



Radiological Evaluation of Cystic Lesions Presenting as Painful Knee

Ağrılı Diz Bulgusuyla Sunulan Kistik Lezyonların Radyolojik Değerlendirilmesi

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ABSTRACT

Purpose: Painful knee is a common clinical scenario in any outpatient clinic. Although, the commonest cause of painful knee is blunt trauma, many non traumatic cystic lesions too present as painful knee. For appropriate management of these conditions, a correct diagnosis is required. Clinical examination alone is often not sufficient to reach the exact diagnosis in patients with underlying cystic lesions manifesting as painful knee. Here comes the role of imaging. This study was therefore undertaken to evaluate how imaging can help in pinpointing the exact cause of cystic lesion presenting as painful knee and therefore assist in proper management.

Material and Methods: 50 consecutive patients with painful knee as the presenting complaint were radiologically evaluated for assessing how common are cystic lesions as the cause of knee pain. The findings were then noted in this descriptive study.

Results: 26 patients were found to have an underlying cystic lesion as the cause of painful knee. Popliteal cyst was the commonest lesion and was seen in 12 cases. Suprapatellar bursitis as well as infrapatellar bursitis was seen in 3 cases each. Meniscal cyst was seen in 8 cases.

Conclusion: Painful knee can be a presenting symptom of many cystic lesions of knee. Ultrasound can show the cystic abnormality, but it is only the Magnetic Resonance Imaging which can demonstrate the complete entity.

Key Words: Painful Knee; MRI; Ultrasound; Cystic Lesions

ÖZET

Amaç: Ağrılı diz; ayakta tedavi edilen hastalarda yaygın bir durumdur. Ağrılı dizin en yaygın nedeni künt travma olmasına rağmen bir çok travmatik olmayan kistik lezyonlarda ağrılı dize aracılık eder. Böyle durumların yönetimi için öncelikle doğru teşhis gereklidir. Klinik inceleme çoğu zaman ağrılı dize aracılık eden kistik lezyonlara sahip hastalarda doğru teşhis açısından tek başına yeterli olmaz. Bu noktada görüntülemenin önemi ortaya çıkar. Bu çalışma ağrılı dize aracılık eden kistik lezyonların kesin nedenini belirleyebilmede görüntülemenin nasıl yardımcı olabileceğini göstermek ve böylece doğru yönlendirmeyi sunmak içindi.

Materyal ve Method: Ağrılı diz şikayeti olan 50 hasta, ağrılı dize neden olan kistik lezyonların hangi durumlarda yaygın olduğunu göstermek için radyolojik olarak değerlendirildi. Bulgular bu tanımlayıcı çalışmada kaydedildi.

Bulgular: 26 hastanın ağrılı dize neden olan kistik lezyonlara sahip olduğu bulundu. Popliteal kist 12 vakada görülmüş olup en yaygın lezyon olarak kaydedildi. İnfrapatellar bursan iltihaplanması yanı sıra suprapatellar bursan iltihaplanması 3 vakada gözlemlendi. Menisküs kist ise 8 vakada gözlemlendi.

Sonuç: Ağrılı diz; bir çok diz kistik lezyonların semptomu olabilir. Ultrason kistik anomaliliği gösterebilir, manyetik rezonans görüntüleme ise daha kapsamlı olarak bütün herşeyi gösterebilir.

Anahtar Kelimeler: Ağrılı Diz, Kistik Lezyonlar, MRI, Ultrason

INTRODUCTION

Almost every one of us has suffered from knee pain at some or other time in life. Painful knee is a common presentation in many clinics. Trauma to the knee, fracture or infection is the commonest etiology. Cystic lesions in and around knee too can present as painful knee. This study was therefore undertaken to find how common such cystic lesions are.

Clinical examination alone is often not sufficient to pinpoint the exact cystic lesion causing pain^{1,2}. Hence, for want of correct diagnosis such patients might not get appropriate treatment. Here comes the role of non invasive imaging³. This study was therefore undertaken to analyze the utility of imaging in pinpointing the cystic lesions presenting as painful knee and therefore assist in proper management.

MATERIALS and METHODS

High resolution ultrasound [HRUSG] and 1.5 T Magnetic Resonance Imaging [MRI] systems were used for evaluating 50 consecutive patients having painful knee as the presenting complaint. The aim was to find how common cystic lesions are as the cause of knee pain, and to study the spectrum of such cystic lesions presenting in our setup. The findings were then noted in this descriptive study.

RESULTS

In this study there were 34 males and 16 females. Most commonly affected age group was between 50 to 60 years of age.

Total 26 patients (52 %) who were found to have an underlying cystic lesion as the cause of painful knee. The commonest lesion cystic lesion that presented as painful knee was the popliteal cyst and it was seen in 12 cases (24%).

Suprapatellar bursitis as well as infrapatellar bursitis was seen in 3 cases each (6%). Meniscal cyst was seen in 8 cases (16%).

MRI could satisfactorily diagnose all the cystic lesions. But HRUSG failed to demonstrate the cystic lesion in 2 cases of popliteal cysts and in 3 cases of Meniscal cyst.

DISCUSSION

The spectrum of encapsulated cystic lesions that occur in the soft tissues and bones in and around the knee joint and cause pain is quite broad and beautiful. Imaging has an important role in not only identifying or confirming this lesion but also in assessing its extent and connections^{3,6}.

Most of these lesions produce clinical features suggestive of internal derangement of the knee. Hence a definitive diagnosis is needed to avoid unnecessary further invasive procedure like arthroscopy.

On plain radiographs, cystic lesions are rarely seen. Sometimes they may cause a focal bulge on overlying soft tissues. Computerized tomography (CT scan) may show the lesions, but exact tissue characterization may be limited. In experienced hands, HRUSG can very well depict the pathology. Cystic lesions typically appear hypo or anechoic on ultrasound. MRI on the other hand can give an idea of entire lesion and demonstrate it in multiple planes so that correct diagnosis and management strategy can be planned. Cystic lesions are seen as low signal intensity on T1 -weighted images and high signal intensity on T2-weighted images because of their high content of free water. Short Tau Inversion Recovery (STIR) MRI sequence demonstrates cystic lesions as hyper intense areas. On imaging studies, typical appearance of cystic lesions has been studied and mentioned in literature^{4,16}.

The following important cystic lesions were found in this study:

Suprapatellar Bursitis

This cystic lesion is formed as a separate synovial space between the quadriceps tendon and the femur, proximal to the knee joint capsule cranial to patella^{4,6}. It is best demonstrated on MRI as a focal fluid collection anterior to the distal femoral diaphysis, separated from the knee joint by a thin intact suprapatellar plica as shown in Table / Figure 1a.

Deep Infrapatellar Bursitis

This cystic lesion is located between the tibial tuberosity and skin and is usually caused by chronic trauma. It is an uncommon site for bursitis^{4,6}. MRI shows a focal poorly defined collection of fluid anterior to the tibial tubercle, best demonstrated on sagittal /axial images. MRI STIR sagittal image Fig 1b shows the collection in the deep infrapatellar bursa as well.

Ganglion Cyst

Ganglion cyst is a benign cystic lesion having viscous, proteinaceous fluid. It occurs adjacent to or within muscles and their tendon sheaths. On MRI it appears hyper intense on T2W and STIR images. Synovial cyst and ganglion cysts are easily distinguished from meniscal cysts by the absence of a direct communication with the meniscus^{5,6,9,10}. Table / Figure 2- STIR MRI image shows cruciate ganglion cyst adjacent to the cruciate ligament.

Meniscal Cysts

These cystic lesions occur at the joint line, almost invariably in association with degeneration and meniscal tears. Synovial fluid is forced through the tear and accumulates at the meniscal capsular junction^{5,6,9,10}. These are of two types:

1. Intrameniscal cyst-when the cyst is confined within the meniscus as shown in Table / Figure 3, it appears as a small, loculated area of altered signal intensity, seen communicating to the anterior horn

of lateral meniscus appearing heterogeneously hyper intense on T2WI sagittal and STIR coronal images.

2. Parameniscal Cyst- when the meniscal cyst extends into the adjacent soft tissue as shown in Table / Figure 4. It is seen as a small, loculated area of altered signal intensity, communicating with the posterior horn of medial meniscus appearing hypo intense on T1WI coronal and hyper intense on STIR axial and coronal images.

Popliteal Cyst /Baker's Cyst

It usually originates between medial head of the gastrocnemius muscle and the more medial semi membranous tendon and demonstrate low signal intensity on T1-weighted images and uniformly increased signal intensity on T2-weighted images as well as STIR MRI images^{11,13}. Table / Figure 5- Popliteal Cyst- Sagittal and Axial STIR image shows complex giant Baker's cyst, seen connected to the joint cavity by a narrow neck.

Sometimes, septations that compartmentalize the cyst are seen especially when the cysts arise in atypical locations. A narrow neck connecting the cyst to the joint can usually be identified on axial images, just below the proximal attachment site of the medial head of gastrocnemius.

Subchondral Cysts (Geode)

These are often associated with osteoarthritis. These may be multiple and segmental in distribution, and present with surrounding sclerosis¹⁴. Table / Figure 6 shows a Geode/Subchondral Cyst in a 60 years male patient with pain in right knee joint. It is seen as a small, round to oval, area of altered signal intensity noted involving the subchondral area of intercondylar region and partly lateral condyle of tibia and lateral condyle of femur, appearing hyperintense on STIR MRI images.

In the present study we came across few lesions that mimicked cysts and caused confusion. Synovial chondromatosis is major proliferative disorder of the synovium in which knee joint is

commonly involved. The cartilaginous metaplasia of the synovium leads to the production of multiple cartilaginous bodies within the confines of the joint¹⁵. On MRI the high signal intensity represents the cartilaginous portion of the bodies, and the relatively lower signal intensity represents the ossified portions as shown in Table / Figure 7 in which Sagittal T2W and Axial STIR image demonstrated high intensity knee joint fluid, which contained multiple joint bodies that are heterogeneous in signal intensity.

Lipohemarthrosis is the presence of a fat-fluid level that represents a mixture of fat and blood in joint capsule following trauma. It is nearly diagnostic of a fracture, even when that fracture is radiographically occult. It is seen in approximately 40% of all intra-articular fractures of the knee¹⁶. Table / Figure 8 shows Lipo-Haem Arthrosis in a 23 years male patient with history of blunt trauma to knee. There is moderate amount of collection seen in the right knee joint and suprapatellar bursa showing fluid-fluid level indicative of lipo-

haem arthrosis, appearing hyper intense on T2W and STIR images. The image shows fat floating atop blood in the knee joint, as a fat-fluid level.

CONCLUSION

Cystic lesions around knee are a less known cause of painful knee. These may incidentally be detected on HRUSG or on MR imaging; or may be symptomatic and palpable and are referred for imaging characterization. Plain radiographs and CT scan are of limited use in diagnosing cystic lesions. Knowledge of the characteristic appearance and location of cystic masses around the knee joint, as well as distinguishing features and potential pitfalls such as atypical cyst contents on MR imaging, aids in allowing a specific diagnosis to be made which determines correct management. Imaging thus has a vital role for assisting in diagnosis and proper management of lesser known cystic lesions as the cause of painful knee

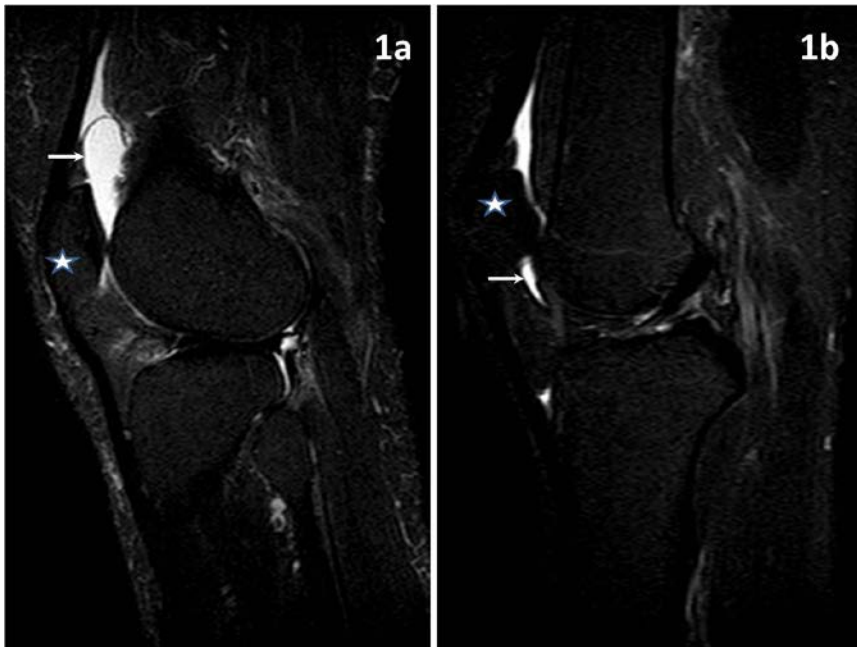


Figure 1. Fig 1a shows Suprapatellar bursitis in 46 Year old male with pain in the anterior aspect of knee, MRI STIR sagittal image showing fluid intensity lesion. Figure 1b. shows the collection in the deep infrapatellar bursa as well. Patella is marked with a star.

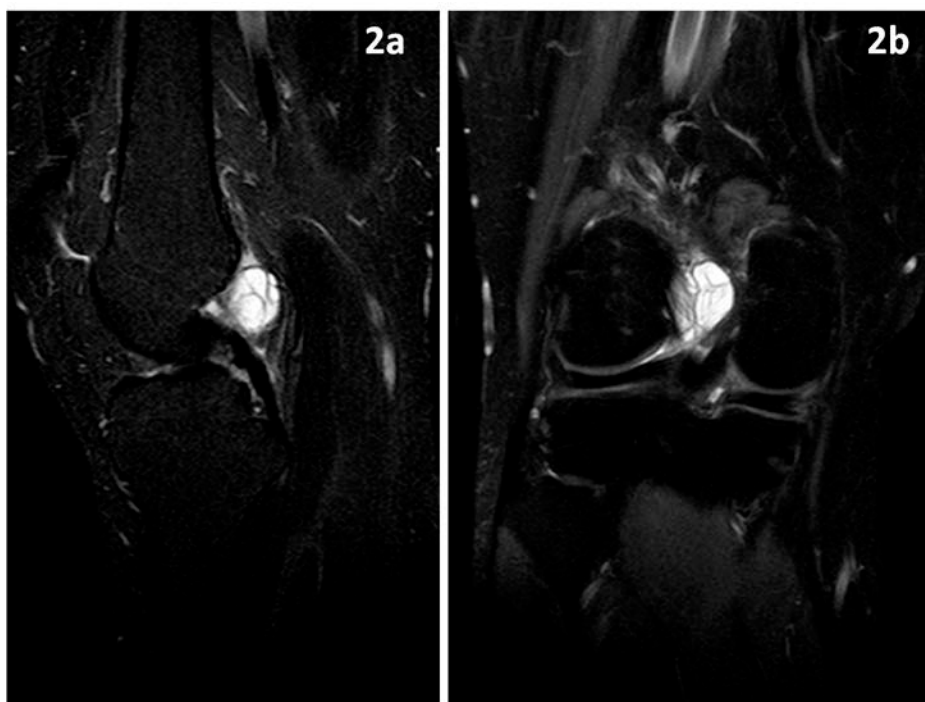


Figure 2.- STIR MRI image shows **cruciate ganglion cyst** adjacent to the cruciate ligament.

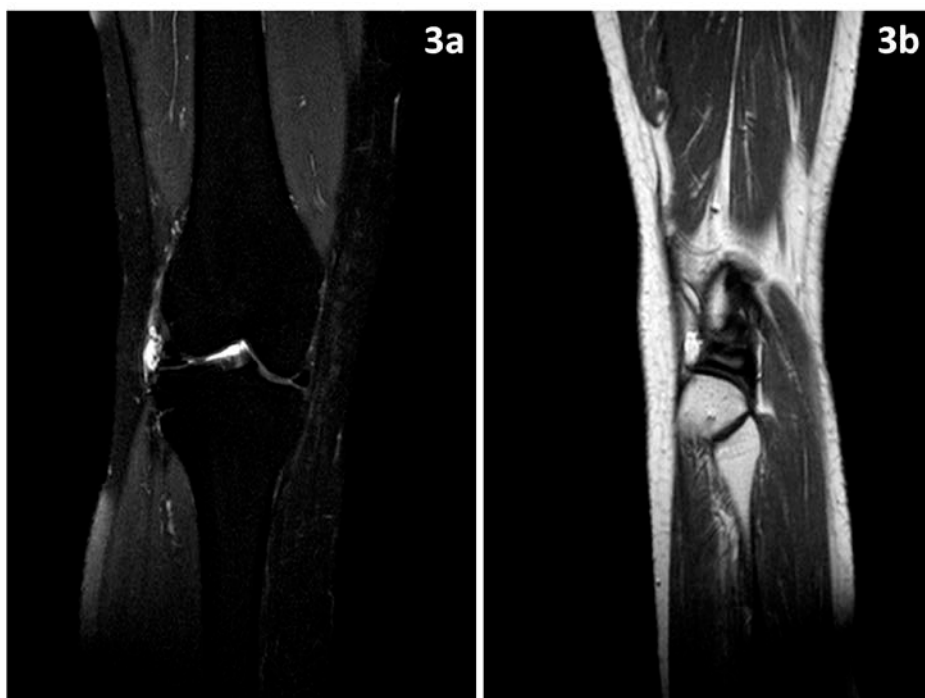


Figure 3-Intrameniscal Cyst A small, loculated area of altered signal intensity, seen communicating to the anterior horn of lateral meniscus appearing heterogeneously hyperintense on T2WI sagittal and STIR coronal images.

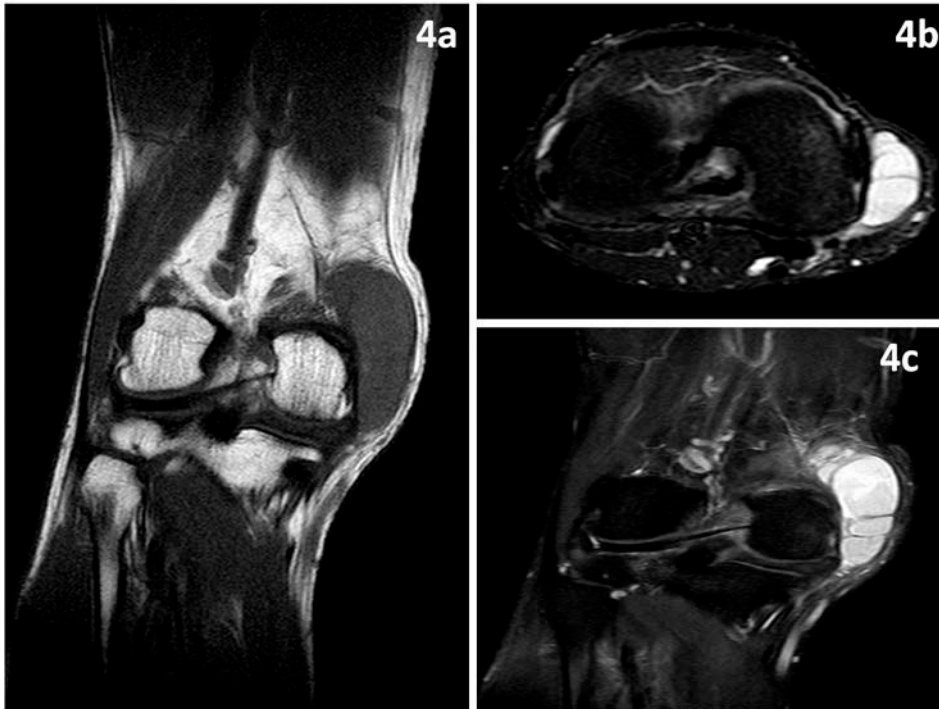


Figure 4. Parameniscal Cyst- A small, loculated area of altered signal intensity, seen communicating to the posterior horn of medial meniscus appearing hypointense on T1WI coronal and hyperintense on STIR axial & coronal images.



Figure 5- Popliteal Cyst- Sagittal and Axial STIR image shows complex giant Baker's cyst, seen connected to the joint cavity by a narrow neck.



Figure 6- Geode/Subchondral Cyst- A 60 years male patient c/o pain in right knee joint. There is small, round to oval, area of altered signal intensity noted involving the subchondral area of intercondylar region & partly lateral condyle of tibia and lateral condyle of femur, appearing hyperintense on STIR and T2W images s/o subchondral cyst.



Figure 7- Synovial Chondromatosis- Sagittal T2W and Axial STIR image demonstrated high intensity knee joint fluid, which contained multiple joint bodies that are heterogeneous in signal intensity.

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