

# Meniscal cyst causing periarticular tibial erosion

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## ABSTRACT

Meniscal cysts causing bone erosions are rare. The majority of meniscal cysts are associated with tears of the menisci and magnetic resonance (MR) imaging appearances are usually diagnostic. The MR images of a 34-year-old man showed a well-defined cystic mass that communicated with a horizontal cleavage tear of the posterior horn of the lateral meniscus and caused pressure erosion of the lateral tibial condyle. We believe this to be the first locally reported case of tibial erosion related to a meniscal cyst. This entity should be included in the differential diagnosis for a well-defined periarticular erosion.

**Keywords:** magnetic resonance imaging, meniscal cyst, meniscus, tibia, tibial erosion

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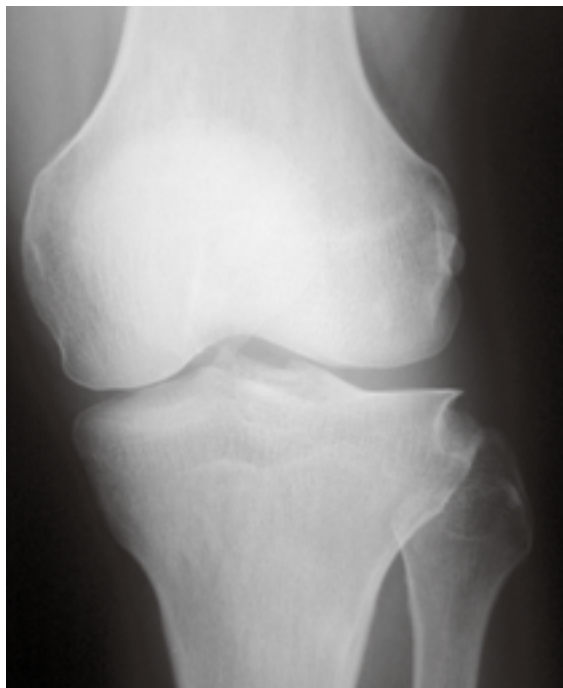
## INTRODUCTION

Most meniscal cysts are associated with tears of the menisci, and are more common on the lateral than medial aspect of the knee<sup>(1)</sup>. Extrusion of synovial fluid with continued motion leads to an increase in size<sup>(1)</sup>. Rarely, meniscal cysts may cause adjacent bony erosion<sup>(2)</sup>. If these are not recognised, they may be initially confused with various other periarticular pathological processes. We illustrate such a case and discuss the pathogenesis of meniscal cysts and the differential diagnosis on imaging.

## CASE REPORT

A 34-year-old man had a history of intermittent pain in the left knee that was increasing in severity over two years. There was no history of trauma. On examination, the patient had pain on the lateral aspect of the joint line, with focal soft tissue swelling on the lateral aspect of the knee. Lachman's test was negative, but the patient had a positive McMurray's test. There was no erythema. Full blood count as well as urea and creatinine were normal. His erythrocyte sedimentation rate was 14 mm/hr. Blood calcium and phosphate levels were within normal limits.

Conventional radiographs of the knee showed a well-defined periarticular erosion with a sclerotic



**Fig. 1** Frontal radiograph shows a well-defined erosion on the lateral aspect of the tibial plateau.

margin that involved the lateral tibial condyle (Fig. 1). Magnetic resonance (MR) imaging showed a lobulated cystic mass communicating with a horizontal cleavage tear of the posterior horn of the lateral meniscus, suspicious of a meniscal cyst (Fig. 2). This mass had a low signal on T1-weighted images and high signal on T2-weighted images. It extended deep to the lateral collateral ligament of the knee joint and resulted in a pressure erosion of the lateral tibial condyle. Arthroscopy of the left knee confirmed a meniscal cyst with degenerative horizontal tear in the posterior horn of the lateral meniscus. This was repaired and the patient reported feeling less pain on follow-up a month later.

## DISCUSSION

Meniscal cysts are commonly thought to result from a combination of trauma and meniscal degeneration, with subsequent introduction of synovial fluid due to motion forces<sup>(1)</sup>. A tortuous cystic tract then develops at the periphery of the meniscus and acts as a one-way valve, preventing synovial fluid from re-entering the knee joint<sup>(1)</sup>. The incidence of meniscal cysts ranges from

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**Fig. 2a** Coronal T1-W MR image of the knee shows a meniscal cyst that is isointense to adjacent muscle. It is associated with a horizontal cleavage tear of the posterior horn of the lateral meniscus.



**Fig. 2b** Coronal T2-W MR image of the knee shows a meniscal cyst with homogeneous high signal intensity.

1% to 22% in patients undergoing meniscectomy<sup>(3,4)</sup>. Lateral meniscal cysts are said to be more common than medially-located ones<sup>(1)</sup>. This may be due to the more superficial and anterior position of lateral meniscal cysts, thus making them more apparent to the patient<sup>(1)</sup>. The initial presumption likely reflects a reporting bias in favour of lateral meniscal cysts. In fact, a recent series of 35 meniscal cysts showed almost equal distribution between medial and laterally-located meniscal cysts<sup>(1)</sup>.

Bone erosions related to meniscal cysts are rare<sup>(2)</sup>. A Medline search of the English language literature from 1966 to present using the keywords “meniscal”, “cyst”, and “erosion” uncovered only 11 reported cases<sup>(2,5-7)</sup>. We believe this to be the first reported case in the local literature. One report described a pericruciate meniscal cyst located lateral to the anterior cruciate ligament (ACL), causing erosion of the adjacent tibial plateau<sup>(6)</sup>. The largest series is a retrospective study of seven cases by Blair et al, with MR imaging correlation in all cases. MR imaging demonstrated established meniscal tears in six of the seven cases<sup>(2)</sup>. The posterior horn of the lateral meniscus was involved in four of these six cases. The anterior and posterior horns of the medial meniscus, respectively, were involved in the remaining two cases. The cases reported above describe a solitary, eccentric and punched-out periarticular erosion with a well-defined sclerotic rim<sup>(2)</sup>. This suggests a benign extraosseous mass.

The differential diagnosis based on lateral tibial condyle erosion on radiographs includes gout and

pigmented villonodular synovitis. Differentials to consider for cystic collections around the knee joint seen on MR imaging include ganglion cysts and popliteal cysts<sup>(2)</sup>. Gout is a polyarticular asymmetric disease of urate crystals. It affects the first metatarsophalangeal joint in 90% of cases<sup>(8)</sup>. On radiographs, there is soft tissue swelling, with extraarticular erosions which are well-defined and classically have overhanging edges. The joint space is usually preserved. Serum uric acid levels are increased in gout. It would be difficult to confidently exclude gout from the differential diagnosis in this case, based on radiographical findings alone.

Pigmented villonodular synovitis (PVNS) is a proliferative disorder of synovium. It affects patients between the 3<sup>rd</sup> and 4<sup>th</sup> decades of life, which fits this patient. It may be diffused or localised. The knee is a relatively rare location in localised PVNS, being involved in 5-12% of cases<sup>(9)</sup>. It is however the most common location for the diffuse form of PVNS, occurring in 85% of cases<sup>(9)</sup>. Adjacent bony erosion may be seen, but there is usually a joint effusion, as opposed to localised swelling in this case. MR imaging demonstrates low signal intensity masses on T1- and T2-weighted images due to the presence of haemosiderin, which was not present in this case.

When MR imaging is performed, the differentials for cystic masses around the knee should then be considered. Ganglia and popliteal cysts are among the more common cystic masses around the knee. In popliteal cyst, demonstration of its origin between the muscles of medial gastrocnemius and semimembranosus

is pathognomonic. It is also usually palpable in the popliteal fossa, as opposed to the lateral joint line in this patient. Ganglia, on the other hand, are attached to tendons sheaths with no intra-articular communication. Adjacent bony erosion is rare. It may reveal increased T1-weighted signal intensity due to proteinaceous material. These ganglia are usually located in the wrist and hand.

MR imaging of meniscal cysts are often diagnostic, and rule out many of the other differentials mentioned above. Findings include well-defined loculations of different sizes with fluid signal characteristics. They may be septated, and may be seen connecting with a meniscal tear. These tears are often horizontal and have high signal on T2-weighted imaging. There is usually no enhancement with Gadolinium-based contrast agents. The treatment of meniscal cysts is often arthroscopic repair of the tear, with the aim of preventing recurrence. The meniscal cyst opening must be repaired, allowing for pressure equalisation between the joint space and cyst cavity<sup>(10)</sup>. It is important for the radiologist to recognise this unusual entity because the results of surgery are good, with most patients being able to return to sporting activities.

In summary, we describe a case of periarticular erosion caused by a meniscal cyst. The initial presentation on radiographs may be confusing to the unsuspecting

reader. This entity must be recognised as the treatment options differ from the other differential diagnoses, notably gout. We suggest that MR imaging be performed in such cases to delineate the extent of meniscal cyst extrusion and associated meniscal tear.

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