

# A Large Calf Mass in a Patient with Rheumatoid Arthritis: Giant Pannus Filling Baker's Cyst

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## Abstract

Rheumatoid arthritis (RA) presents a significant challenge among autoimmune diseases, affecting millions globally with diverse clinical manifestations, primarily targeting joints and inducing inflammation, pain, and deformities. In some cases, it leads to the formation of Baker's cysts, fluid-filled bursae in the popliteal region, resulting from chronic inflammation of the synovial membrane and subsequent pannus growth. Our case, a young female patient with RA, presenting with calf mass, highlights this complex interplay. She presented with large swelling and pain in her left calf region which on high-frequency ultrasound revealed a large, well-defined heteroechoic mass lesion distending bursa between the medial head of the gastrocnemius and semimembranosus muscle, measuring 25 cm craniocaudally, without any color Doppler abnormality. Ultrasound-guided biopsy was performed to rule out the possibility of sarcoma and it revealed inflammatory changes. Final diagnosis of excessive pannus formation within the Baker's cyst forming large mass was made, with RA identified as the underlying cause. The differential diagnosis of masses in the popliteal fossa includes synovial/meniscal/ganglion cysts, lipomas, vascular pathologies, and neoplastic conditions. High-resolution ultrasound is an important diagnostic modality for evaluating popliteal fossa masses. Magnetic resonance imaging is typically performed to assess for neoplastic causes and internal derangement of the knee. Our case of a massive pannus filling a Baker's cyst in the context of RA emphasizes the intricate nature of the disease and its diverse clinical expressions. It is important for the radiologist to be aware of this imaging appearance for timely diagnosis and management.

**Keywords:** Baker's cyst, rheumatoid arthritis, synovial pannus, ultrasound

## INTRODUCTION

Rheumatoid arthritis (RA) stands as a formidable challenge within the realm of autoimmune diseases, affecting millions worldwide and presenting a diverse array of clinical manifestations. It is an autoimmune condition that primarily affects the joints, leading to inflammation, pain, and sometimes deformity.<sup>[1]</sup> In some cases, it can cause the formation of Baker's cyst, which is a fluid-filled bursa in the popliteal region.<sup>[2]</sup> Synoviocytes residing within the joint lining, along with the microvasculature of the synovium, collaborate with immune cells from the bloodstream to initiate pannus formation, the primary pathological characteristic of RA.<sup>[3]</sup> This process ultimately results in the erosion of nearby cartilage and bone tissue. In the case of a Baker's cyst, this pannus may extend into the cyst itself, filling it up and causing it to enlarge significantly.<sup>[4]</sup> This peculiar occurrence presents

clinicians with a clinical conundrum, as the resulting calf mass not only serves as a palpable reminder of the joint's tribulations but also hints at the intricate interplay between inflammation, tissue proliferation, and anatomical structures. In this article, we present a case of a young female patient with RA who presented with a calf mass.

## CASE REPORT

A 29-year-old woman presented with pain and swelling in both shoulder and elbow joints, which progressed to involve her ankles, small hand joints, and wrist joint. Initially experiencing early morning stiffness, she was treated with anti-inflammatory medications for a month, resulting in significant symptom

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improvement. However, she later visited the rheumatology outpatient department at our center with large swelling and pain in her left calf region for 20 days [Figure 1]. On examination, palpation revealed large immobile, soft swelling with mild tenderness. Nodules were observed on the extensor surface of both hands and the dorsum of the foot, with no deformities noted. Laboratory tests showed positive serum rheumatoid factor and an Anti-cyclic citrullinated peptide level of 89.6 U/mL, while S. ANA was negative. High-frequency ultrasound of the left calf revealed a large, well-defined heteroechoic mass lesion distending bursa between the medial head of the gastrocnemius and semimembranosus muscle, measuring 25 cm craniocaudally. Mild joint effusion was noted in the suprapatellar region. Color Doppler did not reveal any significant vascularity. Signs of cyst rupture were also noted in the form of a pointed caudal end and extensive surrounding edema [Figure 2 and Video 1]. Ultrasound-guided biopsy was performed to rule out the possibility of sarcoma and it revealed occasional neutrophils, lymphoplasmacytic cells, and histiocytes, suggestive of an inflammatory etiology, with no evidence of granuloma or malignancy. The option of surgical removal of the lesion was presented to the patient considering the pain and cosmetic problem caused by it, but the patient denied any surgical intervention. The patient is currently on disease-modifying antirheumatoid drugs and on three monthly follow-ups to monitor the disease.

## DISCUSSION

In our case, excessive pannus formation within the Baker's cyst was noted forming a large mass, with RA identified as the underlying cause. The differential diagnosis of masses in the popliteal fossa includes synovial cysts, meniscal cysts, ganglion cysts, lipomas, vascular pathologies (such as deep-vein thrombosis or popliteal artery aneurysm), and neoplastic conditions including nerve sheath tumors, myxofibromas, xanthomas, synovial sarcomas, fibrosarcomas, and malignant fibrous histiocytomas.<sup>[5,6]</sup> High-resolution

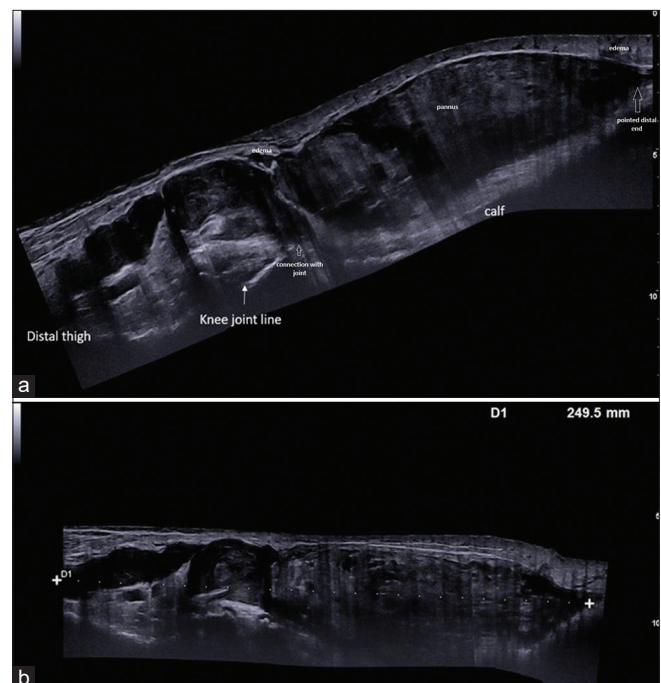
B-mode ultrasound is an important diagnostic modality for evaluating popliteal fossa masses. Ultrasound is particularly useful for identifying communication between the Baker's cyst and the knee joint and for ruling out vascular pathologies. Magnetic resonance imaging (MRI) is typically performed to assess for neoplastic causes and internal derangement of knee.<sup>[5]</sup>

Baker's cyst was first described by Dupuytren G in 1829.<sup>[7]</sup> It manifests as an enlarged bursa located between the medial head of the gastrocnemius and the semimembranosus muscle. According to a study by Fielding *et al.*, Baker's cyst was observed in 4% of adult cases and at an even higher rate in older age groups. They represent the most prevalent cause of nonvascular swelling in the popliteal fossa.<sup>[8]</sup> Lindgren demonstrated the communication between the knee joint and the gastrocnemio-semimembranosus bursa, with communication frequency increasing with age. They also identified a valve mechanism that opens during flexion and closes during extension due to tension in the posterior compartment muscles.<sup>[9]</sup> The correlation between RA and Baker's cyst was described by Adams in 1840.<sup>[10]</sup> In inflammatory joint diseases, synovial cysts can enlarge, leading to pannus formation, sometimes causing symptoms such as pain and limited knee joint movement.

Only a few case reports in the literature mention the formation of large synovial proliferative masses or pannus-filling Baker's cysts. Duman *et al.* detailed a case of a 38-year-old woman with a 9-month history of right knee pain and swelling due to RA. Physical examination revealed a large, immobile mass



**Figure 1:** Clinical picture depicting significant calf swelling (arrow) on the left side



**Figure 2:** High-frequency ultrasound (extended field of view) of the left calf and popliteal region revealed a large, well-defined heteroechoic mass lesion distending the Baker's cyst (a), and measuring 25 cm craniocaudally (b)

behind the knee, confirmed as a synovial cyst by ultrasound and MRI, displaying extensive synovial pannus.<sup>[11]</sup> Adiyek *et al.* documented a giant Baker's cyst in an RA case, treated with arthroscopic joint debridement and partial cyst excision through biomechanical valve excision.<sup>[12]</sup>

## CONCLUSION

RA presents a considerable hurdle in the realm of autoimmune disorders, impacting millions globally with a spectrum of clinical manifestations. It predominantly affects joints, triggering inflammation, pain, and deformities. Baker's cyst, a fluid-filled sac in the popliteal region, can arise from persistent inflammation of the synovial membrane, resulting in pannus formation. Our case of a massive pannus filling a Baker's cyst in the context of RA emphasizes the intricate nature of the disease and its diverse clinical expressions. It is important for the radiologist to be aware of this imaging appearance for timely diagnosis and management.

## Ethics statement

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and its amendments. The authors certify that they have obtained all appropriate patient consent form. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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