

A Case of Overwhelming Postsplenectomy Infection Caused by *Streptococcus pneumoniae* with Fulminant Purpura

Masamichi KOMATSU, Toru ISHIHARA, Saki MANABE, Kosuke KUWANO, Masayuki OKI, Hidetaka YANAGI, Hideki OZAWA and Atsushi TAKAGI

Department of General Internal Medicine, Tokai University School of Medicine

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Severe infection in patients who have lost splenic function is called overwhelming postsplenectomy infection (OPSI). Untimely treatment of patients with OPSI results in critical conditions with mortality rates as high as 50 %-70 %. For patients who undergo a splenectomy, vaccination is recommended for the prevention of OPSI. However, in Japan, the vaccination utilization rates are low. Herein, we report a case of OPSI caused by *Streptococcus pneumoniae* with a fulminant purpura resulting in multi-organ failure, which could be reversed by intensive care.

Key words: overwhelming postsplenectomy infection, splenectomy, streptococcus pneumoniae, fulminant purpura

INTRODUCTION

The spleen is important for the removal of encapsulated organisms, because it has significant immune functions, such as phagocytosis, bacterial filtration, and opsonization [1]. Patients who have undergone splenectomy are at risk of acquiring a highly severe course when infected with capsulated organisms, and the associated mortality rate can be as high as 50 %-70 % [2]. Severe infection in patients who have lost splenic function is called overwhelming postsplenectomy infection (OPSI). For patients who undergo a splenectomy, vaccination for the prevention of OPSI is recommended. However, in Japan, it is sometimes not utilized.

Herein, we report a case of OPSI caused by *Streptococcus pneumoniae* and presented with a fulminant purpura resulting in multi-organ failure, and this condition could be reversed through intensive care.

CASE REPORT

A 40-year-old man with a history of splenectomy for splenic injury due to a traffic accident at the age of 18 years had been well until one week before the onset of fever and cough. On the day of hospitalization, his parents discovered that he collapsed in the toilet, and they took him to the emergency department of the previous hospital. He had fever, impaired consciousness, severe hypotension, disseminated intravascular coagulation (DIC), and renal dysfunction. Therefore, he was referred to our hospital for intensive care management.

When brought to our hospital, he was in a coma. His temperature was 39.6 °C. He had a blood pressure of 84/58 mmHg, heart rate of 156 beats per minute, respiratory rate of 30 times per minute, and an oxygen saturation of 94 % under supplemental oxygen of 2

liters per minutes by nasal cannula. Physical findings showed purpura in the head and extremities, and they spread to the center of the body during the examination (Fig. 1). Results of the initial laboratory examination showed the following values: a platelet count of 17,000 / μ L (reference range: 140,000-400,000 / μ L), activated partial thromboplastin time of 113 s (reference range: 25-36 s), prothrombin time of 39 s (reference range: 9.3-13.8 s), prothrombin-time international normalized ratio of 3.17, creatinine kinase level of 21,377 U/L (reference range: 30-140 U/L), aspartate aminotransferase level of 568 U/L (reference range: < 30 U/L), alanine aminotransferase level of 201 U/L (reference range: < 35 U/L), creatinine level of 3.56 mg/dL (reference range: 0.5-0.8 mg/dL), blood urea nitrogen level of 32 mg/dL (reference range: 8-20 mg/dL), and lactic acid level of 46 mg/dL (reference range: 4.5-14.4 mg/dL), urine samples tested positive for pneumococcal antigen, although blood, urine, cerebrospinal and sputum cultures isolated no organism. Thoracic computed tomography (CT) revealed an absence of infiltration in the lungs. In addition, abdominal CT revealed that his spleen was missing. He never received a pneumococcal vaccine. Thus, the diagnosis of OPSI and invasive pneumococcal infection was made.

Fluid resuscitation was performed. However, anuria persisted, and hypoxemia worsened. Thus, tracheal intubation was performed, and mechanical ventilation was started. We started the patient on vancomycin and ceftriaxone empirically. He was admitted to the intensive care unit, and hemodialysis was required for severe metabolic acidosis. The administration of noradrenaline of up to 0.84 μ g/kg/minute, vasopressin of up to 0.03 unit/min, and hydrocortisone of 200 mg/day was necessary for the treatment of refractory



Fig. 1 Initial assessment upon admission. Fulminant purpura in the head and extremities are observed.

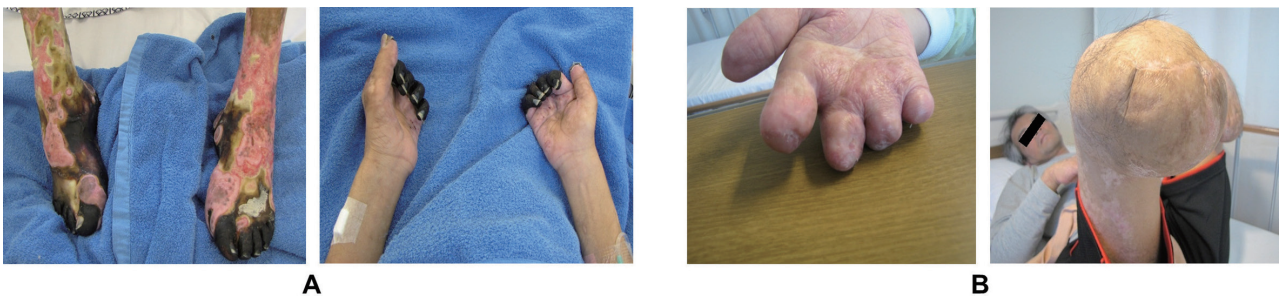


Fig. 2 A: Purpura that had spread to the distal part of the extremities and necrosis are observed.
 B: After the patient's condition stabilized, amputation of the necrotic body part was performed by a plastic surgeon.

shock. These supportive therapies were required for a week. Furthermore, ventilation and dialysis was required for 4 weeks. Eventually, he had to undergo limb amputation due to necrosis (Fig. 2). Rehabilitation was successful, and he walked home with leg prosthesis on day 292 after admission. Later in the outpatient clinic, vaccines for *S. pneumoniae* (23-valent pneumococcal polysaccharide vaccine, Pneumovax®; 13-valent conjugate pneumococcal vaccine, Prevnar®) and *Haemophilus influenzae* (*H. influenzae* type b conjugate vaccine) were administered.

DISCUSSION

This case had highly severe symptoms, such as impaired consciousness, hypotension, renal disorder, and DIC, that progressed in a short time. Sepsis was also suspected. However, the location of the infection was unknown. On the basis of an absent spleen and detection of urinary pneumococcal antigen, OPSI caused by *S. pneumoniae* was suspected. The prevalence of OPSI is about 5 %, and the incubation period is from 5 days to 35 years [3]. In the present case, splenectomy was performed 22 years ago. Common examples of microflora include capsular microorganisms, such as *S. pneumoniae*, *Neisseria meningitidis* (*N. meningitidis*), and *H. influenzae* [4]. OPSI may suddenly develop without prodromal symptoms [5]. When patients suddenly develop sepsis as seen in the present case, we need to take a thorough medical history, including splenectomies undergone, because the differential diagnosis may include OPSI. In patients with OPSI, hypotension, vascular endothelial disorder, and coagulation disorder may lead to fulminant purpura or limb necrosis result-

ing to amputation [6]. In this case, the patient received intensive care after hospital admission. However, amputation was not avoidable.

Prevention is particularly important for OPSI. In view of the high mortality rate observed in OPSI, measures that avoid splenectomy should be utilized whenever possible. The spleen is the dominant site for the production of IgM antibodies that are required for opsonizing encapsulated pathogens. Thus, whenever elective splenectomy is considered, patients should undergo appropriately timed preoperative immunization against *S. pneumoniae*, *N. meningitidis*, and *H. influenzae* type b [7]. Vaccines should be administered at least 14 days prior to scheduled splenectomy. If patient vaccination is not possible preoperatively, immunizations can be given 14 days after operation [8]. In Europe and the USA, guidelines that encourage pneumococcal vaccination in asplenic patients are available. However, only guidelines for ITP are available in Japan [9–11]. A cross-sectional study in the UK showed that only 31 % of patients who suffered from OPSI had vaccination. Even in developed countries, the vaccination rate is low [12].

Postsplenectomy patients must recognize that fever or rigors may be the harbinger of bacteremia and should self-medicate with oral antibiotics. These patients should have prescribed antibiotics on hand and take them immediately [13]. In this clinical scenario, amoxicillin–clavulanate or extended spectrum of quinolone is recommended. After the first dose is taken, the patient should proceed without delay to the nearest emergency care facility. If a patient is suspected of bacteremia in the outpatient department or emer-

gency room, empiric antibiotics, such as ceftriaxone, should be administered immediately. Initial treatment and prevention are important.

CONCLUSION

We report a remarkable recovery in a patient with OPSI. However, if he had received adequate vaccination and had self-medicated with oral antibiotics, limb amputation may have been avoided. When we see patients have undergone splenectomy, they should be educated about OPSI and the importance of vaccination.

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