

Magnetic Resonance Imaging of Anterior Knee Bursitis: A Case Series and Review of Literature

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ABSTRACT

Anterior knee bursitis arises from a range of causes. We present two case studies involving pre-patellar bursitis, superior patella pouch effusions and oedema of the Hoffa's fat pad. Our objective in this paper is to highlight the significance of MRI in evaluating lesions of the anterior knee compartment and undertake a review of related literature regarding anterior knee pain.

Keywords: MRI, Bursitis, Pre-patellar, Infrapatellar, Suprapatellar pouch

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INTRODUCTION

Among the number of bursae around the knee joint, the most commonly affected causing anterior knee pain are the supra patellar, pre-patellar and infrapatellar bursae. Inflammation of these bursae results in superficial swelling on the anterior aspect of the knee.

The diagram below illustrates the simple anatomy of the knee.

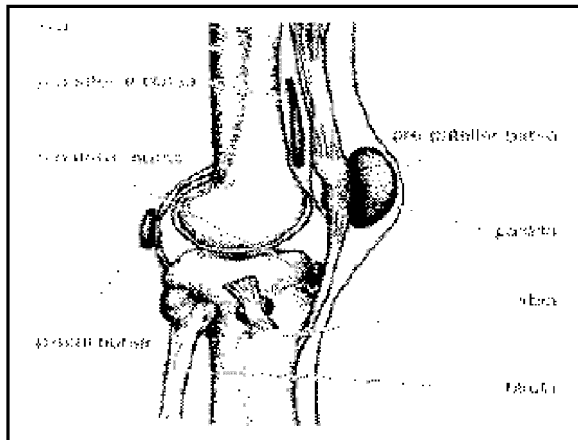


Fig. 1

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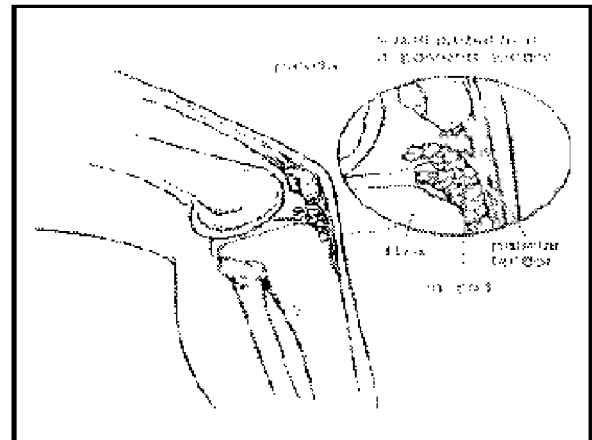


Fig. 2

Within the context of multimodality imaging, arthroscopy is the gold standard for imaging the anterior knee^{2,4} but it requires hospitalization, anaesthesia and all the potential complications of a surgical procedure. Research and literature also indicates a significant correlation in diagnostic accuracy with the use of high frequency ultrasound compared with MRI in evaluating soft tissues of the knee⁵. Ultrasound is reported to be effective in evaluating tendons, effusions, synovitis, periarticular soft tissue masses, muscles and the collateral ligaments⁶. The advantages of sonographic evaluation also

include focused evaluation correlated with the specific site of pain, multiplanar capabilities. It is however less suited for complex internal derangements of the knee such as menisci lesions, cruciate ligaments tears, bone marrow and osteoarthritis of bone and articular architecture⁷. MRI is best suited for evaluating meniscal lesions, fluid collections, cruciate ligaments ruptures and articular cartilages⁸. It also has the benefit of three dimensional advantages in detecting local and diffuse cartilage changes⁹. We now present two cases involving fluid collections in the knee.

Case 1

A 46 year old female presented with anterior right knee pain. Patient complained of medical tenderness over a 6 week period with a history of occasional knee locking.

No history of previous surgery was reported. Using a combination of anterior-posterior drawer test, Lachman test, pivot shift test for the diagnosis of cruciate ligament injuries and Apley's and McMurray's test for meniscal injuries, clinical examination indicated a medial meniscal tear. Patient was then referred for MRI to confirm clinical diagnoses and further evaluation of the knee.

MRI was performed with the knee in full supination using a 1.5 T unit (symphony Siemens) using T2 weighted sagittal spinecho sequence TR/TE: 6110/135, FOV: 350 mm, ST: 6 mm, T2

coronal proton density TR/TE: 5980/180, FOV: 500 mm, ST: 4 mm and T1 axial TR/TE: 5100/18, FOV: 400, mm, ST: 5 mm).

The MRI scan confirmed that within the tibio-femoral articulation, there was mucinous degeneration affecting the medial meniscus and anterior horn of the lateral meniscus without overt tear. Cruciate and collateral ligaments were normal. The articular and subchondral bones were intact.

Within the extensor compartment, the patello-femoral articulation appeared normal. There was abnormal oedematous soft tissue within the supra patellar pouch indicative of synovial proliferation or synovitis(See Figs 3-6). Linear areas of oedema were noted within the infra patellar Hoffa's fat pad. The possibility of impingement could not be excluded. Quadriceps and patellar tendons appeared normal. An incidental baker's cyst was also found (see Figs 4 & 6).



Fig. 3

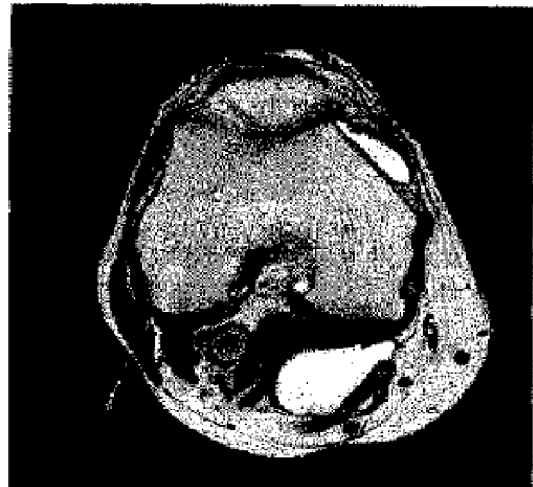


Fig. 4

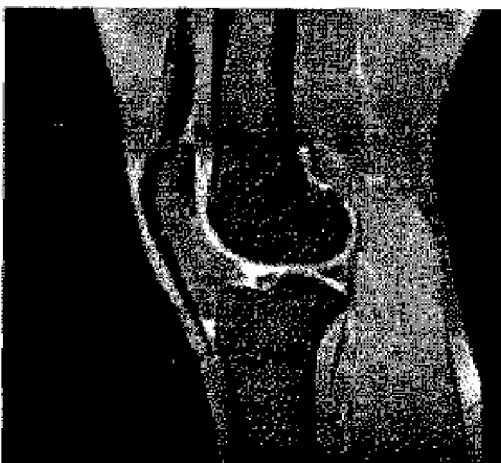


Fig. 5

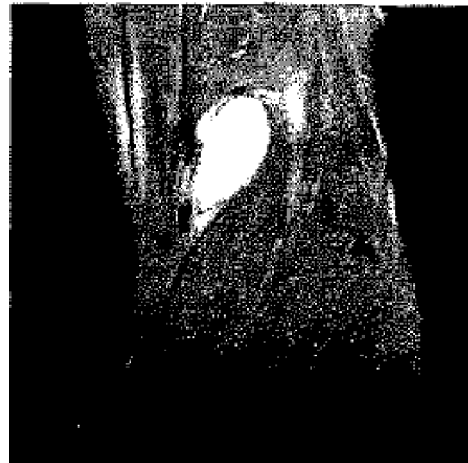


Fig.6

Case 2

A 39 year old male footballer presented with a painful left knee with tenderness in the lateral aspect of the knee.

Clinical evaluation was undertaken using the same parameters in Case 1.

MRI was also performed with a 1.5 T unit (symphony Siemens) using T_2 weighted sagittal spin-echo sequence TR/TE: 6110/135, FOV: 350 mm, ST: 6 mm, T_2 coronal proton density TR/TE: 5980/180, FOV: 500 mm, ST: 4 mm and T_2 axial TR/TE: 5100/18, FOV: 400 mm, ST:5 mm).

The scan reported that within the extensor compartment, the patellofemoral articulation, quadriceps and patellar tendons were normal. Excess fluid was present within the deep infrapatellar bursa.

A small effusion was noted with lateral synovial plica (See Fig 8 -10).

Within the tibio-femoral articulation, there was a radial tear of the antero-lateral horn of the lateral meniscus. Mild effusion with gastrocnemius and semi membranous bursa cyst was noted along the gastrocnemius. The posterior-media and posterior-lateral complexes appeared satisfactory.

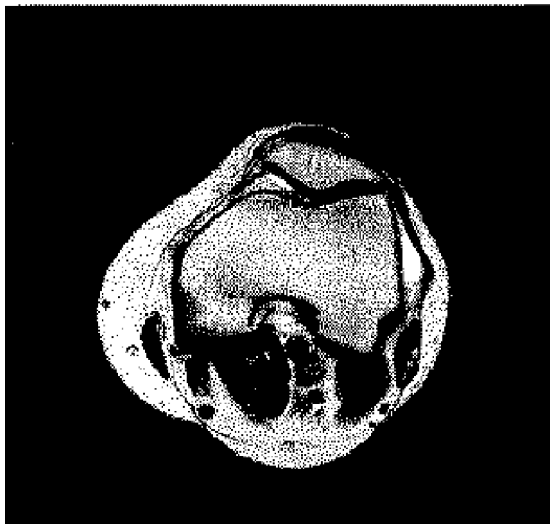


Fig. 7

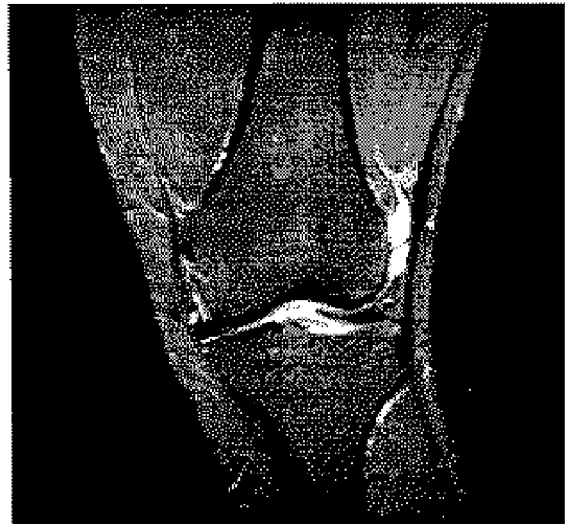


Fig. 8

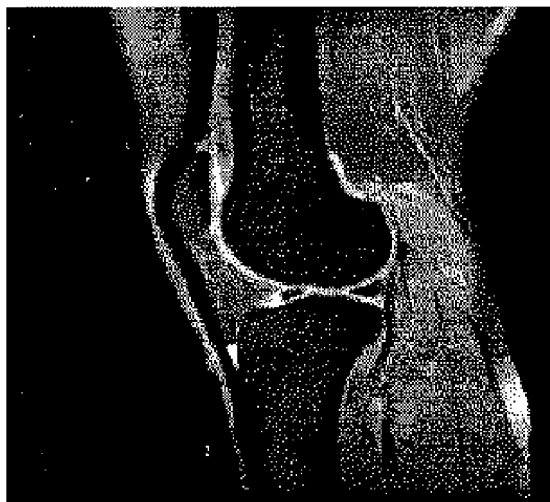


Fig. 9

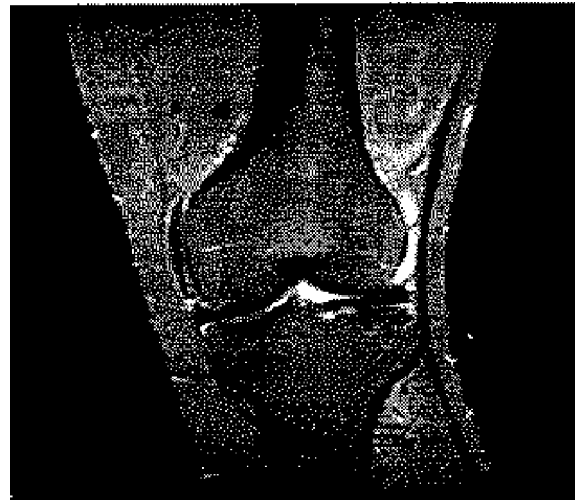


Fig. 10

TREATMENT AND FOLLOW UP

Both patients went on to have arthroscopy with injection of corticosteroids and a local anaesthesia.

DISCUSSION

Overuse, acute trauma to the patellar, Osgood Schlatter disease and jumper's knee (patella tendinopathy) are some of the common causes of anterior knee pain⁹. Any of these could result in either a sprain - overstretching one or more ligaments through twisting or wrenching or a strain - a tendon or muscle is overstretched, Torn ligaments, menisci tear; synovial effusions and bleeding into the knee joint have also been known to arise from any of these aetiologies. Evaluating the cause of anterior knee pain also shows that joint effusions and injuries to the bursae in the knee could be found in non specific pain disorders which are localised to the anterior part of the knee¹⁰. In this type of condition, there are evidences of fluid accumulation in the surrounding bursae of the anterior knee compartment following trauma to the quadriceps tendons and patellar tendinopathy. Infra patellar contraction syndrome, arthrofibrosis, Hoffa's syndrome, tibial collateral ligament bursitis, saphenous nerve palsy, isolated ganglions of the anterior cruciate ligament and knee tumors, slipped capital femoral epiphysis are also some of the other reasons for anterior knee pain¹¹.

Apart from the other pathologies reported in these two patients, the MRI images are classical examples of supra and infrapatellar bursitis which plain radiography would not be able to identify. Within the extensor compartments in Figs 3 & 5, high signal intensity in the supra patellar pouch above the knee cap indicated supra patellar effusions and prepatellar bursitis.

In the same vein, although the patellar tendon appeared normal in Fig 9, the presence of fluid within the infrapatellar bursa indicated an inflammation. The presence of high signal intensity on the lateral border of the femur also indicated a small effusion. There was abnormal

oedematous soft tissue within the supra patellar pouch indicative of synovial proliferation or synovitis. Linear areas of oedema were also noted within the infra patellar Hoffa's fat pad in the infrapatellar bursa, suggesting the possibility of an impingement syndrome. While the patients in both cases indicated they have not had any surgery to the knees examined, the abnormalities noted in the images could have arisen from degeneration and consequences of trauma with possibilities of inflammatory and neoplastic diseases of the synovium in the fat pad.

CONCLUSION

The areas of high MRI signal intensities reported within the extensor compartments of the knees in both patients were indicative of fluid collections and evidences of inflammation to the bursae. While ultrasound has been shown to be good in imaging this abnormality, it would not be possible to evaluate the true status of the soft tissues as discussed above with plain radiography.

Arthroscopy also, would do more damage to them as it is an invasive procedure which carries along with it potential complications of surgery.

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