

## Scarlet fever or scarlatina

---

You may want to read the article on *Rheumatic fever* (in the Cardiovascular chapter) alongside this article.

**There are periodic outbreaks of this condition in the UK. Remember, scarlet fever is a notifiable disease in England, Northern Ireland and Wales (though not in Scotland)!**

**The DTB reviewed the diagnosis and management of this condition (DTB 2017;55(9):105, BMJ 2018;362:k3005). We also fill in gaps with the NICE CKS summary, accessed 2021.**

### Epidemiology

---

- Commonest in children aged 2–8y. In the UK, it is more common in the winter and spring.
- Usually 3–4000 cases/year in England, but in the winter of 2015–16 there were almost 13 000 reported cases.

### Transmission

---

- Without antibiotics, infected individuals remain contagious for up to 3w after symptoms appear. With antibiotics, children can return to school or nursery after 24h, if they are well enough.
- It is spread through saliva/mucus (and so in nurseries through shared toys/cups, etc.).
- It is very unusual to get scarlet fever twice, but you may get a different strep. infection.
- It is very unusual for asymptomatic carriers to be a source of infection.

### Pathology

---

Scarlet fever is caused by *Streptococcus Pyogenes* (Group A streptococcus (GAS)). It is commonly carried on the skin and throat without causing any symptoms. Up to 25% of healthy children carry it in their throats.

Certain strains contain genes that code for 'superantigens'. This makes them highly virulent. They can be invasive or non-invasive. The non-invasive forms of these virulent GAS can cause scarlet fever.

### Superantigens

Superantigens trigger a massive and fairly non-discriminative T-cell immune reaction. This can be beneficial, as the immune system goes on 'mass attack' and can destroy a range of pathogens simultaneously. This results in systemic symptoms such as fever and widespread rash.

It can also be harmful, as the immune system can attack the body itself, triggering guttate psoriasis, rheumatic fever and glomerulonephritis.

### Invasive GAS infections

Rarer still, GAS can cause invasive infections where it enters the bloodstream. These occur in 3 in 100 000 individuals in the UK each year, and are life threatening. They are most common in those with an additional risk factor for sepsis (young and old, immunosuppressed, puerperal women). These can present as:

- Bacteremia (sepsis).
- Meningitis.
- Septic arthritis.
- Cellulitis.
- Necrotising fasciitis.
- Streptococcal toxic shock syndrome.

## Why the fuss?

---

In many respects, 21<sup>st</sup> century scarlet fever is tonsillitis with a rash. But, whenever there is an outbreak, it hits the news. This is because historically, in the 18<sup>th</sup> and 19<sup>th</sup> century, scarlet fever was associated with high morbidity and mortality, particularly its association with rheumatic heart disease and glomerulonephritis. These are now very rare in the UK:

- Acute rheumatic fever <1/100 000 infected individuals.
- Streptococcal glomerulonephritis rarer still.

The sudden jump in cases raised concerns that we would also see an increased incidence in invasive GAS infections.

## Diagnosis

---

- Diagnosis is usually clinical.
- Incubation period usually 2–3d, but can be as little as 1d to up to 6d. Symptoms resolve over about a week.
- Presents with a sore throat, fever (usually >38°C) and a rash.
- Headache, fatigue, nausea and vomiting are common.
- The rash:
  - Blanching red rash which starts on the torso 12–48h into the illness, and then spreads to extremities. The rash starts as scarlet spots or blotches (sometimes called a ‘boiled lobster’ appearance). These become more widespread and start to look like sunburn with goose pimples, giving a sandpaper feel to the skin.
  - The rash is more florid in skin folds, where capillaries can rupture and cause red streaks (Pastia’s or Thompson’s lines). These usually last a day or two longer than the rest of the rash.
  - The top layers of skin may eventually peel off (particularly on the finger tips) as the disease resolves. This may continue for up to 6w.
- On examination, look for:
  - Strawberry tongue.
  - Cervical lymphadenopathy.
  - Flushed face with perioral pallor.
  - Pharyngitis with red macules on the palate (Forchheimer spots).
- **Always assess for features of systemic disease (toxic shock syndrome): fever, headache, confusion, vomiting, diarrhoea, shock.**

## Investigations

---

- Not usually needed in isolated cases – a clinical diagnosis can be made.
- ASO titres are not useful in acute situations, but may be used if there are complications.
- Public health authorities may recommend throat swabs in outbreaks.

## Treatment

---

- **Usually a mild, self-limiting illness, but prompt antibiotics are given to reduce the risk of complications.**
- Use penicillin V for 10d. Doses (from BNF for Children):
  - Child 1–11m: 62.5mg every 6h.
  - Child 1–5y: 125mg every 6h.
  - Child 6–11y: 250mg every 6h.
  - Child 12–17y: 250–500mg every 6h.
- If allergic to penicillin, use azithromycin for 5d. Doses (from BNF for Children):
  - 6m–11y: 12mg/kg once daily (max. per dose 500mg) for 5d.
  - 12–17y: 500mg once daily for 5d.
- **Remember, it is a notifiable disease: you need to tell the local public health team (see Useful website box below).**
- The fever usually resolves after 12–24h of antibiotics.
- Children can return to nursery (if they are well enough) after they have been on antibiotics for 24h.
- Careful hygiene in the home can reduce spread (separate towels, regularly hand washing, not sharing utensils and cups, etc.).

- **Avoid contact with high-risk individuals (pregnant women, young babies, the immunocompromised, those with comorbidities) until well.**

The DTB aimed to review the evidence behind treatment for this condition. Given that it is mostly self-limiting, it questioned whether we should still be routinely prescribing antibiotics. However, there is an absence of evidence to answer this question and for that reason, for now, we should continue to follow public health guidance as above. In addition, current exclusion guidance assumes that all children will be given antibiotics. If we do not give antibiotics, we have to assume they are contagious for 3 weeks...*not likely to be popular with most working parents or schools dependent on attendance figures!*

The DTB calls for further research to answer this question in the interests of prudent antibiotic stewardship.

## Complications

---

Complications are rare, but may be very serious. Prompt antibiotics are given to reduce the risk.

**In those who are immunocompromised or have comorbidities, the risk of invasive group A strep. is higher.**

- **Infective complications:** otitis media, sinusitis, peri-tonsillar/retropharyngeal abscess, mastoiditis, pneumonia, meningitis, cerebral abscess, endocarditis, osteomyelitis, liver abscess, necrotising fasciitis.
  - **Toxic shock syndrome is a result of invasive group A strep. infection. It may present with fever, headache, confusion, vomiting, diarrhoea and shock.**
- **Autoimmune complications:** acute rheumatic fever, glomerular nephritis (which presents with haematuria, proteinuria, peripheral oedema, reduced urine output, hypertension, typically 2w afterwards).

## Differential diagnosis of the rash

---

Many conditions, including:

- **Rubella:** rash usually starts behind the ears and spreads from there to the rest of the face/body.
- **Parvovirus B19:** slapped cheek appearance.
- **Measles:** often more unwell, with a fever >40°C. Red spots beginning on face and behind the ears, spreading over 24–36h to cover the whole body (except soles and palms). Spots are often up to 1cm in diameter initially and often coalesce. After 3–4d they start to fade, often going through a purplish stage.
- **Roseola infantum (herpes 6 virus):** small (<0.5cm) blanching, rose-pink rash. Some spots may develop a halo around them. Mainly on the trunk, rarely elsewhere. Similar spots occur on soft palate and uvula (Nagayama spots). May fade after 2h or last 2d.
- **Kawasaki's:** also can present with strawberry tongue, lymphadenopathy and peeling on hands and feet. Conjunctivitis may be present, and fever is usually prolonged (>5d).





*(Rash descriptions based on information on DermNetNZ website.)*

## Referrals

---

Refer if:

- Immunocompromised/significant comorbidity.
- Existing cardiac disease.
- Significant complications.

	<p><b>Scarlet fever/scarlatina</b></p> <ul style="list-style-type: none"> <li>• Common. Important to recognise and treat to prevent complications.</li> <li>• Usually presents in children with a typical rash, sore throat and fever (usually &gt;38°C), and often with headache, fatigue, nausea and vomiting.</li> <li>• Always assess for features of systemic disease (toxic shock syndrome): fever, headache, confusion, vomiting, diarrhoea, shock).</li> <li>• Treatment is with a 10d course of penicillin (or a 5d course of azithromycin if allergic to penicillin).</li> </ul>
	<p>Do you have a link on your intranet to the contact details for your local public health team? (To find them, see below!)</p>
	<p><b>For professionals:</b>  Notifiable disease forms:  <a href="http://www.gov.uk/government/publications/notifiable-diseases-form-for-registered-medical-practitioners">www.gov.uk/government/publications/notifiable-diseases-form-for-registered-medical-practitioners</a>  To find your local health protection team put your postcode into:  <a href="http://www.gov.uk/health-protection-team">www.gov.uk/health-protection-team</a></p> <p><b>For patients:</b>  There is a Public Health England leaflet that is useful for parents:  <a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/338368/Scarlet_fever_Q_and_A_factsheet.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/338368/Scarlet_fever_Q_and_A_factsheet.pdf</a></p>
	

This article was published 01/12/2022. We make every effort to ensure the information in this article is accurate and/ correct at the date of publication, but it is of necessity of a brief and general nature, and this should not replace your own good clinical judgement, or be regarded as a substitute for taking professional advice in appropriate circumstances. In particular, check drug doses, side-effects and interactions with the British National Formulary. Save insofar as any such liability cannot be excluded at law, we do not accept any liability for loss of any type caused by reliance on the information in this article

