Septic Intramuscular Embolism in a Neutropenic Patient with Myelodysplastic Syndrome Accompanied by Asymptomatic Septic Pulmonary Emboli

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Abstract

Septic embolisms are rare disorders which are associated with increased mortality and morbidity. We describe a rare case of septic intramuscular embolism accompanied by asymptomatic pulmonary embolism in a neutropenic patient. Methicillin-sensitive Staphylococcus aureus (S. aureus) was detected and multiple nodules were revealed in both thighs and lung. Although he was treated with sensitive antibiotics to S. aureus, the symptoms remained unchanged during the neutropenic period. Fever subsided rapidly and his thigh pain disappeared after neutropenia resolved. A prompt diagnosis and optimal therapeutic decisions are critical for the reduction of mortality.

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Key words: septic pulmonary emboli, septic intramuscular embolism, Staphylococcus aureus, neutropenia

Introduction

Septic embolisms are rare disorders which are associated with increased mortality and morbidity. They are frequent complications of bacterial endocarditis, septic thrombophlebitis, or infected central lines (1). The diagnosis is made by blood culture and radiographic findings. In the case of pulmonary embolism, patients typically present with fever, cough, and hemoptysis. Chest CT shows bilateral peripheral nodules with identifiable feeding vessels or subpleural wedge-shaped densities with or without necrosis (2). Staphylococcus infection, especially Staphylococcus aureus (S. aureus), has been thought as the most common cause of septic pulmonary embolism (3, 4). S. epidermidis and Candida albicans can also be the cause of embolism. Antibiotic therapy is often initiated empirically. The initial choice of antibiotics depends upon the severity of the patient’s clinical disease and the risk factors for infection. A prolonged course of antibiotic therapy (duration, 4–6 weeks) should be considered (4). Anticoagulation may expedite recovery. Some patients may need surgical drainage or to remove central venous catheters.

We describe a rare case of septic intramuscular embolism accompanied by asymptomatic pulmonary embolism in a neutropenic patient. S. aureus was detected from peripheral blood culture and multiple nodules were revealed on an MRI of both thighs and chest CT. The embolisms were thought to have developed from an infected central line.

Case Report

A 58-year-old man with myelodysplastic syndrome (MDS; RAEB in T) achieved complete remission after induction therapy and underwent periodic chemotherapy of the same regimen as induction treatment every three months. The induction course consisted of etoposide, cytarabine and vindesine. He received the treatment via a central line inserted immediately before each therapy. At fifteen days after the third course of chemotherapy, he noted fever and generalized fatigue. Carbapenem (0.5 g ×4/day) and tetracycline (100 mg ×2/day) were started empirically after examination of a blood culture and the central line was removed. Laboratory results indicated a white blood cell count of 1.0×10^9/l with 2% neutrophils, hemoglobin was 13.0 g/dl, the platelet count was 23×10^9/l, and the serum concentration of C-reactive protein (CRP) was 6.13 mg/dl. Methicillin-
sensitive *S. aureus* was isolated from the peripheral blood culture, but could not be detected from either another blood culture or the central line. Four days after the appearance of fever, he suddenly felt muscle pain in his bilateral inside femoral region without redness, fluctuation or swelling, and he could not stand because of the pain. His femoral muscle strength was reduced. Laségue sign and sensory disturbance were not observed. Deep tendon reflexes of the bilateral lower extremities were not diminished. He did not present with chest pain, cough, hemoptysis, tachypnea, or shortness of breath. His oxygen saturation in room air was normal. Although he had severe muscle pain, the serum CK did not increase (17 IU/l). MRI of both thighs showed multiple nodules in the muscle (Fig. 1A). A chest radiograph and chest CT showed multiple nodular foci scattered in the peripheral areas of the bilateral lungs.

A diagnosis of septic intramuscular embolism with pulmonary emboli was made. Although the *S. aureus* detected from the patient was sensitive to carbapenem and tetracycline, the symptoms, including fever and pain in the thighs, remained unchanged during the neutropenic period and the CRP increased to 19 mg/dl. The antibiotics were changed to cephalosporin and quinolone, and granulocyte colony-stimulating factor (G-CSF) was administered. After neutropenia was resolved, his fever subsided rapidly and the infection-related symptoms disappeared. The multiple nodules in the thigh muscles and bilateral lung fields disappeared completely on an MRI of both thighs and chest CT at three months after the episode of infection. Although he received another four courses of intermittent chemotherapy and underwent reduced-intensity stem cell transplantation (RIST) from an HLA-identical sibling donor, no symptoms related to the septic embolisms recurred. He was subsequently discharged to an outpatient clinic with no symptoms of infection or recurrence of MDS.

**Discussion**

Septic embolisms are rare disorders usually caused by *S. aureus* (3, 4), which releases various exotoxins. Alfa-toxin acts on cell membranes and may produce an aggregation of platelets and smooth muscle spasm (5). A variety of enzymes are released, among them coagulase, which specifically interacts with fibrinogen and causes plasma to clot. These factors may predispose the development of deep vein thrombophlebitis. In this case, the patient developed multiple septic embolisms. *S. aureus* was isolated from peripheral blood,
and the embolisms were confirmed by an MRI of both thighs and a chest CT. Most cases of septic pulmonary emboli are caused by bacterial endocarditis, septic thrombophlebitis or infected catheters (1). Although *S. aureus* was not isolated from the central line but was detected from a blood culture, we considered that the embolism origin might be the central catheters because the patient had no signs of thrombophlebitis and bacterial endocarditis was not detected. The septic embolisms did not redevelop after removal of the catheter, although he received other courses of chemotherapy and RIST.

Although he developed severe symptoms of intramuscular septic embolism, there were few symptoms associated with pulmonary emboli. It is possible that the asymptomatic pulmonary emboli might be caused by small thromboemboli. The small embolism could facilitate the development of intramuscular lesions. Another possibility of asymptomatic pulmonary disease might be that the patient was under neutropenia. It is known that the signs and symptoms of infection are attenuated during neutropenia. Infection in immunocompromised persons is often rapidly progressive and life threatening. The frequency of infection begins to increase when the neutrophil counts fall below 1,000/mm³ and increases dramatically when it is less than 500/mm³. The morbidity and mortality from infection in neutropenic patients depend on the duration and severity of neutropenia (6).

Neutropenic fevers should operationally be regarded as infection until proven otherwise. A randomized trial of empirical therapy for febrile neutropenia in Japan reported that among 189 patients, 5.8% had microbiologically and 10.6% had clinically documented infections (7). The Guidelines of the Infectious Disease Society of America suggested that antibiotics should be administered for a single temperature of 38.3°C orally or 38.0°C for more than 1 hour in neutropenic patients with cancer (8). Patients with neutropenic fever should be treated with effective antibiotics against *S. aureus*, *strepococci*, *Pseudomonas aeruginosa*, and *enterobacteriaceae* empirically. Vancomycin is not recommended for initial therapy because of the selection risk of vancomycin-resistant *S. aureus* (9). If fever persists after 72–96 hours of first-line therapy with antibiotics, the regimen should be modified. Antibiotic treatment is sometimes unsuccessful unless the neutropenia resolves (9). In the present case, although the patient was treated with suitable antibiotics for *S. aureus*, the symptoms remained unchanged during a neutropenic period. G-CSF was administered and after neutropenia was resolved, fever reduced rapidly and the foot pain disappeared. Growth factor could help in controlling infection.

In conclusion, neutropenic patients with *S. aureus* septicemia should be considered as a possible risk of septic embolisms, although they have few symptoms. The clinical manifestation, blood culture findings and radiographic findings are of diagnostic value. G-CSF should be considered in neutropenic patients who are not responding to initial antibiotic therapy. It is important to make prompt diagnosis and optimal therapeutic decisions to reduce mortality from sepsis.

References


