



PRACTICE

FROM DRUG AND THERAPEUTICS BULLETIN

Managing scarlet fever

Drug and Therapeutics Bulletin

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What you need to know

- Scarlet fever is usually a mild, self limiting illness, and has become more common
- The typical rash is red, pin point, with a sandpaper texture, and spreads from the trunk and settles in the flexures
- People can be infectious for two to three weeks after the symptoms appear, unless they are treated
- Antibiotics minimise the risk of complications and onward transmission (typically non-infectious in 24 hours)
- Rarely, invasive group A streptococcal infections such as meningitis, pneumonia, and septic arthritis develop

Scarlet fever is an infection caused by toxin producing strains of *Streptococcus pyogenes* (also known as group A streptococcus, or GAS). It was associated with high levels of morbidity and mortality when epidemics were common in the 18th and 19th centuries in Europe and the USA.¹ Although the disease nearly disappeared during the 20th century, several countries, including the UK, have recently experienced a re-emergence of scarlet fever.¹⁻³ In this article, we discuss the management of scarlet fever. In the UK, it is a notifiable disease.

How common is scarlet fever?

In England and Wales, the incidence of scarlet fever reduced from 250 notifications in 100 000 population per year in 1944 to less than 5 in 100 000 in the 2000s.³ In 2013-14, however, there were 25 notifications in 100 000.³ Around 87% of cases were in children under 10.²

In 2014, England experienced the highest number of scarlet fever cases in 45 years (table 1).⁴ In 2015 and 2016, scarlet fever notifications were elevated in all areas in England compared with the same period in the preceding year.^{3,6} In the 2016-17 season, weekly scarlet fever notification rates fell below those seen during the previous three seasons.⁷

Peak season for GAS infections, including scarlet fever, occurs between December and April.

What causes it?

Scarlet fever is caused by the bacterium *Streptococcus pyogenes* (also known as group A streptococcus, or GAS). It can be found on the skin or in the throat, where it is usually unproblematic in asymptomatic carriers.⁸⁻¹¹ However, certain virulent forms of *S. pyogenes* carry genes that code for streptococcal superantigens, including pyrogenic exotoxins, which can cause non-invasive infections such as scarlet fever. The typical rash is caused by the exotoxin.¹⁰⁻¹²

Clinical isolates of *S pyogenes* are differentiated by the emm typing system based on sequencing of the emm gene. No single emm strain seemed to be the cause of the 2016 outbreak.¹

What are the symptoms and differential diagnoses?

The symptoms of scarlet fever are non-specific in early illness and may include sore throat, headache, fever, nausea, and vomiting.⁸ After 12 to 48 hours, the characteristic red, generalised pinhead rash develops, typically first appearing on the chest and stomach, rapidly spreading to other parts of the body and giving the skin a texture like sandpaper (fig 1). On more darkly pigmented skin, the rash may be harder to see, although still palpable.⁸

Patients typically have flushed cheeks and pallor around the mouth. This may be accompanied by a “strawberry tongue” (an initial white coating on the tongue peels, leaving it looking red and swollen) (fig 2).^{8,13} The rash is often accentuated in flexures (eg, the antecubital fossae and axillae) and is known as Pastia’s lines.¹¹ The rash usually persists for about a week and may be followed by desquamation at the tips of fingers and toes, and less often over wide areas of the trunk and limbs (fig 3).⁸

Differential diagnoses may include measles, glandular fever, slapped cheek infections, other viral pathogens, Kawasaki disease, staphylococcal toxic shock syndrome, and allergic reactions.^{8,9,11}

How is scarlet fever transmitted?

Scarlet fever is contagious and can be infectious for two to three weeks after the symptoms appear, if untreated.⁸ The bacteria spread by contact with mucus or saliva (eg, by breathing infected airborne droplets produced through coughing or sneezing) or by contact with contaminated surfaces. Asymptomatic carriers of streptococcal bacteria are at very low risk of infecting other people.^{9 14}

What are the possible complications?

Although scarlet fever is usually a mild illness, it can cause the same complications as GAS pharyngitis.⁹ Suppurative complications (eg, otitis media, peritonsillar abscess) are caused by local or haematogenous spread of the organism and tend to occur early in the infection.¹⁵ Non-suppurative (autoimmune) complications (eg, acute rheumatic fever, streptococcal glomerulonephritis) tend to occur later in the course of GAS infections, particularly (but not exclusively) in untreated people.^{8 9 15} Permanent kidney damage from streptococcal glomerulonephritis is rare.¹⁵

Invasive GAS infection

Invasive GAS infection (iGAS) is an infrequent complication of scarlet fever, in which the bacteria are isolated from a normally sterile body site, such as the blood.^{2 8 12 16-18} iGAS infections are acute, frequently life threatening infections ranging from bacteraemia, cellulitis, and pneumonia to meningitis, puerperal sepsis, and septic arthritis.^{19 20} Two of the most severe forms of iGAS are necrotising fasciitis and streptococcal toxic shock syndrome.

iGAS infections are most common in older people, the very young, or those with an underlying risk factor such as chickenpox, diabetes, immunosuppression, cancer, alcoholism, injecting drug use, or women in the puerperal period.^{8 18} Severe iGAS carries a substantial risk of mortality (around 15-25%) and requires prompt diagnosis and management.¹⁷⁻²⁰

In England, Wales, and Northern Ireland, scarlet fever is a notifiable disease. Statutory notifications, based on clinical symptoms consistent with this diagnosis, are submitted to local health protection teams.⁸ Cases of iGAS infection should also be notified urgently, so that close contacts can be identified early and advised to be vigilant for symptoms of GAS infection.^{2 21 22}

What are the principles of management?

General guidance for patients may include advice on rest, drinking plenty of fluids, good hygiene measures to minimise the risk of cross-infection, and the use of paracetamol to reduce discomfort and high temperature.^{13 23 24}

National guidance recommends treating people with scarlet fever with antibiotics regardless of severity of illness to speed recovery, to reduce the length of time the infection is contagious, and to reduce the risk of complications.^{8 13 25} See below for specific drug options.

Overall, the evidence base for the management of scarlet fever is limited, and there is a need for more evidence of the benefits and harms of antibiotics.

Given the increase in scarlet fever in recent years, public health specialists recommend that clinicians are mindful of potential increases in invasive disease and maintain a high index of suspicion with relevant patients.²

What do the guidelines say?

Guidance from Public Health England (PHE)

PHE interim guidelines were developed by the national incident management team in response to the rise in cases in 2014 and are aimed at addressing outbreaks in schools and nurseries.⁸ When a case of scarlet fever is identified, PHE guidelines currently advise clinicians to:

- consider confirming the diagnosis by throat swab (eg, if the case is reported to be part of an outbreak);
- prescribe an appropriate treatment course of antibiotics, without waiting for the culture result if scarlet fever is clinically suspected^{8 13};
- advise exclusion from nursery/school/work for 24 hours after starting appropriate antibiotic treatment⁸; and
- notify established local public health teams.⁸
- Recommended antibiotics include penicillin V four times per day for 10 days, or azithromycin once daily for five days for patients allergic to penicillin.^{8 13} For children in whom compliance with penicillin V is of concern, amoxicillin twice daily may be used as an alternative.^{8 13}
- The guidelines state that antibiotics speed recovery, substantially lower the risk of complications developing, and that most cases become non-infectious within 24 hours of taking antibiotics.⁸
- Patients, or their parents/guardians, should be advised to look out for any symptoms which might suggest complications (eg, persistent high fever, cellulitis, joint pain and swelling) and to seek medical help immediately if concerned.^{8 26}

Clinical knowledge summaries from National Institute for Health and Care Excellence (NICE)

The National Institute for Health and Care Excellence (NICE) Clinical Knowledge Summaries guidance for scarlet fever suggests that clinicians arrange admission for urgent assessment and treatment of people with scarlet fever who have pre-existing valvular heart disease or who are substantially immunocompromised (on account of increased risk of complications), or who have a suspected severe complication of scarlet fever (eg, staphylococcal toxic shock syndrome, acute rheumatic fever, or streptococcal glomerulonephritis).¹⁵

CKS also advise the following:

- If scarlet fever is suspected, the person is well and does not need admission, prescribe antibiotic treatment promptly
- Give advice about symptomatic relief
- Notify the local PHE centre
- Advise the person/family/carers about self care measures
- Consider seeking specialist advice from PHE if a person is at high risk of developing invasive group A streptococcal infection (those who are immunocompromised, have skin lesions, including chicken pox or wounds, have comorbidities such as diabetes mellitus, injecting drug users, and women in the puerperal period)¹⁵
- A 10 day course of penicillin V (or a five day course of azithromycin if allergic to penicillin) is recommended. Amoxicillin (for 10 days) is an option for children if compliance with penicillin is likely to be a problem.¹⁵

We found no other guidelines on scarlet fever published by NICE, the Scottish Intercollegiate Guidelines Network, or the All Wales Medicines Strategy Group.

Should I test or treat household contacts?

Routine testing of asymptomatic household contacts is not required because of the limited efficacy of antibiotic prophylaxis and potential risks associated with antibiotic use, including adverse effects and promotion of resistance.⁸ Antibiotic prophylaxis can be considered in exceptional circumstances, such as in people with severe immunosuppression; the recommended regimen is the same as for treatment.

Advise close contacts to be vigilant for signs or symptoms of scarlet fever or its complications.

Education into practice

- Study the illustrations in this article. How confident are you in recognising typical signs of scarlet fever, including the rash?
- How would you notify your local public health authority about a case of scarlet fever?

How patients were involved in the creation of this article

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Table

Table 1 | Scarlet fever statistics (England)⁴

	2013	2014
Notifications	4 436	15 637
GP consultations	13 200	26 500
Hospital admissions within 30 days of scarlet fever onset	237	656

Figures



Fig 1 Typical scarlet fever rash



Fig 2 Strawberry tongue



Fig 3 Peeling phase of rash