Ruptured Baker’s Cyst in Juvenile Idiopathic Arthritis: A Report of Three Patients

Mustafa Gulgun¹, Yelda Bilginer², Ali Duzova², Seza Ozen²

Abstract

Popliteal cysts occur commonly both in normal and arthritic knees. Most cysts are formed by distension of the medially situated semimembranosus bursa. Herein, we describe three children with juvenile idiopathic arthritis and ruptured popliteal cyst which produced leg complaints. Ultrasound and magnetic resonance imaging were performed in the diagnosis of all cases for better evaluation of the anatomic characteristics of the cysts. In all cases, pain and swelling reduced and then disappeared with conservative management. In children with juvenile idiopathic arthritis who present with calf pain and swelling of leg, ruptured Baker’s cyst should be considered in the diagnosis.

Key words: rupture, Baker’s cyst, juvenile idiopathic arthritis, children, ultrasound, MRI

Introduction

Juvenile idiopathic arthritis (JIA) are defined as a chronic arthritis in a child 16 years of age or younger, lasting for 6 or more weeks in the absence of any known cause [1]. In 1877, Baker described the popliteal cyst as a distended bursa related to the semimembranosus tendon. The etiology of popliteal cysts in children is not well defined but rupture of popliteal cysts produces an unusual clinical picture and may delay the diagnosis and appropriate treatment [1-6]. In a prospective ultrasound-study on asymptomatic children, the prevalence of popliteal cysts has been estimated to be 2,4% [7]. In a retrospective MRI study on 393 children mostly referred for knee pain, a popliteal cyst was found in 25 patients (6,3%) [8]. In contrast, a much higher prevalence of popliteal cysts has been reported in juvenile idiopathic arthritis. We report three children of JIA complicated by ruptured Baker’s cyst.

Case 1

A 17-year-old girl with a diagnosis of oligo-articular type of JIA for three years presented with acute right knee pain and swelling for the last three days. She denied any history of trauma or excessive physical activity. She had not previously noticed any swelling at the back of her knee. She was on steroid and nonsteroidal antiinflammatory drug (NSAID) therapy. On physical examination, the right knee joint and the right leg was swollen and tender, right knee motions were decreased and an area of tenderness with palpitation in the popliteal fossa was detected. Homan’s sign was negative. Erythrocyte sedimentation rate (ESR) was...
75 mm/h and C-reactive protein (CRP) was 13 mg/dl (0-6). Ultrasound revealed a partially ruptured Baker’s cyst with minimal hemorrhage within the residue and a heterogeneous hypoechogenic fluid that was collected mostly within the fascial compartments from the origin of the gastrocnemius muscle to the medial aspect of the calf. Magnetic resonance imaging (MRI) revealed ruptured Baker’s cyst with swelling of the soft tissue (Figure 1) and synovial inflammation (Figure 2). The patient improved significantly (with decreased pain and swelling) after four weeks of treatment with rest.

**Case 2**

A 15-year-old girl with one year history of polyarticular JIA was admitted to the hospital due to pain and swelling in both knees and her left leg for one week. She was on prednisolone, etanercept and methotrexate therapy. The history did not suggest any specific underlying disease and trauma. She had no fever but had signs of active arthritis in her left knee joint. The left anterior leg was red, tender, warm and oedematous. The neurological examination of the lower extremities were normal. ESR and CRP were 9 mm/h and 15 mg/dl subsequently. Ultrasound revealed a fluid collection behind the knee and between the calf muscles, consistent with a ruptured popliteal cyst. MRI confirmed the diagnosis. The symptoms gradually subsided with conservative management.

**Case 3**

A 11-year-old boy with a 2 year history of enthesitis related arthritis presented with redness, pain and swelling in his right calf and knee. The right calf was painful, swollen and erythematous. Homan’s sign was negative. ESR and CRP were 59 mm/h and 15 mg/dl subsequently. Ultrasound revealed a partially ruptured Baker’s cyst with minimal hemorrhage within the residue and a heterogeneous hypoechogenic fluid that was collected mostly within the fascial compartments from the origin of the gastrocnemius muscle to the medial aspect of the calf. Color doppler ultrasonography showed a patent popliteal vein and artery and duplex doppler scans revealed a normal flow pattern. MRI showed high signal intensity edema in the adjacent soft tissues and fascial planes. The patient was diagnosed to have a Baker’s cyst rupture. He improved with rest, bandage and NSAID therapy.

**Discussion**

We call attention of physicians towards the necessity of prompt evaluation, diagnosis and management of ruptured Baker’s cysts in JIA patients. Care should also remain for similar diagnosis like deep venous thrombosis and compartment syndrome.
Children with JIA are also most likely to present with uncommon synovial cysts, especially in the systemic form of the disease and during periods of high disease activity [9]. Szer et al. reported that popliteal cysts were identified in 27 children (61%) in 44 children with clinically detectable knee effusions secondary to JIA (n=35), spondyloarthritis (n=3) and psoriatic (n=2), septic (n=2) and lupus (n=2) associated arthritis using ultrasonography. Two children (8%) had rupture of the popliteal cysts [10]. We think that this clinical entity is rarely more than we estimate. Although our institute is a tertiary referral center and we have received the majority of the patients from all over the country, we have diagnosed only three ruptured Baker’s cyst up to date.

The rupture of a popliteal cyst is usually preceded by a history of pain and swelling of the knee joint. The calf symptoms after rupture are due in part to mechanical distension of the calf tissues by the joint fluid released and in part to the inflammatory enzymes in the fluid [11,12]. When our first patient presented with pain and swelling of the knee joint, we firstly thought that these symptoms were probably related to popliteal cyst because of JRA but we did not recall that we faced to ruptured Baker’s cyst. Case 2 and 3 were diagnosed with ruptured Baker’s cyst easily because of the similar symptoms defined on case 1 on physical examination.

Currently, ultrasound and color doppler ultrasonography are widely used noninvasive techniques. MRI is necessary to certify a link between cyst and articular space and is decisive in revealing the true origin of the clinical features [13]. However, expense and availability are main limitations [3].

Although ultrasound was the initial imaging method used for all of our patients, we also used MRI to show the real nature of the swelling and the connection to the joint. In our patients, MRI showed ruptured cyst ruptured Baker’s cyst and fluid in fascial planes besides synovitis.

A variety of rare but serious complications have been reported following Baker’s cysts rupture. The most dramatic presentation is pseudothrombophlebitis syndrome with subsequent clinical findings mimicking and indistinguishable from deep vein thrombosis, which may further complicate thromboembolic life-threatening events and treatment for these two clinical entities is completely different [9,14]. Occasionally, systemic signs like fever and leukocytosis may accompany the clinical scenario [5]. Generally, these patients have sudden pain and swelling of the calf with rapid reduction in the size of the cyst. On physical examination, warmth, erythema, swelling and even positive Homan’s sign are frequently noted. These patients are sometimes treated even with anticoagulant drugs because of a misdiagnosis of acute deep venous thrombosis and this causes a delay in the diagnosis [14]. An acute compartment syndrome is also a medical emergency. Irreversible changes are known to occur after only eight to 12 hours of increased compartment pressure, making early diagnosis essential. A history of pain associated with the clinical findings of paraesthesias, weakness, swelling, and increased pain with passive stretching should alert the doctor to the possible diagnosis [15]. In our cases, Homan’s sign was negative and there was no sign or symptom including fever, warmth, erythema, paraesthesias or weakness except swelling and pain. In addition to clinical findings, diagnosing probably early enough by the ultrasound and the MRI also contributed not to come across any complication related to ruptured cysts in the patients.

In the management of a painful swollen calf, a full history and careful examination of the legs are essential. Majority of the cysts do not require specific treatment, because they are asymptomatic and often resolve spontaneously or with treatment of the underlying disease. As in our cases of ruptured popliteal cysts, elevation of the leg, application of ice packs and NSAIDs may be beneficial [5,14].

In summary, Ruptured Baker’s cysts produces an unusual clinical picture and causes failure to recognise, this may delay diagnosis and appropriate treatment. Ruptured Baker’s cysts and its complications should be included in the list of differential diagnoses when a patient with JRA complains of pain or swelling or mechanical symptoms of the knee.

Competing interests: The authors declared no competing interest.
Funding: None.
Provenance and peer review: Not commissioned; externally peer reviewed.
References


