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RESEARCH ARTICLE

AN UNUSUAL PRESENTATION OF INFECTED POPLITEAL CYST WITHOUT ANY UNDERLYING SYSTEMIC MANIFESTATIONS OR SEPTIC ARTHRITIS

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ABSTRACT

A Popliteal cyst, also called a Baker's cyst, is a benign, fluid-filled cyst that forms around the posterior knee joint. These cysts are commonly associated with septicemia or septic arthritis. The cyst generally forms between the medial head of the gastrocnemius and the semimembranosus muscles. The highest prevalence is usually seen in adults with degenerative arthritis. In children, it is seen at the age of 4-7 years with a herniated posterior knee joint synovium/capsule. Incidence increases with age. In adults, the cyst is often associated with degenerative diseases or meniscal injury, which can complicate the diagnosis. However, an infected Baker cyst without any systemic manifestations or underlying septic arthritis is a rare clinical entity. Here, we present a case of a female with no known underlying conditions or source of infection/trauma who presented with pain, swelling, redness and warmth of the left lower limb. Radiologic studies revealed an infected baker's cyst without any underlying systemic manifestations. She was conservatively managed. Most of the baker's cysts are left unidentified, a proper diagnostic work-up is needed for early intervention. In this case, we highlight the appearance of an infected baker's cyst with a previous history of osteoarthritis and with no evidence of underlying septic arthritis. The patient was conservatively managed with no surgical intervention.

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INTRODUCTION

Baker's cysts (Fig-01) are generally associated with trauma to the leg, knee pathologies internally involving the meniscal and anterior cruciate ligaments in rheumatoid and osteoarthritis conditions in adults [1] Formation of this cyst occurs due to increased intracapsular pressure creating a one-way valve between the gastrocnemius- semimembranous bursa allowing the flow of synovial fluid in only one direction into the medial aspect of popliteal fossa [2]. Typically, these cysts resolve on their own without the need for surgery. Histologically, (Fig-02) the cyst walls resemble synovial tissue with varying degrees of fibrotic tissue covered with chronic inflammatory cells. However, treating the intracapsular pathology is the mainstay of treatment if surgical intervention is required. The most common complications are cyst rupture or the spread of infection below the knee, which can cause deep vein thrombosis or acute thrombophlebitis [3]. Infection from this cyst causes bacteremia, most likely due to Staphylococcus aureus, leading to septic arthritis [4]. Until recently, there were fewer than 5% of baker's cyst cases seen without any trauma/infection or underlying conditions. This is one such case that describes an infected baker's cyst without any underlying trauma or septic arthritis.

CASE PRESENTATION

This case is about a 48-year-old female, a known case of hypothyroid presented to the ER with a 3-day history of left lower limb pain, redness and swelling, gradually progressing from the foot to the distal thigh. The patient denied any trauma to the leg and was not on any regular medication. On examination, there was marked redness and swelling in the left calf region, grade II pedal edema with palpable peripheral pulses. Foucher's sign was positive. She had a temperature of 37.2^{o}C, a heart rate of 80 bpm, blood pressure of 110/70 mmHg and a respiratory rate of 16 cpm. On evaluation, D-dimer levels (2440ng/ml) and inflammatory markers were elevated. All the other blood investigations and liver parameters were normal. Venous/arterial Doppler of lower limbs was negative for DVT but showed mild atherosclerotic changes without significant narrowing of vessels and normal blood flow. Ultrasound of the lower limb showed a 39x37mm focal cystic collection with internal echoes in the popliteal fossa. There was subcutaneous edema in the prepatellar region. Mild subcutaneous edema with soft tissue swelling below the knee suggests cellulitis. The patient was treated with IV antibiotics, analgesics, foot elevation and other supportive measures. Pedal edema gradually reduced; however, due to persistent pain and redness

repeat ultrasound was done which showed a linear collection of pus along the medial aspect of the gastrocnemius muscle-suggestive of an infected popliteal cyst. A general surgeon and an interventional radiologist were consulted regarding further management of the cyst. MRI (Fig-03/4/5) of the lower limb was advised.

Fig. 1. Appearance of Baker's cyst at the posterior Knee Joint

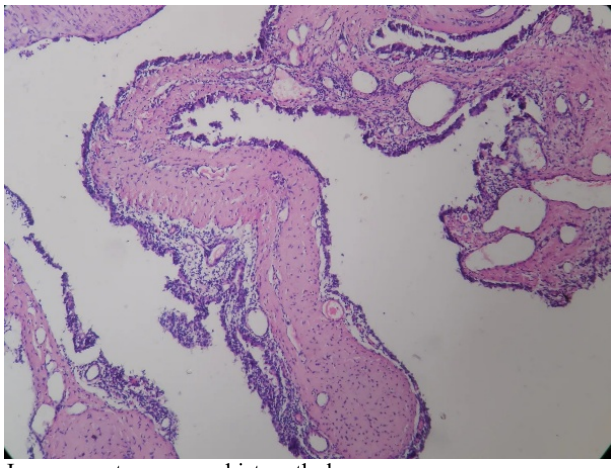

Image courtesy- www.histopathology.guru

Fig. 2. Fibrocollagenous cyst wall lined by synovium and underlying stroma shows congested blood vessels and chronic inflammatory cells

Fig. 3. STIR Coronal MR section showing decreased medial tibiofibular joint space with subchondral erosion/ cyst

Fig. 4. Sagittal MR image showing interstitial tear of the ACL with significant supra and retro-patellar joint effusion and posteriorly a linear collection along the Popliteal and below the knee Popliteal fossa

Images (Fig. 3 & 4) showed a loculated multiseptate fluid collection along the medial aspect of the left knee, with a minimal thickness of 12mm and a length of 15cm, abutting the medial gastrocnemius muscle. The collection extended along the deep fascia, accompanied by adjacent interstitial edema and soft tissue planes. She was subsequently treated with IV antibiotics, analgesics and other supportive care. Further plan was to do repeat imaging and USG-guided aspiration and drainage of persistent cyst collection. At follow-up, pedal edema subsided and there was no persistent pain/swelling.

DISCUSSION

Baker cysts generally form due to knee injuries, meniscal tears, or underlying inflammatory conditions such as rheumatoid or osteoarthritis [5]. Those formed due to underlying conditions typically resolve without any active intervention. The initial clinical presentation is confused with deep vein thrombosis, cellulitis. A soft cyst in the popliteal fossa with a distinct shape aids in distinguishing a baker's cyst from other illnesses [6]. In case of cyst rupture, a growing hematoma or anterior or distal ecchymosis of the lateral malleolus is seen. The pathophysiology of a baker's cyst is based on unidirectional flow of synovial fluid controlled by a valvular mechanism. According to Rauschning et al., the fluid flow between a joint and the cyst followed a pressure gradient during knee extension [7]. A negative intraarticular knee pressure during partial flexion combined with a positive pressure during extension resulted in fluid flow towards the cyst from the suprapatellar bursa during knee flexion which was not seen in knee extension. This is called the "Foucher Sign". This particular phenomenon is attributed to the gastrocnemius and soleus muscle relaxation, with cyst hardness in full knee extension, followed by cyst softness in knee flexion [8]. Ruptured Baker's cyst is the most common complication, which may present with sharp pain/numbness due to entrapment of the posterior tibial nerve, lower extremity edema is seen due to occlusion of the popliteal artery and compartment syndrome. A cyst rupture

might be worsened by the administration of heparin or other anticoagulants as a prophylactic measure for DVT [9]. Hence, an accurate diagnosis should be made. However, infection remains the primary complication. An infected baker's cyst due to bacteremia needs an operative debridement. The most common species causing septicemia is Staphylococcus aureus [10].

The current literature review concludes that only 10 out of 25 cases of infection worldwide are due to staph aureus. If the patient has a popliteal cyst with fever, focal soreness and evidence of systemic infection and it could probably be an Infected Baker's cyst. The primary diagnostic modality to confirm the presence or rupture of a cyst is a knee Ultrasound. MRI remains the gold standard imaging tool [11]. In this case, we focused on the emergence of a Baker cyst in the absence of previous trauma or underlying septic arthritis. This is an unusual presentation with no surgical intervention. Treatment is mainly conservative for uncomplicated cysts. Many authors support arthroscopic debridement over cystectomy as it allows bidirectional flow of synovial fluid. According to Fritschy et al., cystectomy is usually avoided except for symptomatic cysts [12]. He suggested that cysts will automatically disappear once the primary cause is cured. Recurrence rates are lower in the younger population as compared to adults. In this case, the patient presented with signs of an infected Baker cyst; however, the blood cultures were negative for bacterial growth with no signs of cyst rupture. Hence, we concluded that the source of infection remained isolated in the cyst. MRI images of the lower limbs later revealed an infected cyst overlying the popliteal fossa, thus revealing the source of infection. Treatment required a long antibiotic course along with analgesics. We concluded that the development of any cysts without systemic manifestations should not be neglected and requires a proper diagnostic intervention.

CONCLUSION

Isolated Infected Baker's cysts, also known as popliteal cysts, is a rare clinical condition. However, there should always be a suspicion of infection based on the patient's clinical signs, blood investigations, radiologic findings and synovial fluid cultures, prompting the accurate diagnosis and antibiotic treatment.

It is crucial to distinguish a DVT from a ruptured Baker's cyst c linically. Despite the patient's worsening symptoms, the diagnostic workup remained negative, signifying the absence of systemic infection. Thus, with this rare case presentation, we would like to conclude that any disease without systemic manifestations should never be neglected until the exact cause is known. In many cases, these cysts may be recurrent.

Declarations

Abbreviations: None.

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