

Case report

The use of MRI in the investigation of lateral meniscal tear post medial unicompartmental knee replacement

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ABSTRACT

The evaluation of lateral knee pain in patients with a medial unicompartmental knee replacement (UKR) is complex. The native lateral compartment structures are prone to the same injuries as patients with normal knees. Historical reports of lateral meniscal injury post medial UKR have argued MRI evaluation is obsolete due to artefact caused by the prosthesis. We report a case of lateral meniscal injury in a patient two years after successful medial UKR. We identified the offending pathology via utilization of MRI scanners adopting metal artefact reduction sequences (MARS). The MARS MRI protocol helps clinicians accurately and non-invasively evaluate soft tissue structures in knees with metal prostheses. It also allows surgeons to accurately counsel patients and provides a higher degree of certainty in treating the pathology.

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Introduction

Unicompartmental knee replacement (UKR) is a good pain relieving procedure for medial compartment osteoarthritis [1,2]. Surgeons performing this procedure aim to resurface the affected arthritic compartment leaving the unaffected lateral and patella-femoral compartments intact [3,4].

UKR is associated with higher rates of revision than total knee arthroplasty. The revision rate for this procedure can be affected by progression of arthritis in the non-resurfaced compartments or complications and failure of the prosthesis [1,2].

Complications from a medial UKR can also be related to the native knee structures, which are still susceptible to the same myriad of injuries seen in patients with a non-resurfaced knee. This is an important consideration when evaluating the cause of pain and dysfunction in patients with UKR's [1,2].

The case presented here demonstrates the evaluation of lateral meniscal pathology in the untreated compartment of a patient who

received a well functioning medial unicompartmental knee replacement.

Case history

A 69 year old woman, presented to our unit 2 years after successful medial unicompartmental knee replacement. The patient was reviewed by the senior author AL. She reported pain that had commenced after a twisting injury to the right knee from climbing over a fence. The pain was also associated with intermittent swelling, and mechanical symptoms of locking and giving way. On examination, she was tender at the lateral joint line of the right knee. The senior author concluded the likely pathology was a lateral meniscal tear and the patient was referred for MRI scanning. The MRI was performed using metal artifact reduction sequences (MARS). This scan demonstrated an abnormal lateral meniscus, with a significant tear close to the capsular attachment (Figures 1 and 2). The scan concluded that the articular cartilage in the lateral compartment was preserved. The scan also reported the articular cartilage of the patella was found to have some thinning at the inferior pole.

The MRI findings in this case were a useful adjunct to the clinical history and examination, and facilitated accurate patient consent for arthroscopy. Arthroscopy revealed a radial tear within the middle third of the lateral meniscus (Figure 3). Given these findings a 70 per cent resection of the affected meniscus was performed (Figure 4).

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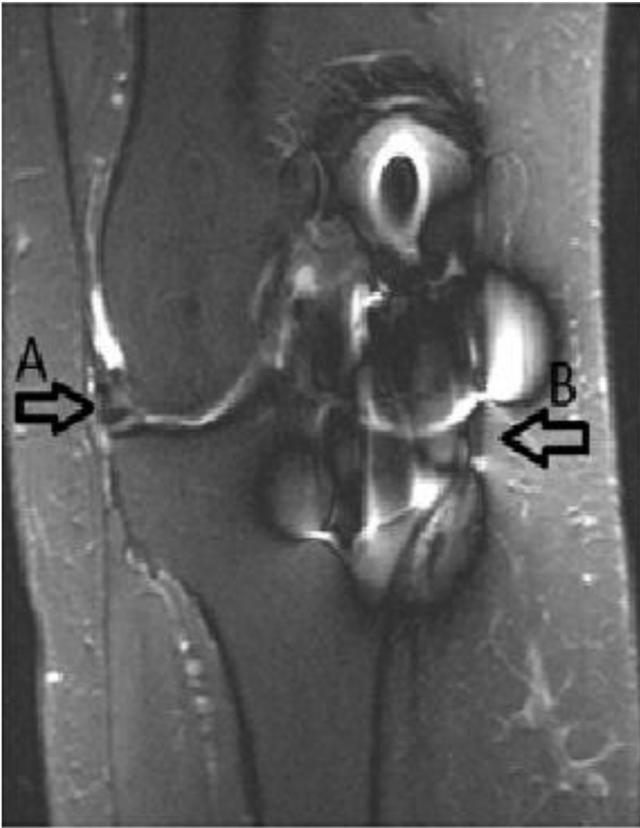


Figure 1. Coronal section of the knee. Arrow A: Horizontal tear of the lateral meniscus extending to site of capsular attachment Arrow B: Gross artifact caused by medial unicompartmental knee replacement.

The patient 2 months post lateral meniscectomy, could flex her knee from 0 to 120° and was back to rural outdoor walking and performing yoga without the same restrictions she had suffered prior to arthroscopy.



Figure 2. Sagittal section of the knee. Arrows demonstrate the intact anterior and posterior thirds of the lateral meniscus.

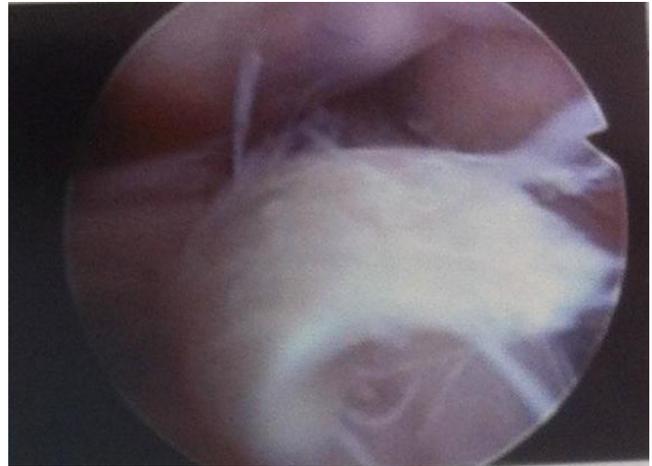


Figure 3. Arthroscopy image of lateral meniscal tear before debridement.

Discussion

The evaluation of pain and dysfunction post medial-UKR can prove to be difficult. The surgeon must be mindful of causes related to the surgery on the affected compartment, as well as the normal compartments of the knee [5]. The diagnostic difficulty is further compounded by the artifact caused by the metal prosthesis. This case demonstrates how pathology associated with the native compartments of the knee can be accurately imaged using MRI, metal artifact reduction sequences (MARS). The MARS technique reduces the intensity of artifact, by altering views and field gradients, with no additional imaging time [6].

Other case reports to our knowledge, argue the artifact created by metal prosthesis, renders MRI imaging of the knee obsolete [7]. These reports suggest that careful arthroscopic assessment of the knee is the only option available to the surgeon if soft tissue pathology is considered. However, diagnostic arthroscopy does carry with it risks to both the patient and implant.

The authors propose that MRI scanning can reliably assist a clinician in evaluating the native knee structures of patients with a medial UKR. Once definitive soft tissue pathology has been confirmed by MRI scan, accurate counseling of the patient can be undertaken.

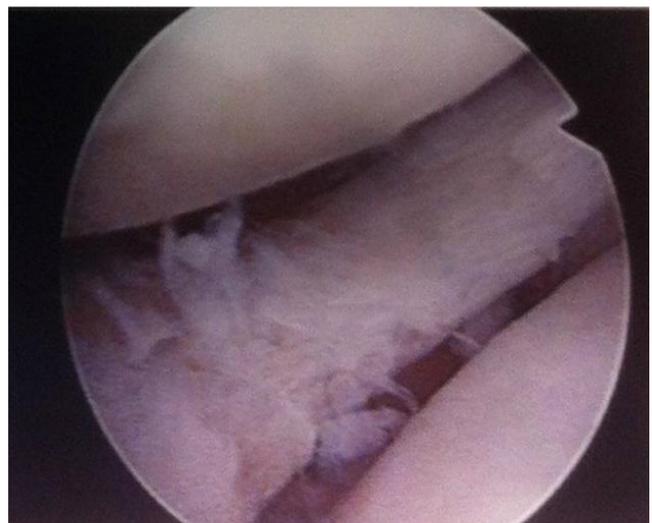


Figure 4. Arthroscopy image of debrided lateral meniscus.

To our knowledge, there are three other case reports of lateral meniscal tear post medial UKR [5,7,8]. None of these reports utilized MRI in the diagnostic investigation of the cases. One describes lateral meniscal tear, six weeks post surgery [7]. The article does concede the lateral compartment was poorly visualized at time of UKR, and therefore the lateral meniscal tear may have been asymptomatic prior to surgery. The second report described a lateral meniscal tear in conjunction with significant degenerative disease of the lateral compartment [5]. The third report described a case of non traumatic lateral meniscal injury in a patient who has had extensive surgery performed to the knee having undergone a UKR after prior high tibial osteotomy [8]. In this case the authors again opted to proceed directly to arthroscopy to ascertain the cause of the patients symptoms.

Summary

Common pathology associated with the normal anatomic structures must be kept in mind when evaluating a painful medial UKR. The use of MRI is advocated as it can assist surgeons in

accurately identifying soft tissue pathology in patients with medial unicompartmental knee replacement [9].

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