

Scarlet fever – a diagnostic challenge for dentists and physicians: A report of 2 cases with diverse symptoms

Zuzanna Ślebioda^{A–D,F}, Agnieszka Mania-Końsko^{A–D,F}, Barbara Dorocka-Bobkowska^{A,E,F}

Department of Gerodontology and Oral Pathology, Faculty of Medicine, Poznan University of Medical Sciences, Poland

A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation;
D – writing the article; E – critical revision of the article; F – final approval of the article

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Address for correspondence

Zuzanna Ślebioda

E-mail: zuzia_slebioda@o2.pl

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Abstract

Scarlet fever is an infectious disease caused by group A streptococcal bacteria, transmitted mainly through direct contact with the saliva and nasal fluids of infected people. It may also arise from streptococcal wound infections or burns. The disease most commonly affects children aged 5–15 years and manifests as a sore throat, fever and a sandpaper-like, papular skin rash. Due to the evident involvement of the oral structures, the awareness of the symptoms of scarlet fever is essential for dentists in order to avoid the spread of this highly contagious disease in crowded places, such as kindergartens and schools. As no vaccine is available to prevent scarlet fever, the early diagnosis and treatment of this condition are important in reducing the risk of developing local and systemic complications, which include acute rheumatic fever, glomerulonephritis, bacteremia, pneumonia, endocarditis, and meningitis.

In this report, 2 cases of scarlet fever are described in unrelated children with diverse symptoms, and diagnostic and therapeutic strategies are discussed.

Key words: oral pathology, oral mucosa, scarlet fever

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Introduction

Scarlet fever is a disease caused by infective group A streptococcal bacteria.^{1–3} The route of transmission is mainly through direct contact with the saliva and nasal fluids of infected people. Scarlet fever may also arise from streptococcal wound infections or burns. Food-borne outbreaks have also been reported.^{1,2} A recent report indicates a potential relationship between opportunistic *Streptococcus sanguis* (*S. sanguis*) and scarlet fever.⁴ The disease most commonly affects children 5–15 years of age, in winter and spring, and manifests as a sore throat, fever and a sandpaper-like, papular, general skin rash. Rare cases of scarlet fever in elderly patients have also been reported.⁵ The characteristic appearance of the tongue, described as ‘strawberry tongue’ or ‘raspberry tongue’, is a common symptom.^{4–8} Although the incidence of scarlet fever declined in the past few decades, an increase in the number of cases worldwide has been observed recently. A newer virulent streptococcal bacterium is one of the potential causes of this reemergence of the disease. Major outbreaks have been reported in Asia, particularly in Vietnam and mainland China; smaller outbreaks have also occurred in the USA and Canada. The largest outbreak in the UK since 1969 was reported in 2015.^{1,2,9–13} Meanwhile, no serious exacerbations of scarlet fever have been observed in New Zealand, which may be partially explained by the 2012 introduction of a nationwide program for reducing acute rheumatic fever by treating *Streptococcus pyogenes* (*S. pyogenes*) pharyngitis in children at high risk.¹⁴ A significantly higher incidence of scarlet fever in urban areas with denser populations and more developed transport infrastructure as compared to rural regions has been recently observed, which suggests that prevention and control measures for this disease should be focused more on metropolitan areas.¹

The early diagnosis and treatment of scarlet fever are important in order to avoid the development of complications, both local and systemic. Local complications



Fig. 1. Erythema of the face in a 7-year-old patient

present as peritonsillar and retropharyngeal abscesses. Systemic complications include acute rheumatic fever, glomerulonephritis, bacteremia, pneumonia, endocarditis, and meningitis. In rare cases, hepatitis, gallbladder hydrops or splenomegaly may develop as a consequence of scarlet fever.^{9,10} Due to the characteristic oral presentation of this disease, it is very important for dentists to be able to recognize and correctly diagnose patients with scarlet fever, which will facilitate proper treatment.

Case reports

Case 1

A 7-year-old schoolboy suddenly developed facial erythema – initially appearing unilaterally, and later bilaterally – in the buccal regions, excluding the mouth (Fig. 1). This was followed by a diffuse, pink, papular rash affecting the limbs, the groin, the armpits, the trunk, and the buttocks (Fig. 2). Subjective complaints included only a moderate soreness of the throat and fatigue. The body temperature was elevated during the first 2 days of the infection, but did not exceed 38°C. There was no evidence of lymphadenopathy.



Fig. 2. Papular rash in the flexor area in a male patient

An intraoral examination revealed the erythema of the posterior wall of the pharynx and redness of the tongue with the absence of coating.

Apart from the ongoing infection, the boy was generally healthy. However, he required regular neurological follow-ups due to childhood epilepsy without seizures, which had been diagnosed 1.5 years earlier; he had suffered pharyngitis approx. 1 month prior. Also, his father and younger sister were infected at the time, presenting with flu-like symptoms, including fever, malaise and a cough.

Scarlet fever was diagnosed by a pediatrician on the 3rd day of the onset of the symptoms based on the characteristic mucocutaneous findings, without any accessory tests. Treatment for 10 days with amoxicillin with clavulanic acid in suspension – (400 mg + 57 mg)/5 mL – adjusted to the child's body weight, was begun on the 3rd day of the onset of the symptoms. The skin lesions faded fully in approx. 1 week, and no desquamation of the skin was observed afterward.

Case 2

A 4-year-old, generally healthy girl reported fatigue, nausea and abdominal pain followed by vomiting. At night, her body temperature was slightly elevated, reaching 37.7°C. The next day she developed a pink, papular skin rash, which started on the neck, the chest and the armpits, and rapidly spread to her trunk, limbs, groin, and



Fig. 3. Sandpaper-like skin rash in a 4-year-old female patient

face (Fig. 3). The patient did not report itching. Simultaneously, redness of the palatal tonsils and erythematous macules on the soft palate were detected. Severe coating on the tongue was observed, which disappeared in 2 days, showing a reddened tongue surface with enlarged filiform papillae (Fig. 4). However, the girl did not complain of a sore throat. The submandibular, cervical, axillary, and inguinal lymph nodes were tender and enlarged.

Scarlet fever was diagnosed by a pediatrician, who recommended phenoxymethylpenicillin at a dose of 750 mg/5 mL thrice daily for 10 days. Shortly afterward, the rash and other symptoms resolved. However, soon after the termination of the antibiotic treatment, the girl again developed a pink skin rash located on the neck and the back, spreading to the buttocks and the legs, but not accompanied by any other evident systemic signs. She complained of a sore throat. An intraoral examination revealed reddened palatopharyngeal arches. The tongue was not coated at the front, but elongated papillae were evident in the posterior part. A bacteriological culture from the oropharyngeal area revealed a moderately high growth of *S. pyogenes*, which was sensitive to penicillin, erythromycin and clindamycin. Due to the spontaneous remission of the symptoms, by the time the result of the culture was received, no additional treatment with an antibiotic

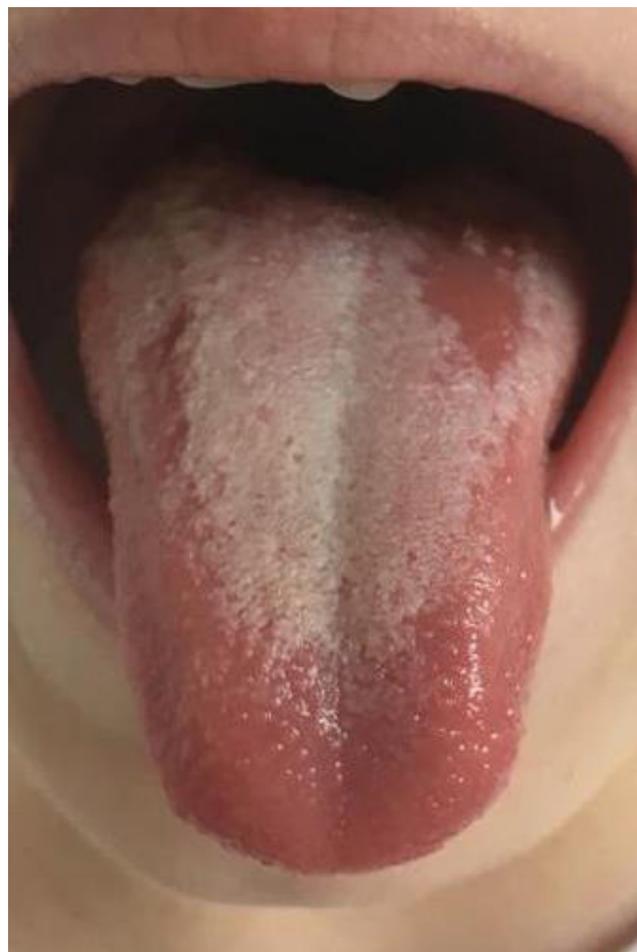


Fig. 4. Strawberry tongue in a 4-year-old girl with scarlet fever

was advised by the doctor. Considering the type and location of the skin lesions as well as the positive family history, this time, the condition was diagnosed as atopic dermatitis. Treatment with a cream containing fusidic acid and betamethasone valerate, applied twice daily for 5 days, was prescribed. The skin lesions slowly resolved, but a further application of emollients was advised.

As mentioned before, the girl was generally healthy, but 2 weeks prior to the initial infection, she had developed paronychia of the right thumb. The nail wall was red, swollen and warm, but no pathological exudate was evacuated from the area (Fig. 5). It was first treated with medicinal soft soap (soaking the thumb in a soapy solution a few times daily), and then with a topical neomycin spray twice daily for 5 days, with no improvement observed. It healed shortly after a systemic antibiotic for scarlet fever was administered. In this case, the typical skin desquamation of the hands was observed 2 weeks after the termination of the antibiotic therapy.

Meanwhile, the child developed signs of acute genital candidiasis with massive, white, removable coating on erythematous genital mucosa, combined with itching. This was treated with topical nystatin at a dosage adjusted to the child's body weight, which quickly resolved the symptoms.

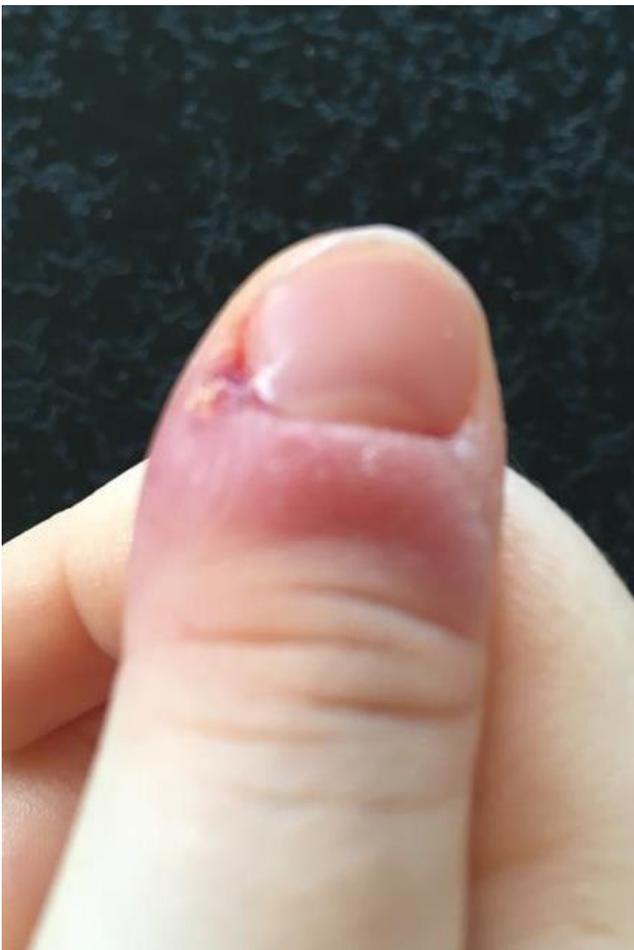


Fig. 5. Paronychia in a female patient with scarlet fever

Interestingly, the 2 children were in direct contact 8 days before the symptoms occurred in the boy. The girl was infected approx. 1 month later.

Discussion

Numerous options of a differential diagnosis in children with maculopapular dermatitis and fever must be considered. They include rubella, measles, Kawasaki syndrome, infectious mononucleosis, hand-foot-and-mouth disease, and the exanthematous drug reaction. A thorough history of all the clinical symptoms preceding dermatitis, a positive family history, the location of the lesions and their evolution as well as a history of medical treatment and recent travel history of the child and their caregivers are all essential for making a prompt diagnosis.^{8,15-17} Although the clinical appearance of scarlet fever is well established and well documented, we believe it is still important to describe the crucial signs of the disease and to emphasize the oral involvement, showing the potential role of a dentist in recognizing the disease. Considering the risk of complications in diseases with maculopapular dermatitis, an early diagnosis and the implementation of proper treatment are very important. For example, the clinical presentation of Kawasaki syndrome, which is defined as acute, generalized systemic vasculitis of an unknown etiology, may mimic scarlet fever, and there is a risk of acquired cardiac sequelae associated with both. However, treatment is different in each of those diseases.¹⁶

The gold standard for treating scarlet fever are antibiotics. Such a therapy decreases the duration of the illness and helps to prevent developing complications.^{10,15} It also stops the transmission of the disease between children, as a person is no longer contagious after 24 h of the treatment. The antibiotic of choice is penicillin V or amoxicillin for 10 days in a form and at a dosage adjusted to the child's body weight. If the patient is allergic to these drugs, first-generation cephalosporin, clindamycin or erythromycin can be used. The effectiveness of tonsillectomy did not appear to be high in the treatment of recurrent streptococcal pharyngitis, as the carrier state of group A streptococci is also common in patients who have had their tonsils removed.^{10,15,16}

In both of the cases presented herein, the patients were small children and the crucial symptom was a diffuse, sandpaper-like skin rash. The potential route of transmission in the 1st case was via the infected exudates of the family members. In the 2nd case, either direct contact with an infected person from a nursery school or the infection of a nail wall (paronychia) could be considered as the main route. It is worth noting that the oral symptoms were not so evident in the case of the boy, where the lymphadenopathy of the neck area was barely evident. Also, the phase of strawberry tongue with massive coating was not reported by the child's parents. No complications were observed as a consequence of this infection.

Contrary to those observations, in the 2nd case, all typical oropharyngeal signs of scarlet fever, including strawberry tongue and raspberry tongue with simultaneous pharyngitis and local lymphadenopathy, were preceded by abdominal pain and nausea, another common initial sign of this disease. Atopic dermatitis, which appeared in the girl shortly after the infection ended, could have been initiated by the presence of pathological streptococci or by the general dysregulation of the immune system due to infection. On the other hand, another complication which developed in this patient, i.e., acute pseudomembranous candidiasis, could have been a consequence of the antibiotic and steroid treatment, and again a sign of a temporarily reduced immune response. Although the 2 children were in contact with each other shortly before the boy developed the first signs of scarlet fever, it is not very likely that they infected each other, as the girl became ill approx. 10 weeks later than the boy. Considering the incubation period of scarlet fever, which is estimated to be 2–5 days, another route of transmission must be considered.

A diagnosis of scarlet fever is most commonly based on a detailed history and a characteristic clinical presentation. The recommended confirmation of the diagnosis is the culturing of a throat swab.^{10,15} Serological testing, where the antibodies against a streptococcal infection (antistreptolysin O and anti-deoxyribonuclease B) are detected, can be performed when assessing a person who may have one of the complications from a previous streptococcal infection, as it takes the body 2–3 weeks to produce these antibodies. Therefore, this type of testing cannot be used in diagnosing a current infection.¹²

As presented in these 2 case reports, the route of transmission and clinical appearance of scarlet fever may vary. Due to the evident involvement of the oral structures, the awareness of the symptoms of scarlet fever is essential for dentists in order to prevent the spread of this highly contagious disease in crowded places, such as kindergartens and schools. Currently, no vaccine is available to prevent scarlet fever, although the antibiotic treatment allows the complete resolution of the disease and prevents the development of complications. That is why a prompt diagnosis is so important.

ORCID iDs

Zuzanna Ślebioda  <https://orcid.org/0000-0002-5482-3964>

Agnieszka Mania-Końsko  <https://orcid.org/0000-0002-7345-2601>

Barbara Dorocka-Bobkowska 

<https://orcid.org/0000-0003-3659-7761>

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