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Fiagbedzi, Emmanuel, Arkorful, Joseph, Brobbey, Isaac Frimpong, Appiah, Emmanuel, Nyarko, Savanna, Otumi, Nicholas, Piersson, Albert, Nimo, Obed, Ofori, Ishmael Nii and Gorleku, Philip Narteh (2025) A case of ruptured infrapatellar bursa sac with Baker's cyst. Radiology Case Reports, 20 (1). pp. 700-704.

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Radiology Case Reports 20 (2025) 700–704

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Case Report

A case of ruptured infrapatellar bursa sac with Baker's cyst ☆

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ARTICLE INFO

Article history:
Received 5 August 2024
Revised 9 October 2024
Accepted 10 October 2024
Available online 13 November 2024

Keywords:
Infrapatellar bursa
Baker cyst
Treatment
Case
Diagnosis

ABSTRACT

A 40-year-old female arrived with persistent posterior right knee pain, swelling in the popliteal, infrapatellar, anterior calf areas and difficulty walking due to joint stiffness. Multiple hypoechoic collections with internal echoes and debris were discovered in the anterior calf region using ultrasound imaging, which extended from a thick-walled infrapatellar hypoechoic collection with peripheral vascularity. A significant popliteal fossa cyst of comparable appearance was also observed. The results were consistent with a ruptured infrapatellar bursa sac and a popliteal fossa (Baker's cyst). The patient received conservative treatment with anti-inflammatory drugs, leading to the resolution of symptoms after a period of 6 weeks. For patients with more complex cysts, procedures like aspiration and corticosteroid injections under ultrasound guidance may be necessary. Recognizing the condition and using ultrasound for diagnosis and management can lead to successful outcomes.

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Introduction

Baker's cyst which also referred to as a popliteal cyst, is a fluid-filled protrusion that is found in the popliteal fossa region at the back of the knee [1]. It is an enlarged bursa located between a capsular reflection of the semimembranosus tendon and the medial head of the gastrocnemius [2]. Baker's cysts can occur in connection with various intra-articular pathologies, such as osteoarthritis, meniscal tears, rheumatoid arthritis and synovial disorders [1,3,4].

Infrapatellar bursitis is a condition defined by inflammation of the infrapatellar bursa, a tiny fluid-filled sac found under the kneecap (patella).This bursa plays a crucial role in reducing friction between the patellar tendon and the underlying tibia, facilitating smooth movement of the knee joint [5]. It can occur due to repetitive trauma, overuse, or as a result of an underlying condition like gout or rheumatoid

☆ Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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https://doi.org/10.1016/j.radcr.2024.10.058

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Fig. 1 – Prominent swellings of the right knee including the popliteal region (behind the knee), the patella (kneecap), and the anterior leg region (infrapatellar).

arthritis [5]. Infrapatellar bursitis can be classified into 2 types: superficial and deep. The superficial one lies above the patellar tendon, while the deep one is situated underneath it. Both bursae can become inflamed due to various factors, leading to significant discomfort and functional impairment. The etiology of infrapatellar bursitis is multifactorial. It can result from acute trauma, chronic overuse, or infection. Acute trauma may occur from a direct blow to the knee or a fall on a bent knee, causing immediate swelling and pain. Chronic overuse is often seen in individuals who engage in activities that require repetitive knee flexion and extension, such as kneeling or running. This condition is sometimes referred to as "clergyman's knee" due to its historical prevalence among clergymen who kneel during prayer [6]. Infection, or septic bursitis, can also occur, particularly if there is a break in the skin overlying the bursa, allowing bacteria such as Staphylococcus aureus to enter [7].

Bursitis, including infrapatellar bursitis, is a common ailment among athletes and those who work in jobs that demand a lot of kneeling or crouching. It affects up to 20% of people participating in such activities worldwide [8]. There is minimal epidemiological data on infrapatellar bursitis in Africa. However, the illness is most likely underreported due to limited access to healthcare and diagnostic imaging in many areas. The frequency is likely to be higher in populations engaged in manual labour or traditional behaviors that require extended kneeling [9]. In rare situations, a ruptured Baker's cyst might present with a clinical presentation similar to deep venous thrombosis (DVT) or thrombophlebitis, known as "pseudo thrombophlebitis". Rupture of an infrapatellar bursa sac can also lead to similar symptoms [10,11].

Clinical presentation

A 40-year-old female patient presented to the emergency room of a reputable hospital with a history of persistent pain in the posterior region of her right knee. Along with the chronic pain, she noticed swellings in several locations of her right knee, including the popliteal region (behind the knee), the patella (kneecap), and the anterior leg region (see Fig. 1). The patient additionally reported having difficulty walking due to joint stiffness. Importantly, she stated that there had been no recent trauma episodes to explain these symptoms. Instead, she explained that her current problems began after a protrusion in the infrapatellar (anterior knee) area was resolved. Given these concerns, the clinician monitoring her care requested a musculoskeletal (MSK) ultrasound examination to gain a more detailed understanding of the underlying causes of her condition.

Investigations and imaging findings

The patient underwent an ultrasound examination with a preset set to "Musculoskeletal" and a linear transducer used. The findings were primarily obtained using grayscale imaging, with Color Doppler activated to assess the vascularity of any lesions. The examination was optimized using various settings. The patient was positioned supine to assess anterior calf swellings and suprapatellar swelling, and fluid collections were measured. The patient was then repositioned to lie prone, allowing a thorough examination of the popliteal region. The popliteal fossa was evaluated from both sagittal and transverse planes, and fluid levels in the posterior knee were measured. The comprehensive ultrasound examination aimed to provide detailed insights into the patient's condition and guide further clinical management and treatment.

An ultrasound examination revealed an infrapatellar fluid collection with internal echoes and peripheral vascularity measuring approximately 3.5 × 1.7 × 3.5 cm (volume = 10.8 ml) located anteriorly to the distal patellar tendon and tibial tuberosity (Fig. 3). Also noted were 2 well-defined collections with internal echoes and debris at the anterior leg region measuring approximately 1.7 × 2.8 × 3.0 cm (vol = 30 ml) and 4.1 × 1.7 × 3.5 cm (12.7 ml) (Fig. 2) which demonstrated connection to the infrapatellar collection. Further examination of the posterior fossa revealed a huge popliteal fossa cyst with

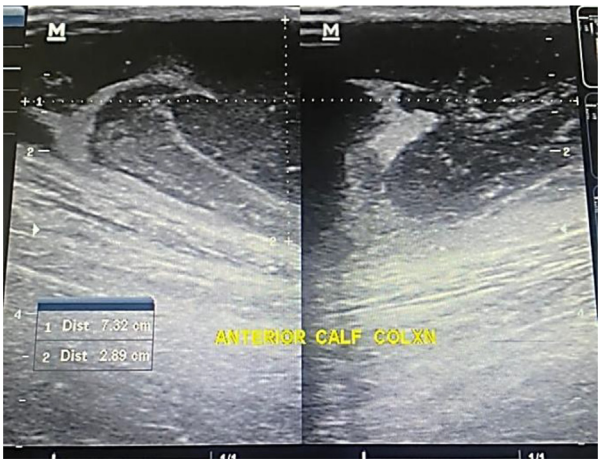

Fig. 2 – Two well-defined connected hypoechoic collections with internal echoes and debris in the anterior calf region.

a similar look to the infrapatellar bursa and anterior leg collections, measuring 17.7 ml (Fig. 4). Normal overlying skin and subcutaneous tissue were observed.

An impression of ruptured superficial infrapatellar bursitis with Baker's cyst was arrived upon after the ultrasound examination. An MRI was requested by the attending physician for further interrogation but the patient could not afford the cost involved.

Differential diagnosis

Infrapatellar bursitis and Baker's cyst are 2 conditions that can present with similar symptoms. Differential diagnosis is crucial to differentiate these conditions from other causes of knee pain and swelling. Key differential diagnoses include septic bursitis, septic arthritis, patellar tendinitis, prepatellar bursitis, pes anserinus bursitis, osteoarthritis, rheumatoid arthritis and gout.Septic bursitis is an infection of the bursa, often caused by bacteria like Staphylococcus aureus. It presents with increased redness, warmth, and tenderness over the affected area, along with systemic symptoms like fever and chills. Joint aspiration is key in differentiating between septic arthritis and bursitis, as fluid analysis shows different characteristics. Patellar tendinitis is an overuse injury affecting the patellar tendon, often seen in athletes involved in jumping sports. Prepatellar bursitis occurs due to inflammation of the bursa located in front of the kneecap, commonly associated with occupations that involve frequent kneeling [9,12–14]. Pes anserinus bursitis is characterised by inflammation of the bursa on the medial side of the knee, which is the site of the insertion of the tendons of the sartorius, gracilis, and semitendinosus muscles. Osteoarthritis can cause pain, swelling, and stiffness, particularly with weight-bearing activities. Radiographic imaging can help identify joint space narrowing, osteophytes, and other degenerative changes, distinguishing it from bursitis. Rheumatoid arthritis is a systemic inflammatory condition that can affect the knee joint, leading to pain and swelling. The diagnosis may be aided by laboratory testing for anticitrullinated protein antibodies and rheumatoid factor. Gout is characterized by the deposition of urate crystals in the joint, leading to acute inflammatory attacks. To differentiate infrapatellar bursitis and Baker's cyst from other conditions, a comprehensive clinical evaluation is essential. This includes a detailed history, physical examination, and appropriate diagnostic tests. A thorough differential diagnosis and appropriate diagnostic workup are essential to ensure accurate diagnosis and guide targeted treatment, ultimately leading to better patient outcomes [2,15].

Treatment

Small-sized infrapatellar bursitis or Baker's cysts can resorb on their own. Conservative approaches such as rest, ice compression, and elevation can assist in the reduction of the cyst's size and symptoms [16].Medications such as non-steroidal anti-inflammatory drugs (NSAIDs) can also be used to alleviate inflammation and pain [8,17]. In cases of persistent or recurrent symptoms, joint aspiration and corticosteroid injection may be considered. Surgical treatment, such as bursec-

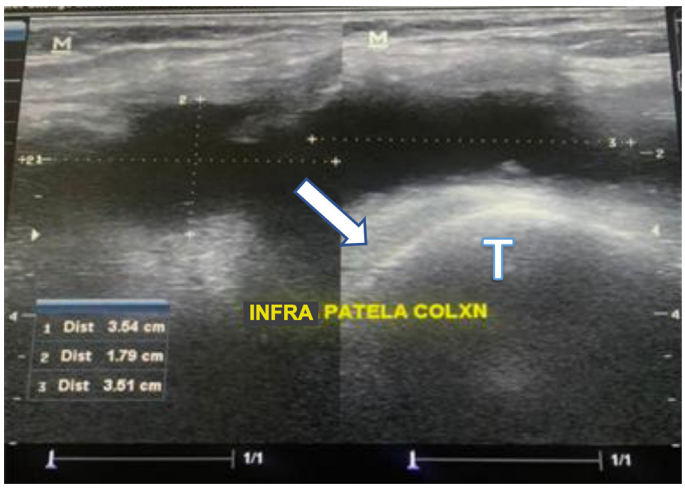

Fig. 3 – Infrapatellar fluid collection located anteriorly to the distal patellar ligament (arrowed) and tibial tuberosity (T).

Fig. 4 – A huge popliteal fossa cyst with a similar look to the anterior calf and bursa collections.

Fig. 5 – Clinical outcome and follow-up of patient.

tomy or arthroscopic surgery, is reserved for cases refractory to conservative management [16]. In our case, the patient was given anti-inflammatory drugs and told to return in 1 month for a follow-up consultation, with the option of cyst aspiration if necessary. The doctor also advised the patient to avoid strenuous physical activities during the drug cycle to avoid worsening the disease. The prescribed drugs were Domadol (Tramadol capsules) and Zulu-100 (Aceclofenac tablets).

Outcome and Follow-up

A decrease in swelling within 3 weeks of beginning the pharmaceutical regimen was noted. The patient's symptoms had greatly improved by her follow-up session, which took place about 6 weeks later (Fig. 5). During the follow-up visit, the physician confirmed that the edema and associated symptoms had resolved, showing that the conservative approach used had been beneficial in the treatment of the patient's condition without the need for further invasive procedures. The patient was advised to continue avoiding activities that could strain the knee and to monitor for any recurrence of symptoms.

Discussion

Baker's cysts and infrapatellar bursitis are common but yet separate conditions, and their simultaneous occurrence and subsequent rupture are rare. These cysts can resemble other conditions like deep vein thrombosis or thrombophlebitis, making diagnosis challenging [16].

Infrapatellar bursitis is a common condition in Ghana, particularly among individuals engaged in activities requiring frequent kneeling or squatting [18]. Although global statistics on the prevalence of this condition are limited, it is likely to be significant due to cultural practices and occupational hazards. Many Ghanaians engage in manual labor, agriculture, and religious practices that involve prolonged kneeling, which can predispose individuals to this condition. A study in a Ghanaian population highlighted that knee-related disorders, including bursitis, are prevalent among workers in occupations that require frequent kneeling or squatting, increasing the risk of developing the condition, particularly in males. This aligns with findings from other regions where construction, agriculture, and similar fields exhibit higher rates of knee bursitis due to the physical demands of their jobs. Males may have a higher incidence due to greater participation in high-impact sports and physically demanding jobs. Limited access to healthcare and diagnostic imaging may also contribute to underreporting of infrapatellar bursitis in Ghana. Ruptured infrapatellar bursa sac is a significant issue in Ghana, especially among those in kneeling or squatting occupations [19]. Other factors that influence the incidence of infrapatellar bursa rupture in productive age include some underlying medical conditions such as rheumatoid arthritis or gout which can predispose individuals to bursitis by causing inflammation around the knee joint. A history of knee injuries or surgeries can weaken the surrounding structures and increase susceptibility to bursitis and potential rupture. Cold weather may increase muscle stiffness and decrease flexibility, potentially leading to increased strain on the knee during physical activities. Abnormalities in knee alignment and also weakness or tightness in surrounding muscles can also lead to uneven pressure distribution across the knee joint, contributing to bursitis development. Individuals with a family history of joint issues may be more susceptible to developing this condition [1,20]. Understanding its global prevalence is crucial for developing effective prevention and management strategies.

Ultrasound is a critical diagnostic tool for identifying ruptured infrapatellar bursae with Baker's cysts, allowing for precise localization and assessment of fluid collections. Magnetic Resonance Imaging (MRI) offers a more comprehensive

evaluation, but its high cost and limited availability make it less practical as a routine screening tool. Conservative management, primarily involving anti-inflammatory medications and rest, has proven effective in treating ruptured infrapatellar bursae with Baker's cysts. However, in cases where symptoms persist or the cysts are complex, more invasive measures may be warranted [9,16]. The combination of nuclear imaging and intra-articular administration of a contrast agent (arthrography) also demonstrates significant potential for the diagnosis of this pathology. This technique allows for the assessment of cartilage abnormalities and provides valuable functional information [21]. For treatment, surgical intervention is seldom necessary and is typically reserved for cases that do not respond to conservative treatment. The successful resolution of symptoms following conservative management underscores the efficacy of this approach, as the use of ultrasound in the initial evaluation was pivotal in accurately diagnosing the condition and guiding the treatment plan. Continued research and awareness are necessary to effectively address this condition, particularly in populations at higher risk.

Conclusion

Ruptured infrapatellar bursa sac with Baker's cyst is a rare condition often presenting with symptoms similar to other serious conditions like deep vein thrombosis or thrombophlebitis [10]. Ultrasound is an essential diagnostic and management tool for this condition, allowing clinicians to accurately identify fluid collections and guide treatment decisions. Conservative treatment, typically involving anti-inflammatory medications and rest, has been proven effective in resolving symptoms and promoting natural healing. For patients with more complex cysts, procedures like aspiration and corticosteroid injections under ultrasound guidance may be necessary [8,9]. Recognizing the condition and using ultrasound for diagnosis and management can lead to successful outcomes.

Patient consent

Written informed consent was seek from the patient prior to the publication of this case.

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