



Hoffa's fat pad ganglion cyst of the knee: a case report of a rare cause of knee pain and swelling

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Introduction and importance: Hoffa's fat pad (HFP), also known as infrapatellar fat pad, is one of the three fat pads in the knee. Ganglion cyst (GC) rarely arises from HFP which presents knee pain and swelling.

Case presentation: A 43-year-old female presented with left knee pain for 1 year and swelling in her left knee for 6 months. Clinical examination revealed a palpable swelling of size around 3 cm × 2 cm over the anteromedial aspect of the left knee. The size of the swelling increased on extension and decreased on flexion of the knee. A musculoskeletal ultrasound of the left knee revealed a lobulated anechoic lesion of size ~2.3 cm × 2 cm in HFP. Open excision of cystic mass through medial parapatellar approach was done, and histopathological examination showed findings consistent with GC. At 6 months follow-up, there was no residual swelling and no recurrence. She was symptom-free on her recent evaluation after 1 year of operation.

Clinical discussion: GCs arising from HFP are much rarer among the cysts around the knee. Diagnosis is primarily done by magnetic resonance imaging. However, the use of ultrasonography has grown in the diagnosis of the GC. Among different modalities of treatment, open excision is the most recommended to prevent recurrence and incomplete resection.

Conclusions: This case illustrates the importance of ultrasonography in the early diagnosis of HFP GC and reserving more costly and time-consuming imaging modality magnetic resonance imaging for localizing the extent of the cyst. We recommend an open resection to avoid recurrence and incomplete resection of the cyst.

Keywords: case report, ganglion cyst, Hoffa's fat pad, knee joint, musculoskeletal ultrasonography

Introduction

A ganglion is a cystic swelling with a jelly-like consistency that is formed of a myxoid matrix and is lined with a pseudomembrane^[1]. A GC in the knee joint often arises from the lateral meniscus, anterior cruciate ligament, or posterior cruciate ligament but rarely arises from the infrapatellar fat pad^[2–4]. HFP (infrapatellar) is one of the three fat pads beside the anterior suprapatellar and posterior suprapatellar fat pad^[2,5]. The incidence of HFP GC on MRI is 1%, which correlates with that of arthroscopy of 0.8–1.1%^[6,7]. Thus,

HIGHLIGHTS

- Ganglion cyst (GC) rarely arises from Hoffa's fat pad (HFP) of the knee, with the incidence of 1% on magnetic resonance imaging (MRI) and 0.8–1.1% on arthroscopy.
- Diagnosis is primarily done by MRI. However, our case was diagnosed by musculoskeletal ultrasonography.
- Among different modalities of treatment, open excision is the most recommended to prevent recurrence and incomplete resection.

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we present a relatively rare case of HPF GC in a 43-year-old female diagnosed with musculoskeletal ultrasonography.

This case has been reported in line with the Surgical Case Report (SCARE) 2023 criteria^[8].

Case presentation

A 43-year-old female presented in the outpatient department with chief complaints of anterior knee pain for 1 year and noticed swelling in the last 6 months in the anteromedial aspect of her left knee. There was no previous history of trauma, infections, local injections, instability, locking, clicking, giving way, or any constitutional symptoms.

On clinical examination, there was palpable swelling of size around 3 cm × 2 cm which was ill-defined, soft, cystic, nontender, and irreducible present over the anteromedial aspect of the left knee (Fig. 1). Swelling was nonadherent to underlying bone and overlying skin. The size of the swelling increased on extension and decreased on flexion of the knee. There was no effusion, no



Figure 1. Soft tissue swelling in the anteromedial aspect of the knee.

joint line tenderness, and no evidence of ligamentous laxity. Lachmann test, Mc Murray test, Apley's grinding test, and anterior and posterior drawer test were negative.

Blood investigations were within normal limits. A standard radiograph of the knee showed no bony abnormality (Fig. 2). Musculoskeletal ultrasound of the left knee revealed a lobulated anechoic lesion of size $\sim 2.3 \text{ cm} \times 2 \text{ cm}$ in HFP with few internal

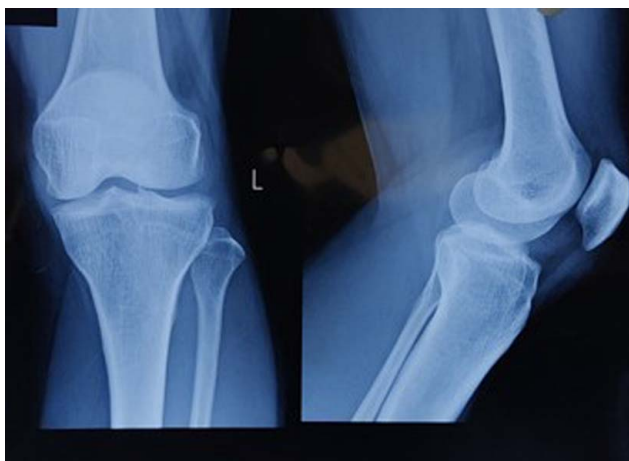


Figure 2. Plain radiograph of the left knee (anteroposterior and lateral views) showing no bony abnormality.

echoes and no internal vascularity and extending superficially into the subcutaneous plane passing between the patellar tendon and medial patellar retinaculum. Visible bones appeared normal. No cortical disruption was noted. The knee joint appeared normal (Fig. 3). MRI was advised for further diagnosis, but due to inaccessibility and high cost of the study, the patient refused it.

Further management options, including arthroscopic resection, debridement, and open excision, were discussed with the patient, who opted for operative excision, citing the easy availability and decreased risk of recurrence as the deciding factors. Operative intervention was done under spinal anesthesia and a tourniquet. We went for an open excision of the cystic mass through the medial parapatellar approach (Fig. 4). The cyst was found to be protruding just beneath the skin through retinacular rent. The cyst's origin from the fat pad was confirmed. The cyst ruptured towards the end of the procedure, and clear jelly-like material was released from the cyst. The entire mass was taken out (Fig. 5) and sent for histopathological examination, and the findings were compatible with a GC (Fig. 6).

The postoperative period was uneventful. The patient was able to return to normal activities with appropriate postoperative care and rehabilitation within 3 weeks with no complaints. Further evaluation after 6 months of operation revealed no palpable swelling and range of motion within normal limits. She had no complaints and no pain from the knee joint while walking and doing household activities. She was symptom-free on her recent evaluation after 1 year of operation.

Discussion

HFP is an intracapsular but extra synovial structure of the front knee section. The exact function of these HFPs is not known. However, it is believed to play a role in mechanical support, which absorbs shock or as a store for reparative cells after the injury^[9,10]. GC arising from HFP is much rarer among the GC around the knee^[2-4]. A study done by Krudwig *et al.*^[7] found out 85 intraarticular GC among arthroscopically examined 8000 knees over 15 years. Among 85 GC in the knee, only three cases were HFP GC. In a study by Bui-Mansfield *et al.*^[6], out of 1767 patients referred for MRI examination of the knee, 23 patients had intraarticular ganglia of the knee. Only three ganglia were found in HFP.

HFP GC can present with signs and symptoms ranging from localized pain and swelling to a clicking sensation and limited range of motion^[11].

Miljko *et al.*^[10] reported a case of giant infrapatellar HFP GC in a 36-year-old woman who presented with right knee swelling and limitation in bending the knee.

Cystic lesions around the knee can be ganglia, lipoma, synovial myxoma, meniscal or parameniscal cyst, synovial cysts, pigmented villonodular synovitis, synovial hemangioma, aneurysm, synovial sarcoma, and synovial chondromatosis^[1].

MRI has been the diagnostic modality for GC around the knee joint, which helps to depict their size and location, to exclude neoplastic lesions, and to detect other intraarticular pathologies^[3,6]. The characteristic findings of a GC in MRI include a fluid-filled lesion with low T1-weighted and high T2-weighted signal intensities^[3,10]. However, the use of ultrasonography has grown in popularity for the diagnosis of GC because ultrasonography is a relatively inexpensive, convenient, in-office procedure. The

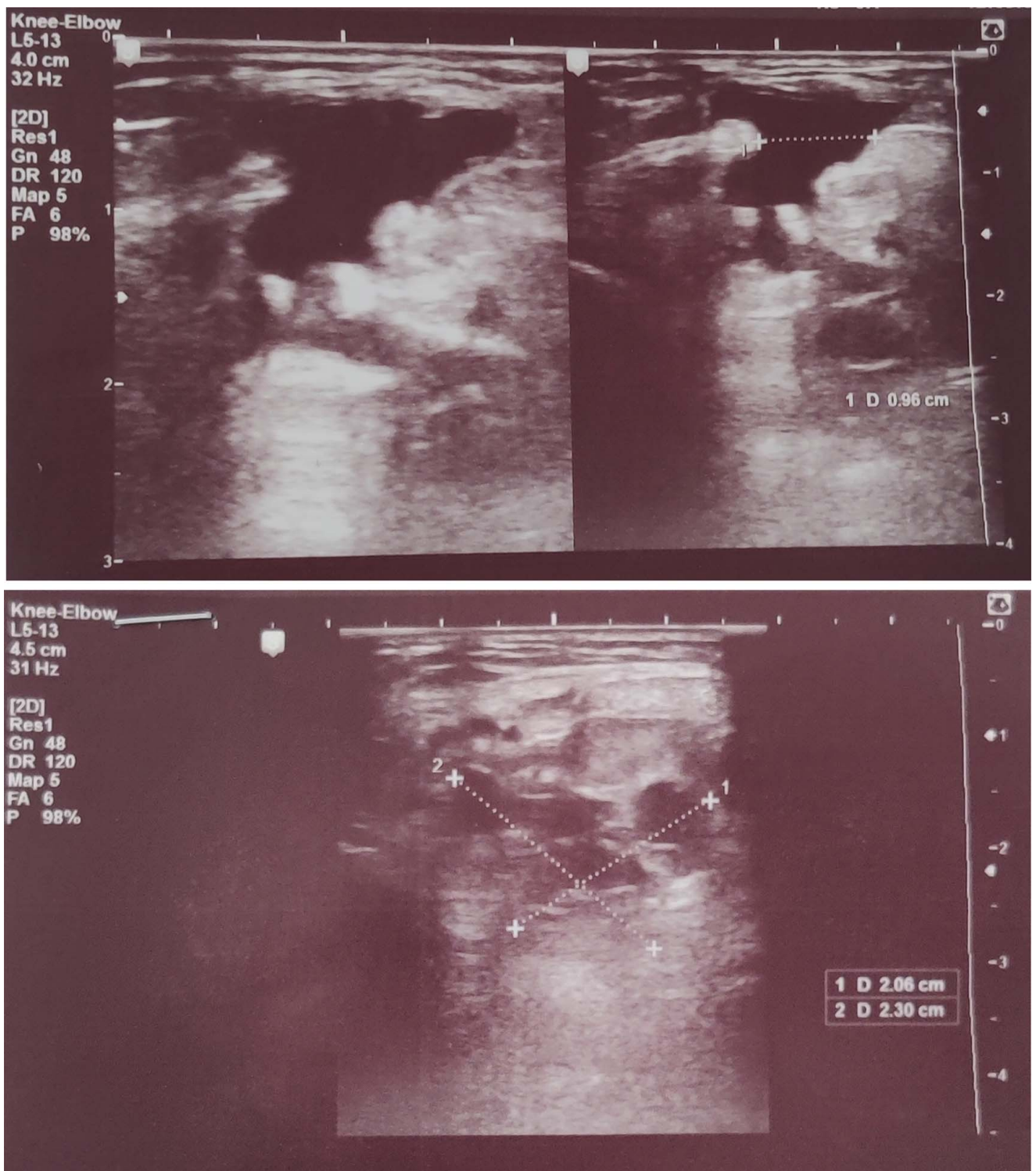


Figure 3. Ultrasonography medial infrapatellar views acquired with the knee placed at 30° flexion: a lobulated anechoic lesion of size ~2.3– cm x 2 cm is noted in Hoffa’s fat pad with few internal echoes and no internal vascularity and extending superficially into the subcutaneous plane passing between the patellar tendon and medial patellar retinaculum.

characteristic features of a GC in ultrasound are a well-defined, anechoic, or mildly complex soft tissue lesion with posterior acoustic enhancement, lacking internal vascularity, and having variable degrees of compressibility^[12].

In our study, a diagnosis of HFP GC was made by using musculoskeletal ultrasonography, which was later confirmed by histopathological examination. Ultrasonography properly depicted the size and location of the cyst in our case. Thus, MRI

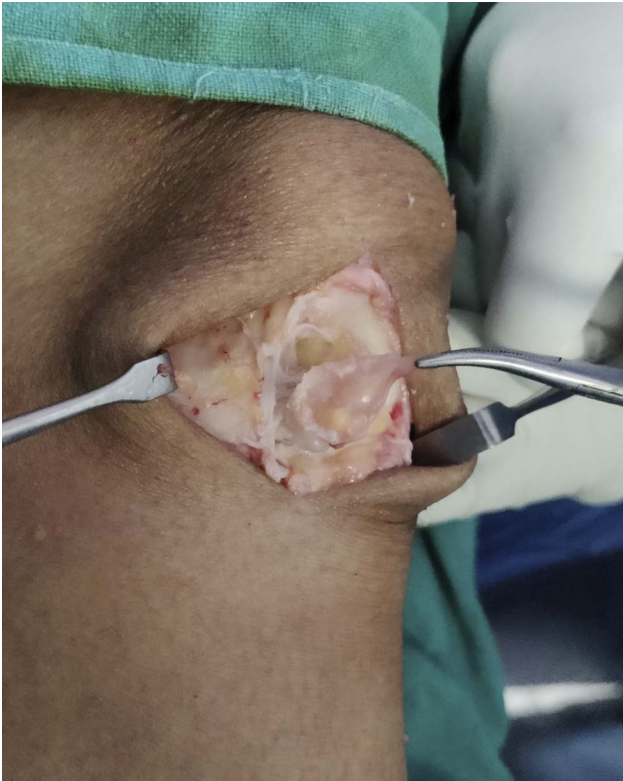


Figure 4. Medial parapatellar incision and ganglion cyst revealed.

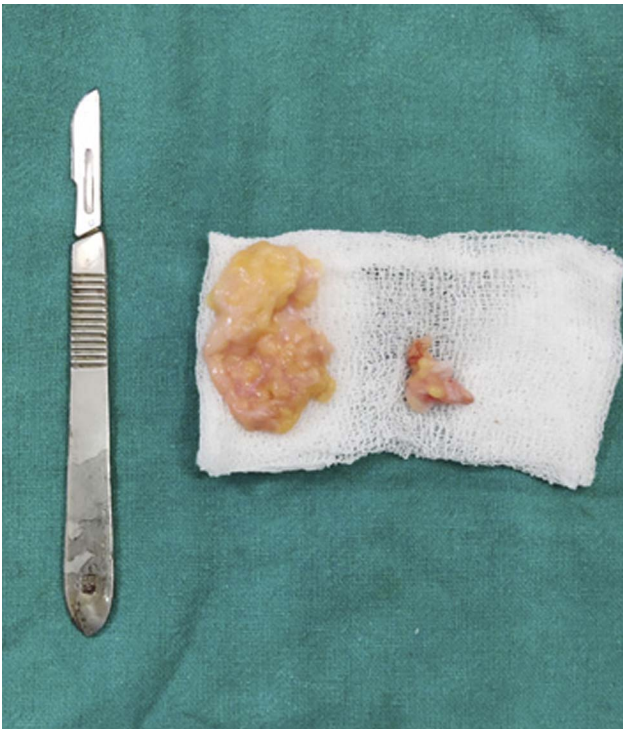


Figure 5. Completely resected ganglion cyst of Hoffa's fat pad.



Figure 6. Histopathological section of the specimen showing fibrous wall cyst with mucoid material (H&E, $\times 100$).

can be reserved for localizing the extent of the cyst in inconclusive cases and detecting other intraarticular pathologies.

Various treatment modalities have been employed for the treatment of HFP GC. Excellent results of symptomatic relief as well as substantial reduction in the size with ultrasound-guided local steroid injection (single injection of 40 mg methylprednisolone) have been reported^[12]. Depending on the size and site of the cyst, excision of the cyst can be done by open procedure or arthroscopically^[11]. Nikolopoulos *et al.*^[11] recommended open surgical excision for large GC for complete resection and minimal risk of recurrence, while arthroscopic excision for small lesions lay strictly within the synovium. Open surgical excision is recommended for small HFP GC as these masses may extend subcutaneously across the retinaculum, resulting in incomplete arthroscopic resection^[13]. In our study, we performed an open excision of the cyst as the cyst was extending superficially into the subcutaneous plane, passing between the patellar tendon and medial patellar retinaculum. Postoperatively there was no recurrence at 1 year follow-up.

Conclusion

This case illustrates the importance of ultrasonography in the early diagnosis of HFP GC and reserving the more costly and time-consuming imaging modality MRI for localizing the extent of the cyst. We recommend an open resection to avoid recurrence and incomplete resection of the cyst.

Ethical approval

Not applicable.

Consent

Written informed consent^[14] taken for the publication of the case report and the images. A copy of it is available for review by the Editor-in-Chief of this journal on request.

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Author contribution

S.K.K. and S.B.: contributed in the study concept, data collection, process of original draft preparation, and editing of the final manuscript. A.S., R.P., and S.K.: contributed in data collection, review, and editing of final manuscript. All the authors approved the final version of the manuscript and agreed to be accountable for all aspects of the work, ensuring questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflicts of interest disclosure

The authors report no conflicts of interest.

Research registration unique identifying number (UIN)

This manuscript is a case report and not a human study; therefore, it does not need to be registered.

Guarantor

Sabin Banmala.

Data availability statement

This submission is a case report and, therefore, does not include any results derived from research data.

Provenance and peer review

Not commissioned, externally peer-reviewed.

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