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CASE REPORT

Bakers Cyst: An Rare Case Presentation

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ABSTRACT

Benign cystic lesions are encountered on MRI during routine scans done for other pathologies likely Osteoarthritsis, meniscal tear, knee pain etc. Baker's cyst is a common finding and should be differentiated from other benign cystic lesions and bursas which are misdiagnosed as cyst. Baker's cyst is seen between the gastrocnemius and semimembranosus tendons and communicates with knee joint but in our case as cyst was very large, its location was not usual and communication of cyst with knee joint could not be established on MRI but this communication with the joint was established during the operation. Hence, we present a case of unusual presentation of baker's cyst.

Material & Methods: MRI was done on 3T.

KEYWORDS

• Baker's cyst • Popliteal cyst • Knee joint • Gastrocnemius • Cyst

INTRODUCTION

Popliteal or Baker's cyst represents fluid distention of a bursa between the gastrocnemius and semimembranosus tendons via a communication with the knee joint[1].Small sac of fluid is formed at the damaged area of the weak part of joint capsule. Baker's cysts is associated with many abnormality of knee like osteo-arthritis, internal derangement, inflammatory arthritis, joint effusion, meniscal tear, and degenerative joint disease[2].

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Gastrocnemius-semimembranosus bursa consist of two bursa: a bursa anterior to the medial gastrocnemius tendon and a bursa between the tendons of the gastrocnemius and semimembranosus tendons[3]. Prevalence of diagnostic Baker's cysts is 10% to 41%[4]. Differential for other cystic lesionon MRI knee is encapsulated fluid collections appears hypointense on T1-weighted Figures and hyperintense on T2-weighted Figures So correct diagnosis on MRI is necessary to avoid unnecessary arthroscopy[3]

CASE REPORT

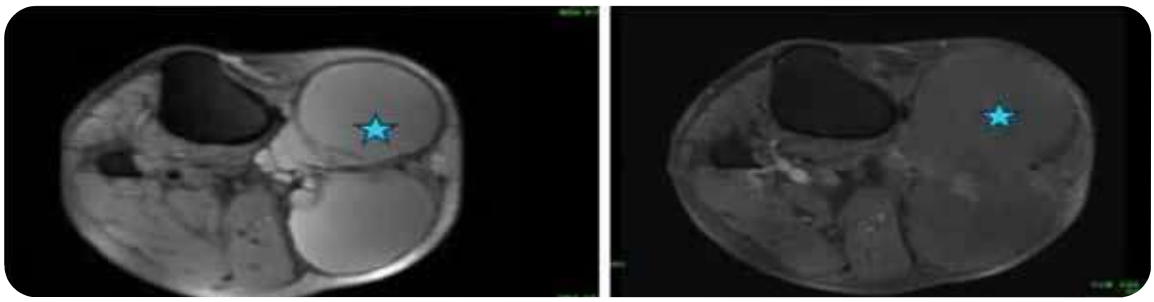
A 72 year-old patient presented with pain, swelling in knee and difficulty in walking in orthopedics department of our hospital. On clinical evaluation, the orthopedician detected osteoarthritic changes in knee however character of knee swelling was not sure. OA knee replacement was suggested however before doing total knee replacement defining swelling character was necessary. Hence, the patient was referred to our radiology department for MRI of knee to evaluate the cause of swelling.

MRI of right knee was performed & on MRI severe osteoarthritis changes was observed. Anterior cruciate and posterior cruciate ligament were seen crumpled up. Medial and lateral menisci were not well seen. Joint and supra patellar effusion was noted. A large irregular lobulated multicystic lesion was seen in the knee along medial-posterior aspect of knee. It was heterogeneous in appearance on PDFS Figures. Medial collateral ligament was not properly visualized. On MRI relation of cyst with gastrocnemius was not clearly make out as cyst was very large.

Post contrast MRI was also done but no significant post contrast enhancement was seen in the cyst. Mild synovial enhancement was seen along the joint. So on MRI, the possibility of medial collateral bursitis and ganglionic cyst was raised (*Figure 1*)

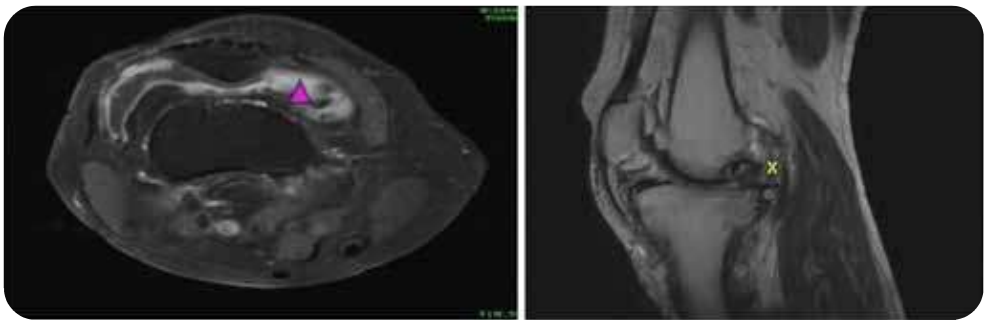
A **B**

Figure A: PDFS sagittal Figures showing a large heterogenous hyper intense cyst with septations**.**
Figure B: PDFS coronal Figures showing edema along medial condyles of femaur and Tibia. Medial and lateral meniscus are not visualised likely tarn.



C **D**

Figure C & D: Axial T2 and T1 Figures showing large cystic lesion.
Appearing hyper intense on T32 and hypo intense on T1 Figures.



E **F**

Figure E: T1 Axial showing joint effusion. **Figure F:** T2 Sagittal Figures showing crumpline of ACL and PCL ligaments.

Figure 1: MRI of the Knee

Therefore, patient was operated where the large cyst (*Figure 2*) was removed and sent for Histo-pathology and in operative findings the cyst appeared to be communicating with the joint. Injury of Medial collateral ligament was seen during operation.

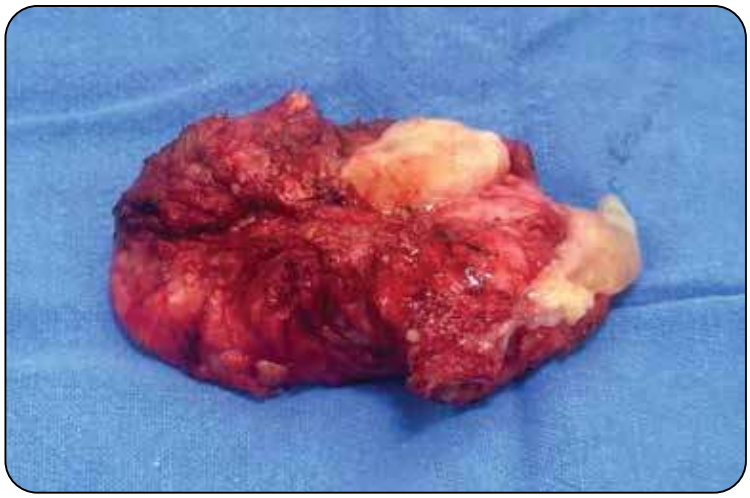


Figure 2: Post surgery Histopathological sample of Baker's cyst

On histopathology:

Gross Description: Received Single globular mass

Outer Surface: Irregular

Method: Light microscopy &IHC

Microscopic Description & Opinion: Sections show a multiloculated cyst composed of cystic spaces lined by synovial cells. The cyst contents are myxoid. A few inflammatory cells noted. No atypical cells/granuloma noted.

Impression: Baker's cyst

DISCUSSION

Baker cysts/popliteal cysts located at or below the knee joint are synovial lined fluid-filled cyst seen in the popliteal fossa **between the medial head of the** gastrocnemius **and the** semimembranosus **tendons** communicating with the knee joint.

They are usually incidental findings on MRI Knee done for some other pathology. They are communication between gastrocnemius-semimembranosus bursa and posterior joint capsule so they could not be labels as true cyst or bursa.

Clinically baker's cyst is suspected when there is acute pain in calf region. Ruptured baker's cyst is one of the diagnosis and second most common is deep venous thrombosis. In case of baker's cyst rupture fluid along gastrocnemius muscle is seen and remnant baker's cyst is also seen. It can be diagnosed on

ultrasound as well as MRI. In case of chronic baker's cyst patient presented with lump/ swelling in posterior calf region as seen in our case.

Common associations of baker's cysts are[2,5]:

- Osteoarthritis
- Rheumatoid arthritis
- Meniscal tear
- Degenerative arthropathy
- Rheumatoid arthritis
- Charcot joint involving the knee
- Post-traumatic in athletes

Differential for other cystic lesion on MRI knee is encapsulated fluid collections, intra-articular Ganglion, Meniscal cysts, Intraosseous cyst

Various bursa seen in knee joint are[1,4]:

- Anserine bursa
- Pre-patellar bursa
- Superficial infrapatellar bursa
- Deep infrapatellar bursa
- Iliotibial bursa
- Tibial collateral ligament bursa
- Isolated supra patellar bursa

As discussed various differentials of cysts and bursa, before undergoing surgery or arthroscopy few points need to be evaluated by surgeon as well as radiologist[1,4] (a) popliteal cyst origin to differentiate they are fluid distended bursa or capsular herniations, (b) if cyst is continuing with the joint thwn surgical approach, (c) anatomy of cyst as its neck, pedicle or stalk is present, (d) if cyst is large then possibility of isolating and radical removal of the cyst, (e) cyst location,size shape and surrounding structures, (f) evaluating joint capsule predominantely for any weak portion in the postero-medial knee joint capsule, (g) evaluating surrounding structures, knee movement in regard to cyst for the surgical technique, (h) to evaluate anatomy for proper closure of the communication to avoid recurrence of cyst.

Anatomy (Figure 3):

The Popliteal Fossa is a diamond-shaped space behind the knee joint. It is formed between the muscles in the posterior compartments of the thigh and leg as The Biceps Femoris tendon (superolateral) and Semimembranosus reinforced by Semitendinosus (superomedial). The medial and lateral heads of Gastrocnemius form the inferomedial and inferolateral boundaries, respectively. The floor of the fossa is formed by the Popliteal surface of the Femur, the capsule of the Knee reinforced by the oblique Popliteal ligament and, the Popliteus muscle covered by its Fascia. Roof of the Popliteal fossa is covered by the Fascia Lata which is strongly reinforced by the transverse fibers. Thus, the roof is pierced by the small Saphenous vein and the posterior Femoral cutaneous nerve. Contents of the Popliteal fossa are Popliteal Artery & Vein, Tibia nerve and common Fibular nerve.

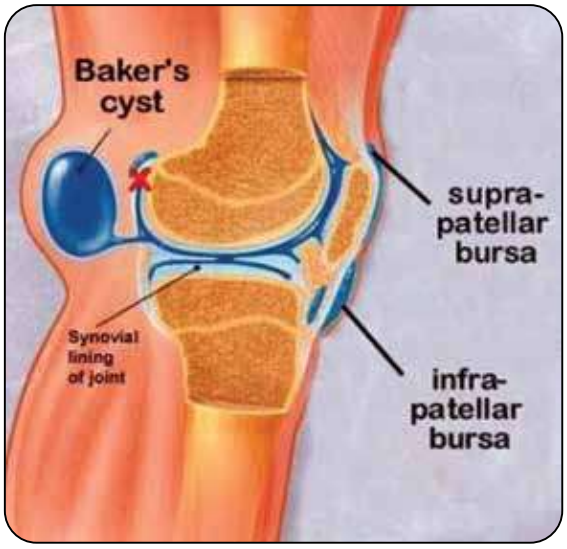


Figure 3: Anatomical depiction of popliteal fossa showing popliteal cyst and communication with joint

SURGICAL CONSIDERATIONS[1,4]

Important anatomical landmarks need to be consider in surgical technique before operating popliteal cysts: diagnosis of popliteal cyst and proper differentiation of cyst with fluid filled bursa, popliteal cyst is lined with synovial lining, help in reducing friction between capsule and tendon, so evaluation of excising all of the synovial lining tissue required or not should be considered, knee in flexion view at the time of surgery helps retraction of semitendinosus tendon and a longitudinal incision in line of semitendinosus tendon give good access to capsule opening and prevent cutaneous nerve damage and a sharp angle should be avoided to avoid skin necrosis, Popliteal cyst are more extended mediolaterally and narrow

ventrodorsally, for removal of popliteal cyst part of tendon and muscle need to be remove, cyst and joint capsule communicate in a transverse slit pattern which is seen beneath the medial head of gastrocnemius muscle, only upper rim of capsule is thick adjacent part of capsule appears thin,gastrocnemius tendon have no rim that expedite suturing, free tendon grafts are not easily fitted into the opening, Gastrocnemius tendon is thick and overlaps the capsular opening so suturing it with capsule i.e. capsuloplasty strengthen the weaken portion of capsule,closure of fascia should be done properly to avoid tibial nerve and superficial structure injury.

Surgery through posterior approach is considered usually in popliteal cyst removal, repair of posterior horn of medial meniscus, Posterior cruciate ligament reconstruction, ORIF (Tibial plateau fracture fixation). Various approach of surgery have benefits and risks in posteromedial approach: transverse incison helps in better evaluation of femoral condyles,muscles and ligaments and used mainly for popliteal cyst posterior tibial fractures, PCL avulsions etc however risk of flexion contracture result of inadequate closure of incision and a longitudinal incision in line of semitendinosus tendon give good access to capsule opening and prevent cutaneous nerve damage[1,4,9]

IMAGING

Plain X-ray: Provide no information about cyst however associated factors like osteo-arthritic changes, loose bodies etc can be detected through xrays

Conventional Arthrography was used in past to diagnose popliteal cyst however as its an invasive procedure and involves ionizing radiation not used now a days.

Ultrasound is an easy to use and reliable tool to diagnose Baker cysts. It helps in characterizing the cyst as simple or complex, can detect the size of the cyst and its relationship with surrounding structures (muscle, tendons, vessels). On ultrasound baker's cyst appears hypoechoic cystic structures in relation to the gastrocnemius muscle. Also ultrasound with color Doppler can help in distinguishing acute conditions of popliteal fossa as ruptured baker's cyst/deep vein thrombosis.

Limitations of ultrasound is when the cyst is very large real extension of cyst is difficult to differentiate on ultrasound and also communication of gastrocnemio-semimembranosus bursa with joint is difficult to diagnose in case of large complex Baker cyst.

Chatzopoulos *et al.* found that on ultrasound, Chronic osteoarthritis is commonly associated with popliteal cysts and associated with synovial inflammation. He found 89 popliteal cyst in 328 chronic osteoarthritic knees (27%) and 1 popliteal cyst in 54 nonosteoarthritic knees (2%). In bone scintigraphy of osteoarthritic knee baker's cyst association shows abnormal and intense tracer accumulations in early phase as compared to the knee without popliteal cysts[8].

CT scan is not modality of choice for soft tissue however popliteal cyst appears as hypodense mass with CT density of 20 to -10 HU and also osteoarthritic changes, loose bodies, bony erosions,cyst calcifications can be evaluated.

Magnetic resonance imaging is modality of choice for soft tissue and Baker cyst can be well evaluated on MRI with its extent, composition and complexity. Usually popliteal cyst is an incidental finding on MRI which was done for some other reasons. On MRI intra-articular communication of baker's cyst can be detected as a high signal intensity fluid filled neck communicating with joint space. MRI can also be evaluated for associated findings like osteo-arthritic changes, meniscal tears, loose bodies, chondral defects, synovitis and ligament tears. Differentiation of other cysts like meniscal cysts etc can be well evaluated on MRI. MRI also helps differentials of popliteal fossa lesions likely my xoidliposarcoma. Disadvantage of MRI is its cost.[6,7]

CONCLUSION

Bakers cyst are usually seen inbetween the medial head of the gastrocnemius and the semimembranosus tendons & communicating with the knee joint but in our case it is presented uncommonly medially with no obvious relationship between cyst and the gastrocnemius and the semimembranosus tendons could made on MRI however in operative findings it was appears to be communicating with the joint. So this is an uncommon presentation of Baker's cyst.

Conflict of Interest: None

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