



Baker's Cyst With Bacterial Infection in a Patient with Recently Diagnosed Systemic Lupus Erythematosus

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Systemic lupus erythematosus (SLE) is a systemic autoimmune disorder characterized by the production of numerous pathologic autoantibodies. Patients with SLE are at increased risk of infection because of the disease course or treatment-related immunodeficiency. Infection is a major cause of morbidity and mortality among patients with SLE. Infected Baker's cyst (BC) can occur in patients with trauma, and degenerative or inflammatory arthritis, but is rarely described in SLE patients. We describe the case of a 22-year-old woman with a three-month history of SLE who did not receive any immunosuppressive treatment after diagnosis. Initial manifestations included fever, tachycardia, and hypotension with pain and edema in her left calf. Magnetic resonance imaging revealed a large BC with thickening of the adjacent subcutaneous layer of the calf. Turbid fluids were aspirated from the cyst, and methicillin-susceptible *Staphylococcus aureus* was cultured. She received antibiotic therapy and surgical drainage of the abscess. The patient recovered after 4 weeks of therapy. Early diagnosis, timely surgical intervention and use of antibiotics are important for reducing mortality associated with BC with infection.

Key words: Baker's cyst, systemic lupus erythematosus, *Staphylococcus aureus*

INTRODUCTION

Baker's cyst (BC), or popliteal cyst, is an accumulation of fluid in the posteromedial aspect of the knee between the medial gastrocnemius tendon and the semimembranosus tendon^{1,2}. The initial presentation of BC may be asymptomatic, or there may be a palpable mass, limited movement of knee, pain, swelling, and thrombophlebitis-like symptoms¹. The incidence of BC is between 5% and 38%, and the prevalence increases with aging¹. There are various diseases associated with BC, including osteoarthritis, rheumatoid arthritis (RA), trauma-related tearing of ligaments, infection, spondyloarthropathies (SpA) and Behcet's disease¹⁻⁴. Infection is a major cause of mortality among patients with systemic lupus erythematosus (SLE) because

of immunologic dysfunction⁵. Among patients with SLE, infection-related mortality is observed both early and late in the course of the disease. Bacterial, viral, fungal, and protozoa organisms cause infections in patients with SLE. The pulmonary, integumentary, and genitourinary systems are most commonly affected by infections⁶. Unlike other autoimmune diseases, including RA and SpA, BC with infection is uncommon among patients with SLE because of less peripheral arthropathy. This report describes the case of BC with bacterial infection resulting from methicillin-susceptible *Staphylococcus aureus* (MSSA) in a SLE patient without regular immunosuppressive medication.

CASE REPORT

A 22-year-old woman presented to the emergency department with a three-day history of fever and swelling in her left calf associated with severe difficulty in walking. Three months before, she had been diagnosed with SLE. She reported eating regular health foods and not having any immunosuppressive therapy. On physical examination, she had a temperature of 40 °C, a heart rate of 144 beats/min, a blood pressure of 97/46 mm Hg, and a respiratory

Received: February 25, 2009; Revised: March 23, 2009;
Accepted: April 7, 2009

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Fig. 1 Significant swelling with a mild erythematous skin rash on the left calf.

rate of 26 breaths/min. The patient was alert and answered questions properly. There was marked swelling and a mild erythematous rash with tenderness on her left calf (Figure 1). She had significant difficulty moving her left leg. Laboratory investigations showed a white blood cell count of 35,200 cells/ μ L with 98% neutrophils and 1% lymphocytes, a hemoglobin level of 8.1 g/dL, a platelet count of 142,000 cells/ μ L, a C-reactive protein (CRP) level of 27.19 mg/dL (normal <0.5 mg/dL), blood urea nitrogen level of 53 mg/dL (normal 7-20 mg/dL), a creatinine level of 1.0 mg/dL (normal 0.5-1.0 mg/dL), an aspartate aminotransferase level of 55 U/L (normal <31 U/L), an alanine aminotransferase level of 124 U/L (normal <31 U/L), and a glucose level of 81 mg/dL. Immunoserological analysis revealed antinuclear antibodies (ANA) 1:1280 with mixed pattern. Her levels of antibodies were as follows: anti-Sm 57.5 U/mL (normal <5 U/mL), anti-Ro 240 U/mL (normal <7 U/mL), anti-La 140 U/mL (normal <7 U/mL), C3 35.5 mg/dL (normal 90-180 U/mL), C4 5.7 mg/dL (normal 10-40 mg/dL), and anti-dsDNA 136 IU/mL (normal <10 IU/mL). The results of blood cultures obtained on admission showed gram-positive cocci. A musculoskeletal ultrasound (MSUS) showed a large cyst with accumulation of hypoechoic fluids (Figure 2). Emergent aspiration was performed, and pus-like materials were found. Analysis of synovial fluid revealed a white blood cell count of 64,000 cells/ μ L with predominately neutrophils (90%). Based on the results of imaging and laboratory studies, the patient was diagnosed as having BC with infection. Magnetic resonance imaging (MRI) showed BC with thickening of the adjacent subcutaneous layer of the patient's left calf (Figure 3). Debride-

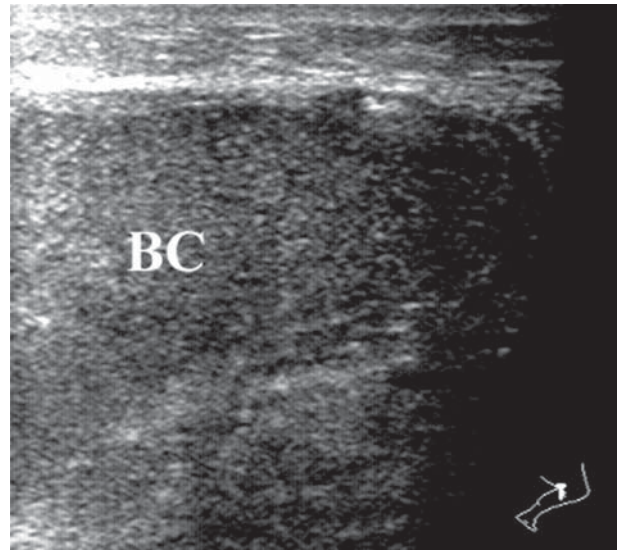


Fig. 2 Longitudinal sonogram of the left calf shows a hypoechoic effusion arising from the popliteal fossa, between the medial gastrocnemius and the semimembranous tendons, and extending downward to the ankle joint.

ment with hemo-vac suction drainage was performed. Microscopic pathology of the soft tissue showed necrotizing inflammation with hemorrhage. Cultures from blood, synovial fluid, and soft tissue all grew MSSA. The patient received intravenous oxacillin therapy for 14 days, and her fever subsided. Oral prednisolone (10 mg) and hydroxychloroquine (200 mg) was given daily in addition to antibiotics. After 4 weeks, the patient's renal and liver functions were within normal range. The serum levels of anti-dsDNA, C3, and C4 also returned to normal range. The patient had no recurrent symptoms of infection in the following three months.

DISCUSSION

SLE is a multi-system disease with intrinsic and extrinsic defects in humoral and cellular immunity⁷. To correct these immune dysfunctions and to control disease activity, patients with lupus are usually given numerous immunosuppressive drugs. Therefore, infections are more common among patients with SLE compared to among people in the general population⁵. Various viral and bacterial infections can occur during the clinical course of SLE. Active renal disease, lupus activity, and lower serum albumin are associated with an increased risk of infection^{5,6}. In bacterial infections of SLE, the most infectious patho-

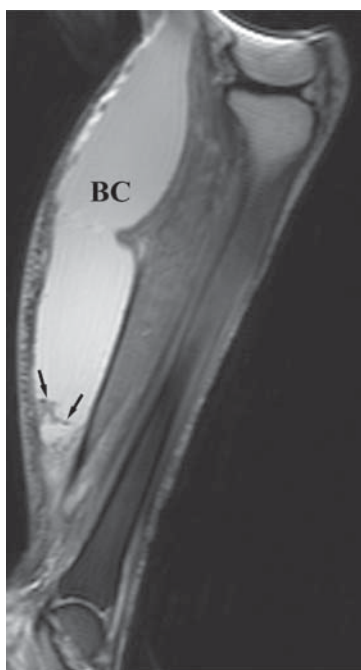


Fig. 3 Sagittal fat-suppressed T2-weighted magnetic resonance image clearly showing the extent of the Baker's cyst. Note the internal septations (black arrows) within the cyst. Thickening of the adjacent subcutaneous layer of calf is also evident.

gens are *S. aureus*, *Streptococcus pneumonia*, *Escherichia coli*, and *Pseudomonas aeruginosa*⁵. Infection can occur at different sites, including the respiratory tract, urinary tract, and the skin. However, arthritis with infection-related fluid accumulation is uncommon in patients with lupus.

BC can occur in patients with autoimmune diseases, such as RA, Bechet's disease, and SpA^{8,9}. However, BC is rare among patients with SLE^{10,11}. The most common reason for BC is recurrent synovitis or arthritis-induced accumulation of excess fluid in the joint space¹. Most patients with BC are asymptomatic; however, acute calf pain may occur. There are many diseases that should be included in the differential diagnoses for acute calf pain and swelling, including deep vein thrombosis, BC, trauma, tendonitis, cellulitis, and arterial aneurysm¹². MSUS is useful for differentiating between these diseases. In our case, the patient had significant septic shock based on clinical symptoms and laboratory data. MSUS showed significant BC containing hypoechoic materials. From our experience, images obtained by MSUS of BC generally show a hypoanechoic pattern. In this case, however, a diffuse hypoechoic pattern was found. Therefore, we highly

suspected that the patient had BC with infection. Needle aspiration of the cyst was performed by guidance of MSUS, and turbid material was found. The usual complications of BC include dissected or ruptured cyst, vascular occlusion, posterior compartment syndrome, or impaired nerve conduction because of compression of a large cyst^{1,4}. BC with infection is an uncommon complication that is usually related to septic arthritis^{13,14}. Numerous microorganisms, such as *S. aureus*, *Bacteroides species*, *E. coli* and *Mycobacterium tuberculosis*, can cause infected BC¹⁴. Our patient initially presented with significant septic shock without active peripheral arthritis. Infected BC caused by atypical mycobacterium can occur in patients with long-term immunosuppressive therapy¹⁵. Previous reports suggest that immunosuppressive therapy plays a major role in BC with infection. However, our patient did not receive any immunosuppressive therapy, such as glucocorticoids, azathioprine, cyclophosphamide, and hydroxychloroquine, after the diagnosis of lupus.

In patients with SLE, dysfunctional autoimmunity can also cause impaired immune responses against microorganisms⁷. In this case, we hypothesized that infected BC developed on the background of SLE, independently of immunosuppressive drug therapy. Infections caused by external pathogens triggered the patient's lupus flare-up. There was evidence of a disease flare-up, including elevated anti-dsDNA levels and reduced C3/C4 levels in this patient. After adequate antibiotic therapy and surgical debridement, the patient's lupus was controlled. In summary, BC can occur in patients with SLE, and infections of the cyst should be considered for patients with septic shock. MSUS should be performed for patients with acute calf swelling to evaluate the dissection or rupture of the BC, with or without infection from the sonographic pattern. Needle aspiration of the cyst can be done to exclude infection of the cyst. Early surgical intervention of the infected BC and initiation of antibiotics therapy are important to cure the infection.

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