



Severe Form of Scarlet Fever in a Child: A Case Report

İmdat Efendiyev , Anargul Mansurova 

ABSTRACT

Background: Scarlet fever is a bacterial illness characterized by a high fever and skin rash that can develop with acute onset, is typically accompanied by pharyngitis, and has the possibility of severe complications.

Case Report: An 11-year-old boy was referred to a children's infectious diseases hospital with a fever, rash, and sore throat. The child had significant signs of erythrotoxication, as well as punctate exanthem against a hyperemic background, a hemorrhagic rash on the lower extremities, and purulent plaques in the lacunae of the tonsils. Blood tests revealed hyperleukocytosis, neutrophilia, and an elevated erythrocyte sedimentation rate. Urine analysis revealed profuse erythrocytes. Hypocoagulability was determined in coagulation tests. Following antibiotic therapy, desensitization, and detoxification, the child was discharged on the 11th day with clinical and laboratory improvement.

Conclusion: Scarlet fever often occurs in a mild or moderate form; however, a severe and complicated course may also occur. Knowledge of appropriate treatment can be life-saving.

Keywords: Group A beta-hemolytic Streptococcus, scarlet fever, streptococcal infection

INTRODUCTION

One of the most common sources of bacterial infections in humans is group A beta-hemolytic Streptococcus. Streptococcal infection can appear in numerous clinical forms, from superficial (e.g., tonsillopharyngitis and erysipelas) to deep presentations (e.g., necrotizing fasciitis, meningitis, pneumonia, peritonitis), as well as toxin-mediated (e.g., scarlet fever) and immunopathological variants (e.g., acute rheumatic fever, post-streptococcal glomerulonephritis, etc.) (1). Though the availability of antibiotic treatment has greatly reduced the prevalence and morbidity of scarlet fever, it continues to be a concern. Up to 80% of modern scarlet fever cases occur between the ages of 4 and 12 years. The majority of cases are non-severe and uncomplicated, however, there are also severe forms with a risk of complications and death (2–4).

Scarlet fever is ubiquitous, but is more common in temperate and cold regions. One of the characteristic features of the disease is periodic fluctuations in incidence. In the East Kazakhstan region, as well as in whole of the Republic of Kazakhstan, there has been an increase in the incidence of scarlet fever. In 2019, the incidence was 4.10 per 100 thousand in the Republic of Kazakhstan and 8.88 in the East Kazakhstan region. In 2020, the recorded incidence in the republic was 11.51 and 28.57 in the East Kazakhstan region (5). This report describes a case of a severe form of scarlet fever with a hemorrhagic component in an 11-year-old child treated in the city of Semey in the East Kazakhstan region.

CASE REPORT

An 11-year-old boy was hospitalized with complaints of a fever, sore throat, weakness, and a body rash. The patient was admitted 2 days after the onset of the disease. The early signs of illness were a temperature of 38.5°C to 40°C, weakness, and an episode of vomiting. On the second day, miliaria appeared on the body, and a sore throat was noted. A doctor at the polyclinic referred the patient to an infectious diseases hospital. Investigation of the epidemiological history revealed that 5 days before the onset of disease, the boy had been in contact with a schoolchild diagnosed with purulent tonsillitis.

The general condition of the patient was assessed as severe, due to manifestations of erythrotoxication, profuse rash, hemorrhagic syndrome, and purulent-inflammatory process in the oropharynx. The patient's body temperature at admission was 39.9°C and he was lethargic. A small-point, miliary rash was present all over the body, particularly in the natural folds and on the inside of the forearms and thighs (Fig. 1, 2). A hemorrhagic petechial rash was observed on the lower extremities. Hyperemia of the cheeks and forehead was noted, in

Cite this article as:
Efendiyev İ, Mansurova A.
Severe Form of Scarlet
Fever in a Child: A Case
Report. Erciyas Med J
2022; 44(6): 621-3.

Department of Children's
Infectious Diseases, Semey
Medical University, Semey,
Republic of Kazakhstan

Submitted
24.01.2022

Revised
02.02.2022

Accepted
07.04.2022

Available Online
23.05.2022

Correspondence
Anargul Mansurova,
Department of Children's
Infectious Diseases, Semey
Medical University, Semey,
Republic of Kazakhstan
Phone: +90 777 151 76 35
e-mail:
mansurova2005@yandex.ru

©Copyright 2022 by Erciyas
University Faculty of Medicine -
Available online at
www.erciyesmedj.com



Figure 1. Small-point rash observed on a lower extremity

addition to a pale nasolabial triangle and white dermographism. Examination of the oropharynx revealed hyperemia of the mucous membranes, hypertrophied tonsils, and purulent deposits in the lacunae of both sides. The tongue papillae displayed the classic raspberry tongue appearance (Fig. 3). The submandibular lymph nodes were enlarged, painless, and mobile. Auscultation revealed vesicular breathing without wheezing. The respiratory rate was 24 breaths per minute; heart sounds were muffled and rhythmic, with evidence of tachycardia (heart rate 160 beats per minute). Other findings were arterial pressure: 125/85 mmHg, a soft abdomen with no sign of pain, and reduced urination. Laboratory test results indicated leukocytosis, neutrophilia, elevated erythrocyte sedimentation rate, a low platelet count in the general blood test, a moderately low level of fibrinogen, and a prolongation of activated partial thromboplastin time in the coagulogram (Table 1). Urinalysis revealed transient erythrocyturia without impairment of the concentration function of the kidneys. Bacteriological examination of a throat swab revealed a culture of *Streptococcus pyogenes*.

Acute onset, fever reaching 40°C, pronounced intoxication syndrome, punctate rash with a hyperemic background, hemorrhagic elements on the lower extremities, and purulent tonsillitis phenomena yielded a clinical diagnosis of a severe case of typical form scarlet fever.

On the day of admission, a single intravenous infusion of benzylpenicillin was performed for detoxification. Subsequently, desensitization and antibacterial therapy was performed with benzylpenicillin at 1 million units, 4 times a day, administered intramuscularly for 8 days.

On the third day of hospitalization, the patient's body temperature decreased to a subfebrile level, and returned to normal on the fourth day. After 5 days, the rash had begun to gradually fade, and by the end of a week of hospitalization, flaking and peeling appeared on the body as well as large areas of lamellar peeling on the palms. Purulent plaque on the tonsils persisted until the seventh day of hospitalization. Cardiac activity, and blood and urine test results had returned to normal by the ninth day. The patient was discharged on the 11th day of hospitalization.



Figure 2. Diffuse, small, punctiform rash present on the abdomen

DISCUSSION

Scarlet fever is an infectious, streptococcal disease. It is often mild, but may also be severe. Scarlet fever remains a serious epidemiological and clinical concern. The disease has been associated with toxico-allergic complications, such as myocarditis and glomerulonephritis. Research has suggested that as much as 10% to 12% of the development of diffuse glomerulonephritis may be related to scarlet fever.

The source of infection may be a patient with tonsillitis, scarlet fever, or other clinical forms of streptococcal infection, as well as healthy carriers of group A *Streptococcus*. In our case, the patient had been in contact with a schoolmate with tonsillitis.

Most often, scarlet fever in children is seen in a mild or moderate form, however, some 1% to 2% of cases may be severe. It is also important to bear the incidence rate in mind, which appears to be cyclical and may be rising, in part due to antibacterial resistance. In the present case, the symptoms of scarlet fever with a severe course included hyperthermia (body temperature up to 40°C), pronounced symptoms of intoxication (vomiting, weakness, lethargy), a typical small-pointed rash with a hyperemic background, and hemorrhagic elements. Typical changes in the oropharynx were observed: bright, limited hyperemia of the tonsils, purulence in the tonsils and swelling in peripheral submandibular lymph nodes. It should be noted that changes in the heart associated with a change in the tone of the autonomic nervous system (sympathetic phase) were observed within the first week: tachycardia and a slight increase in blood pressure. Blood testing revealed indications of



Figure 3. Strawberry tongue and perioral desquamation

inflammation. Urine tests returned to normal in parallel with the alleviation of intoxication syndrome. A hemorrhagic syndrome (petechial rash) was confirmed with coagulogram indications of hypocoagulation, which is also a criterion for severe scarlet fever.

Due to timely hospitalization and appropriate therapy, this patient did not develop any complications and was discharged in 11 days. However, clinicians must remember that complications associated with the allergic component of group A *Streptococcus* (glomerulonephritis, myocarditis) may develop in the later stages after recovery. Appropriate monitoring for the possible development of complications after scarlet fever after discharge from the hospital should include recommendations for further outpatient management. This includes evaluation of a complete blood and urine test, conducting an electrocardiogram, and consultation with a nephrologist or cardiologist.

CONCLUSION

The clinical picture of scarlet fever can vary from mild to severe, and the outcome can be deadly. Clinicians should be aware of the clinical manifestations of the disease, the risk of complications, and the need for further management after recovery.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Table 1. Laboratory test results

Laboratory test	Days in hospital		
	Day 1	Day 4	Day 9
WBC ($\times 10^9/L$)	20.94	15.5	8.6
RBC ($\times 10^{12}/L$)	4.05	4.0	4.0
Hemoglobin (g/L)	118	119	119
Thrombocytes ($\times 10^9/L$)	120	240	250
Neutrophil %	96	76	60
Lymphocyte %	1.2	15.2	27
Monocyte %	2	2.8	10
Eosinophil %	0.8	6	3
ESR (mm/h)	30	20	10
APTT (30–40 s)	55	50	35
INR (1.1)	1.8	1.1	1.0
Fibrinogen (g/L)	1.5	1.7	2.3
Urea (mmol/L)	5.29	5.0	4.5
Creatinine (mmol/L)	59.3	55.5	50

APTT: Activated partial thromboplastin time; ESR: Erythrocyte sedimentation rate; INR: International normalized ratio; RBC: Red blood cell; WBC: White blood cell

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – İE, AM; Design – İE, AM; Supervision – İE, AM; Data Collection and/or Processing – İE, AM; Analysis and/or Interpretation – İE, AM; Literature Search – AM; Writing – İE, AM; Critical Reviews – İE.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

- Guy R, Williams C, Irvine N, Reynolds A, Coelho J, Saliba V, et al. Increase in scarlet fever notifications in the United Kingdom, 2013/2014. *Euro Surveill* 2014; 19(12): 20749. [CrossRef]
- Yang P, Peng X, Zhang D, Wu S, Liu Y, Cui S, et al. Characteristics of group A *Streptococcus* strains circulating during scarlet fever epidemic, Beijing, China, 2011. *Emerg Infect Dis* 2013; 19(6): 909–15. [CrossRef]
- Basetti S, Hodgson J, Rawson TM, Majeed A. Scarlet fever: a guide for general practitioners. *London J Prim Care (Abingdon)* 2017; 9(5): 77–9. [CrossRef]
- Kim JH, Cheong HK. Increasing number of scarlet fever cases, South Korea, 2011–2016. *Emerg Infect Dis* 2018; 24(1): 172–3. [CrossRef]
- Ministry of Health of the Republic of Kazakhstan. The health of the population of the Republic of Kazakhstan and the activities of health-care organizations in 2020: Statistical compendium.; 2020. 324P. Available from: URL: <https://www.gov.kz/memleket/entities/dsm?lang=en>.