination of rifampicin (Rifadin, Rimycin) and flucloxacillin or clindamycin (Cleocin, Dalacin C) for seven days will usually end the problem.

Folliculitis and boils

Folliculitis is a common condition, particularly in hot weather. It presents with mildly itchy pustules on an erythematous base (Figure 2). It may affect any part of the hair-bearing skin, and it often occurs in macerated areas, including under dressings or nappies.

Although folliculitis is most often due to *S. aureus* infection (patients are often chronic carriers of *S. aureus*), this should be confirmed by culture. Folliculitis may also be caused by *Pseudomonas aeruginosa* (usually acquired from contaminated water supplies or mouldy bath toys), dermatophytes and herpes simplex virus.

Folliculitis caused by *S. aureus* is treated in the same way as impetigo with



Figure 3. Perianal streptococcal dermatitis.



Figure 4. Acute streptococcal balanitis.



Figure 5. Vulvovaginitis due to *S. pyogenes*.

a staphylococcal carrier state. For pseudomonas folliculitis, identify the source (by culturing water in the hot water tank, for example) and cease contact with it until it has been treated. If a child is still wearing nappies at night and the folliculitis involves the buttocks, there will usually be marked improvement when nappies are no longer worn.

Boils are a deep form of folliculitis and are usually tender and painful. The causative organism is generally *S. aureus*, occasionally in association with *S. pyogenes*. It is common for boils to be recurrent, but this does not usually indicate any form of immunological abnormality. Small lesions may be treated with drainage alone, but it is usual to treat them in the same way as folliculitis and recurrent impetigo.

Streptococcal genital and perianal infections

Healthy prepubertal children do not suffer from candidal infections of the genital area, unlike adults. In children, most cases of infection of the penis, vulva and perianal area are due to the group A streptococcus *S. pyogenes*, which may possibly be acquired by haematogenous spread from the throat.

Streptococcal perianal dermatitis in children presents with a persistent perianal eruption (Figure 3). The rash is itchy and tender and may be complicated by painful fissuring. There is usually well-defined erythema, with scaling or weeping, which may extend to several centimetres from the anal verge. Bleeding and discharge may occur.

Acute balanitis (Figure 4), which is seen most often in uncircumcised boys, and vulvovaginitis (Figure 5) in girls are most often due to *S. pyogenes*. They may occur in conjunction with perianal lesions or in isolation.

Confirmation of the infection should be made by culturing a skin swab, and a low vaginal swab in cases of vulvovaginitis. The infection must be treated with

oral antibiotics (penicillin, cefalexin or roxithromycin [Biassig, Rulide]), and unless a full 10-day course is adhered to, recurrence is common. It is helpful to use topical mupirocin ointment (Bactroban) topically twice daily at the same time to prevent recurrence.

Some children with this infection do not immediately lose their symptoms after adequate antibiotic treatment. This does not necessarily mean that the infection is persistent, and a second swab should be done before repeating antibiotics. Many simply have residual dermatitis or psoriasis that has been flared by the infection, and treatment with topical 1% hydrocortisone is all that is required.

Common fungal infections

Tinea

In children, tinea (dermatophyte infection) most often involves the scalp, face and body. Tinea pedis is less common in children than it is in adults. In children, tinea is often acquired from dogs, cats, pet mice and guinea pigs, but human pathogens may also be responsible, especially in the case of tinea pedis. Animal dermatophytes tend to produce a more inflammatory and acute form of tinea.

Tinea capitis

Tinea of the scalp is very uncommon in adults but occurs often in children. Usually there is loss of hair, which occurs most often in round patches, but occasionally is diffuse. This is associated with itching and scaling. A kerion is a very acute form of tinea capitis, usually caused by an animal dermatophyte, in which a large boggy, pustular mass appears on the scalp.

If tinea capitis is suspected, fungal culture of skin scrapings and plucked hairs should be done before starting therapy. It is important to confirm the diagnosis for future monitoring and to justify what is usually a prolonged course of oral treatment, but treatment may start before the results are available. Wood's light examination is unreliable for diagnosis.



Figure 6. Florid tinea corporis acquired from a new kitten.

Topical therapy is ineffective in treating tinea capitis and oral treatment must be used. Griseofulvin (Grisovin) has been the drug of choice in the past, but is very slow to act, usually requiring at least three months' therapy. Although tinea capitis is not a PBS indication for terbinafine (Lamisil), this antifungal drug has the advantage of being effective in about six weeks with once daily dosing. Overseas trials have confirmed its safety and usefulness in children. When griseofulvin tablets are used, they should be crushed and given with fatty food.

At the end of the treatment period, the culture should be repeated. If the culture is negative, the hair has regrown and there is no scalp inflammation, treatment can be ceased. If the culture is positive, continue therapy, repeating the culture every four to six weeks. Therapy may be stopped when a negative culture is obtained and hair has regrown. Occasionally this may take several months. Permanent alopecia is an unusual sequel of tinea capitis.

Ketoconazole shampoo (Hexal Konazol, Nizoral, Sebizole Shampoo) and selenium sulfide shampoo (Selsun) reduce shedding of spores and are a useful adjunct to therapy; however, if used alone they are ineffective.

The use of antibiotics, oral corticosteroids and surgical debridement does not add to the management of a kerion.

continued

Tinea corporis

Tinea corporis usually presents with annular, scaly lesions; there may be one or many (Figure 6). Usually they are itchy. Many rashes that are common in children, such as dermatitis and psoriasis, may mimic tinea, but a fungal scraping for culture will usually make it possible to differentiate tinea.

Localised tinea corporis in children is usually easily treated with topical anti-fungal creams, but if the infection is widespread, longstanding or has been treated with topical corticosteroids, oral treatment with griseofulvin is indicated. Clinical improvement usually occurs promptly, but ceasing treatment prematurely results in relapse. Treatment should be continued for a minimum of three weeks after resolution of all signs and symptoms.

Common viral infections

Warts

Warts are benign tumours that are seen at any age but most often in children. Common warts usually occur on the hands, feet and extensor surfaces. Facial warts often take the form of multiple tiny brown papular lesions. Warts adjacent to mucosal surfaces are often filiform. There is no specific or reliably effective treatment for warts but in children they often resolve spontaneously within two years, making aggressive or painful therapy inappropriate.

The presence of warts in the genital area in children of either sex should raise the question of child sexual abuse (Figure 7). In children under 2 years of age there is the possibility of vertical transmission from a mother with genital or cervical warts. In theory, warts may be acquired from a parent with warts on the hands or by autoinoculation if the child has warts elsewhere on the skin. Although many published studies have stated that in children genital warts are not always sexually acquired, the fact is that children rarely disclose sexual abuse. Given that genital warts are usually sexually acquired in adults, in my opinion this finding is always cause for concern. The origin of genital warts in children is still controversial.

There are many over-the-counter treatments for warts. Plane warts may respond to topical tretinoin 0.05% cream (Stieva-A, Retrieve Cream, Retin-A), and genital warts to topical podophyllotoxin or imiquimod (Aldara). Painful procedures such as cryotherapy, cautery or laser are often impractical in children.

Immunotherapy with the topical sensitiser diphencyprone (DPCP) is effective and well tolerated by children but can be hazardous because of the risk of severe allergic contact dermatitis and the possibility of systemic reactions. This drug is only available through some children's hospitals.

It is often best to wait for warts to resolve spontaneously, but when they are causing distress or embarrassment and conservative treatment has failed, specialist referral of the patient is recommended.

Molluscum contagiosum

Molluscum contagiosum is a common contagious poxvirus infection (Figure 8). In young children, the lesions occur anywhere on the body and the infection is usually acquired from family members or others with whom they swim or bathe. The typical lesion is a pearly papule with central umbilication and a core that may be expressed by applying firm pressure to either side of the lesion.

Molluscum contagiosum usually resolves spontaneously in immunocompetent patients, but this may take up to two years. Atrophic scarring may occur, whether or not the lesions are treated. The infection may be complicated by dermatitis, particularly in atopic patients, and bacterial superinfection.

Showering rather than bathing may reduce the spread of lesions, as the virus is transmitted in water. It is not practicable or necessary to isolate children with molluscum contagiosum. Most chemical therapies are ineffective, although topical imiquimod works in some cases. In children, conservative management – i.e. waiting for spontaneous resolution – is



Figure 7. Genital warts in a baby.



Figure 8. Molluscum contagiosum.



Figure 9. Pityriasis rosea.

usually best, unless lesions are widespread and interfering with lifestyle and function.

If treatment is needed and the lesions are small, they may be curetted or expressed. When lesions are numerous, patients may require sedation, nitrous oxide analgesia or even a general anaesthetic. Secondary dermatitis requires treatment with topical therapy, and it is helpful for the patient to have a tube of mupirocin ointment at home in case of superinfection.

Viral exanthemata

Now that the classic exanthemata such as measles and rubella are uncommon because of immunisation, most of the viral rashes seen in children are due to enteroviridae such as coxsackie viruses and echovirus. Despite vaccine being available, varicella is still quite common.

Generally, viral exanthemata have two main presentations in children:

- generalised, bilaterally symmetrical maculopapular rashes, often with confluence on the face
- peripheral papular eruptions, mainly on the arms and legs.

In most cases the child is well and afebrile, but the rash may be quite itchy. Children may have had mild fever and diarrhoea at the onset of the rash. It is not uncommon for the lesions to take several weeks to resolve, and only symptomatic treatment is possible.

A few viral infections have specific presentations. These include:

- parvovirus infection (slapped cheek disease), which presents with confluent erythema of the cheeks associated with a reticulate rash on the arms and legs
- hand, foot and mouth disease, which presents with small vesicles on the hands and feet associated with mouth ulcers
- roseola, due to herpes virus 6, which is a transient maculopapular rash associated with fever and lymphadenopathy and seen in children under the age of 3 years
- pityriasis rosea (Figure 9), which

presents with a single scaly herald patch, followed by multiple ovoid, erythematous macules with a peripheral scale mainly on the trunk; this is probably viral but has yet to be confirmed

- herpes simplex infection, which most often causes a stomatitis in children and only generalises in those with eczema, causing a widespread vesicular rash.

- varicella, which presents with fever and a vesicular eruption that rapidly forms umbilicated pustules and crusts; all mucosal surfaces, including the conjunctivae, may be involved.

Common infestations

Scabies

Scabies is caused by infestation with a tiny six-legged insect that is a specific human pathogen. It is spread by close physical contact between infected persons and is not acquired from animals. Scabies is common in children and if untreated, it will usually spread to all members of a patient's family. Aboriginal children living in crowded communities are particularly susceptible.

The diagnosis of scabies is often difficult, especially if it is not suspected. The

clinical picture is variable because it is due to an allergic reaction to the mite and this is very individual. Some patients have very few signs, and occasionally the only complaint is itch without an obvious rash. The itch exacerbates at night and after hot showers. Typically there is an itchy, excoriated but nonspecific rash on the trunk associated with scaly burrows on the fingers and wrists. Papular and nodular lesions are often seen around the major flexures in children, and in babies and toddlers there are often vesicles and pustules on the palms and soles and sometimes on the scalp. Secondary bacterial infection may occur.

Confirmation of the diagnosis is made by microscopy of scalpel scrapings from a burrow. The main pitfall in using this technique is the selection of a suitable burrow, as these are few in number and difficult to identify. Therefore, the most practical diagnostic test may be response to antiscabietic medication.

For the topical treatment of scabies, the treatment of choice in terms of safety and efficacy is permethrin 5% cream (Lyclear, Quellada Scabies Treatment). Benzyl benzoate 25% emulsion (Ascabiol, Benzemul) can be effective in scabies if used correctly, but it is more irritating than permethrin. The treatment is applied from the neck down and left on for a minimum of eight hours for permethrin and 24 hours for benzyl benzoate. If the hands are washed during this time, the treatment should be reapplied. In central and northern Australia, scabies above the neck is common and treatment should also be applied to the face and hair (avoiding eyes and mucous membranes). In babies, the scalp and face should also be treated, and mittens should be worn to stop them sucking their hands. In all cases, the treatment should be repeated in a week.

There is some controversy regarding the treatment of scabies in babies. Although permethrin is not approved for use in those under 6 months of age, this has to be balanced against the high

Practice points: how infections can mimic other rashes

- Streptococcal impetigo may ulcerate and be confused with trauma.
- Bullous impetigo may look annular and simulate tinea.
- Rare immunobullous diseases are usually thought initially to be impetigo or varicella.
- Rashes in the genital area that do not resolve with antibiotics are often due to psoriasis.
- Tinea is often confused with psoriasis and eczema.
- Acute hair loss is not always due to tinea: consider alopecia areata and hair pulling (trichotillomania).
- Not all warty lesions are warts; epidermal naevi can simulate them.
- Scabies can be very difficult to diagnose and is often mistaken for dermatitis.
- Viral exanthemata are often bilaterally symmetrical and of sudden onset; if the child is taking an antibiotic, it is hard to differentiate viral exanthemata from a drug eruption.
- Viral exanthemata have very varied morphology and come into the differential diagnoses of scabies and dermatitis.
- Not all scaly lesions on hair shafts are nits; sometimes they are just adherent scalp scale (known as hair casts).
- Pityriasis rosea may be indistinguishable from guttate psoriasis.

morbidity of untreated scabies, which can be severe in this age group. Although some authors recommend the use of 10% sulfur and 10% crotamiton cream in this age group, there may be no rationale in doing so and, in fact, safety data on these preparations are very sketchy.

Head lice

Head lice are common in school children, affect all sections of society and are harmless. They are not a sign of poor hygiene. The infestation is acquired by head to head contact. Although it can be asymptomatic, the scalp and nape of neck can be itchy and nits are noticeable on the hairs. The itching can result in excoriations and lymphadenopathy can follow.

Head lice are crawling mites the size of a sesame seed. They live on the scalp but lay eggs, known as nits, on the hair. Diagnosis of active lice infestation is made by

observing a live, moving mite on the scalp. This can be achieved by wet combing the hair with a fine-toothed comb after applying a generous amount of hair conditioner to dry hair. The conditioner stuns the lice and stops them crawling for about 20 minutes. Conditioner from the comb is wiped on to a paper towel and lice and nits are detected. Even when all the lice are dead, nits may remain on the hair. If they are 1.5 cm away from the scalp, they are unlikely to contain live larvae, and just represent old infestation.

Treating head lice can be difficult. Treatment resistance is well documented, and reinfestation is always a risk. Some cases can be cured by wet combing (applying hair conditioner to dry hair and using a fine-toothed nit comb as above) every day for 10 to 14 days until no lice are found. This method has only about a 40% success rate.

Alternatively, topical scabicides can be used. Most contain permethrin and are usually left on for 20 minutes, but malidison is another insecticide that appears to be more effective. Maldison should be left on for eight hours and is not recommended in infants aged under 6 months. Parents and even pharmacists are often worried about using these insecticides on children, and parents may need reassurance before starting treatment.

All scabies treatments should be repeated seven to 10 days later, and the conditioner and combing method (above) should be used the next day to check that there are no further live mites on the scalp. Between treatments, the same combing method should be used twice, with all eggs less than 1.5 cm from the scalp being removed with a head lice comb or pulled off with fingernails. These eggs may contain viable larvae. Wet combing should

be repeated weekly for several weeks after cure to detect any recurrence.

Pillowcases, combs and brushes should be washed in hot water (at least 60°C). Family and close physical contacts should be examined and treated if live lice are found. The patient's school should be notified, but it is not necessary to exclude children with head lice from school after their initial treatment.

Conclusion

Most children will at some time in their childhood have an infectious rash or infestation, some of which can mimic noninfectious rashes (see the box on page 40). The key to the diagnosis of infectious rashes or infestations is a positive culture or scraping, which will also guide treatment decisions. MT

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