

# Pyogenic Baker cyst in a patient with psoriatic arthritis during etanercept therapy

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Patients with psoriatic arthritis (PsA) are at increased risk of infection due to disease course or treatment-related immunodeficiency. We describe a patient with a 10-year history of PsA, with arthritis of the right knee and pain and edema in the right calf, treated with the TNF $\alpha$  inhibitor etanercept for 6 months. Ultrasound showed accumulation of hypoechoic fluid, which was aspirated and was positive for staphylococcus and aspergillus. The patient recovered after surgical drainage and four weeks of antibiotic and antifungal therapy.

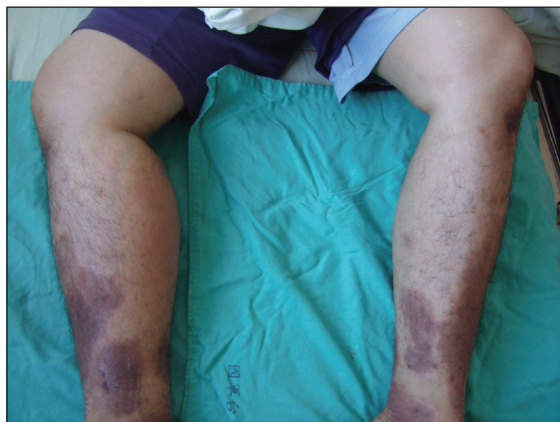
**A** Baker cyst (BC), or popliteal cyst, is an accumulation of fluid in the posteromedial aspect of the knee between the medial gastrocnemius tendon and the semimembranosus tendon.<sup>1,2</sup> A patient with a BC may be asymptomatic or may present initially with a palpable mass, limited movement of the knee, pain, swelling, or thrombophlebitis-like symptoms.<sup>1</sup> The incidence of BC is between 5% and 38% and increases with aging.<sup>1,3</sup> Various diseases associated with BCs include osteoarthritis, rheumatoid arthritis (RA), trauma-related tearing of ligaments, infection, spondyloarthropathies (SpA) and Behçet disease.<sup>1,2,4,5</sup> Psoriatic arthritis (PsA) is a spondyloarthropathy with an easily recognizable clinical presentation of psoriasis, inflammatory lower back pain, peripheral enthesitis, and arthritis. Traditional treatments include methotrexate, sulfasalazine, cyclosporine, and low-dose glucocorticoids. Among patients with refractory PsA, TNF $\alpha$  inhibitors, and other biological drugs, including efalizumab (anti-CD11), alefacept (anti-LFA/CD2), and abatacept (anti-B7), are used to control disease activity.<sup>6</sup> We describe a case of BC with bacterial infection resulting from *Staphylococcus aureus* and *Aspergillus fumigatus* in a PsA patient with regular immunosuppressive medication using etanercept.

## CASE

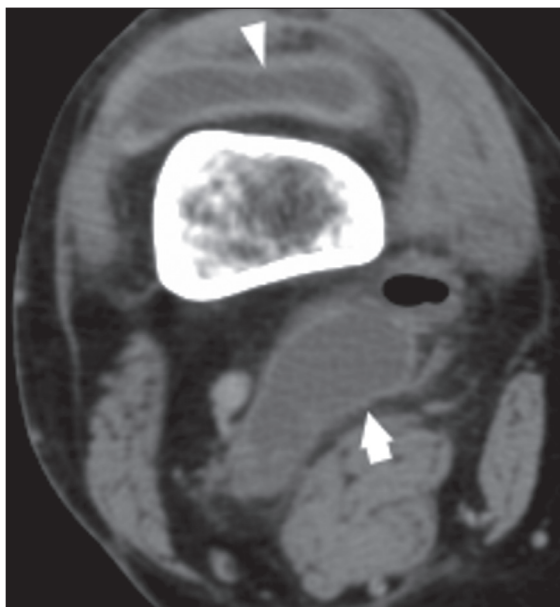
A 38-year-old man presented to the emergency department with a 1-week history of fever and swelling in his

right knee and calf associated with severe difficulty in walking. The patient initially denied having symptoms of cough, fever, hemoptysis, bone pain, gastrointestinal tract upset or even hematochezia initially. The patient had a 10-year history of PsA and was diagnosed on the basis of psoriasis over the trunk, nail pitting, bilateral grade III sacroiliitis, and positive HLA-B27. He had received non-steroidal anti-inflammatory drugs, sulfasalazine, and methotrexate for arthritis and psoriasis, but had no previous intra-articular injection. However, distribution of skin psoriatic lesions and oligoarthritis had increased over the past 1 year. Cyclosporine and phototherapy were given to control the disease activity of PsA; however, because of poor control of psoriasis, he started receiving subcutaneous etanercept 25 mg twice weekly 6 months previously. On physical examination, he had a temperature of 38°C, a heart rate of 120 beats/min, a blood pressure of 90/67 mm Hg, and a respiratory rate of 20 breaths/min. The patient was alert and answered questions appropriately. There was marked swelling and a tender, mildly erythematous, scaly, silvery-white appearance and Koebner phenomenon on his right calf (**Figure 1**). The patient had significant difficulty moving his right leg. Laboratory investigation showed a white blood cell (WBC) count of 22 200 cells/ $\mu$ L, with 91% neutrophils and 9% lymphocytes, a hemoglobin level of 12.1 g/dL, a platelet count of 142 000 cells/ $\mu$ L, a C-reactive protein (CRP) level of 17.19 mg/dL (normal <0.5 mg/dL), blood urea

nitrogen level of 19 mg/dL (normal range 7–20 mg/dL), and a creatinine level of 1.0 mg/dL (normal range 0.5–1.0 mg/dL). The patient was HIV negative. Chest x-ray showed no significant finding, including fibrosis change, cavities or pneumonia patchy. A musculoskeletal ultrasound (MSUS) showed a large cyst with accumulation of hypoechoic fluid extending distally in the right leg. Emergent aspiration revealed pus-like material. Analysis of synovial fluid revealed a WBC count of 255 000 cells/ $\mu$ L, with 92% neutrophils. Based on the results of imaging and laboratory studies, the patient was diagnosed with a BC with infection. Axial comput-



**Figure 1.** Marked swelling and erythematous rash without necrotic ulcer over the right calf.

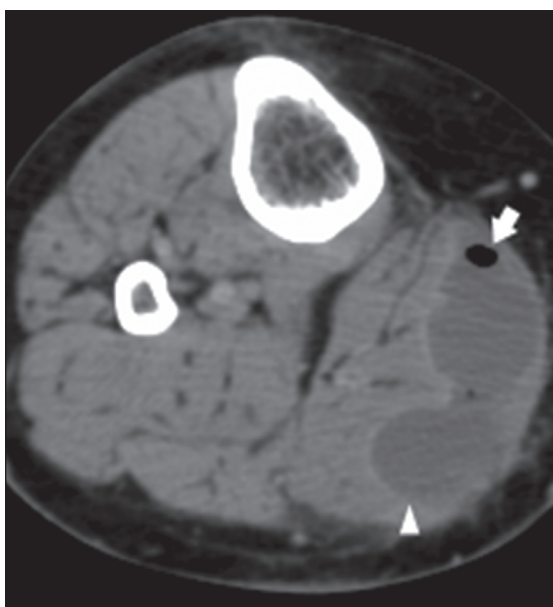


**Figure 2.** Contrast-enhanced axial computed tomography (CT) scan of the right knee showing gas-containing fluid within the Baker cyst (arrow). Synovial thickening and enhancement were found in both the suprapatellar recess (arrowhead) and the cyst.

ed tomography (CT) scan showed gas-containing fluid within a Baker cyst with synovial thickening and enhancement in both the suprapatellar recess and the cyst (**Figures 2 and 3**). Fasciotomy and debridement with Hemovac suction drainage was performed. Microscopic pathology of the soft tissue showed necrotizing inflammation with hemorrhage. Cultures from synovial fluid and soft tissue all grew *Staphylococcus aureus* and *Aspergillus fumigatus* but the blood cultures were free of pathogens. The patient received oxacillin and fluconazole initially, but fluconazole was changed to voriconazole after *Aspergillus fumigatus* was detected. After 28 days of drug therapy, the patient improved. The serum levels of CRP and the white blood cell count returned to within the normal range. The patient had no recurrent symptoms of infection or other complaints more than 6 months from presentation.

## DISCUSSION

BCs can occur in patients with autoimmune diseases such as RA, Behçet disease, and SpA.<sup>7,8</sup> The most common etiology of a BC is recurrent synovitis or arthritis-induced accumulation of fluid in the joint space.<sup>1</sup> Most patients with BCs are asymptomatic; however, acute calf pain may occur. Many diseases should be included in the differential diagnosis of acute calf pain and swelling, including deep vein thrombosis, BC, trauma, tendonitis, cellulitis, and arterial aneurysm.<sup>9,10</sup> MSUS



**Figure 3.** Pyogenic Baker cyst with inferior intramuscular extension to the right medial head of the gastrocnemius muscle (arrowhead) on contrast-enhanced axial computed tomography (CT) scan. Free gas bubble (arrow) inside the cyst.

is useful for differentiating between these diseases, and a well-defined anechoic cystic structure can be visualized within an uncomplicated BC.<sup>3</sup> In our case, clinical symptoms and laboratory data revealed significant sepsis. MSUS showed a significant BC containing diffuse hypochoic material. Therefore, we suspected that the patient had a BC with infection. Needle aspiration of the cyst was performed under MSUS guidance and revealed turbid material. The usual complications of BCs include dissected or ruptured cyst, vascular occlusion, posterior compartment syndrome, or impaired nerve conduction because of compression by a large cyst.<sup>1,5</sup> BC with infection is an uncommon complication that is usually related to septic arthritis.<sup>11,12</sup> Numerous microorganisms, such as *Staphylococcus aureus*, *Bacteroides* species, *Escherichia coli*, *A. fumigatus*, and *Mycobacterium tuberculosis*, can cause an infected BC.<sup>8,12,13</sup> Our patient initially presented with significant septic shock, and a CAT scan of the right knee showed gas-containing fluid within a BC. A gas-producing bacterial or fungal infection was highly suspected, and cultures revealed coexistent infections with *S aureus* and *A fumigatus*.

PsA is a chronic inflammatory spondyloarthritis with a high incidence in patients between 30 and 50 years of age. The pathogenesis is associated with humoral immune system-related production of autoantibodies against dermal or synovial antigens and cellular immune system-related activation of T-lymphocytes.<sup>6</sup>

Genetic and environmental factors are both important in the disease course of PsA. Extraplural symptoms, including arthritis, dactylitis and enthesitis often occur in PsA patients. TNF- $\alpha$  inhibitors, including etanercept, can be given to control refractory PsA. Our patient began receiving etanercept 6 months previously. TNF- $\alpha$  inhibitors are associated with an increased risk of infection; however, serious infections including tuberculosis, fungal infection, cytomegalovirus, and herpes zoster infection are uncommon.<sup>14</sup> The development of a BC may have been associated with our patient's underlying PsA-related immune dysregulation, and a pyogenic BC may have been a medication-related adverse event from immunosuppression by etanercept.

In summary, a BC can occur in patients with PsA, and pyogenic BC should be always considered for patients receiving aggressive immunosuppressive therapy, such as TNF- $\alpha$  inhibitors. Although invasive fungal infections in patients receiving TNF- $\alpha$  inhibitor are rare, careful monitoring is recommended. MSUS should be performed in patients with acute calf swelling to evaluate for dissection or rupture of a BC with or without infection. Needle aspiration of the cyst can be performed to rule out infection. Early surgical intervention of an infected BC is important to stop the progression of infection.

### Conflicts of interest

None.

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