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Clinics in Diagnostic Imaging (40)

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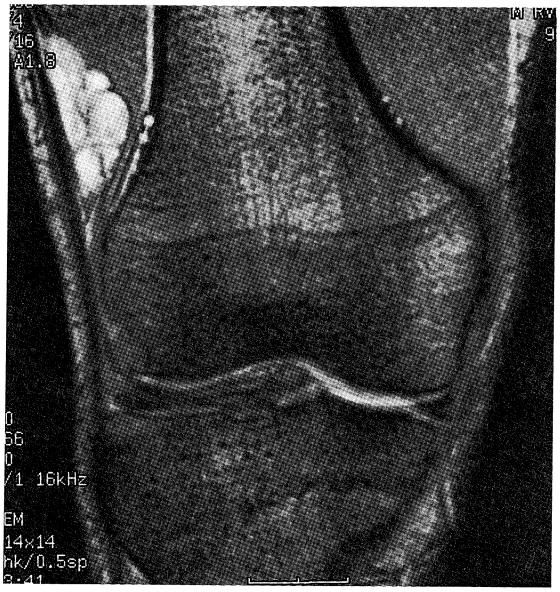

Fig 1a – Coronal MR scan of the right knee (MPGR sequence, TR 566/TE 20).

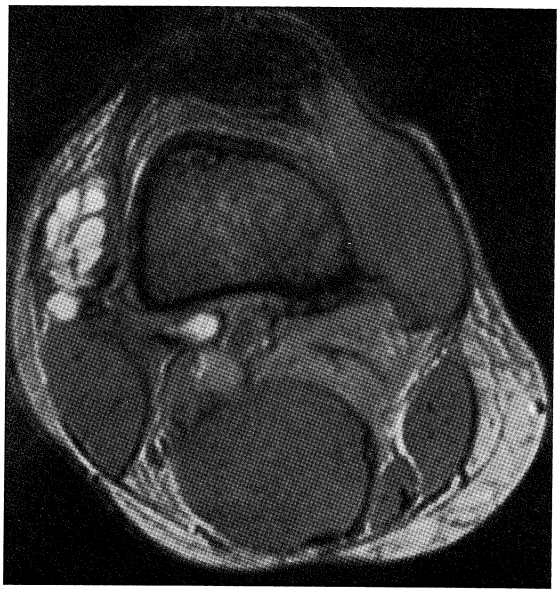

Fig 1b – Axial MR scan of the right knee (MPGR sequence, TR 483/TE 20).

CASE PRESENTATION

A 51-year-old non-professional male cyclist detected an almond-sized lump at the lateral aspect of his right thigh, just above his knee joint. He had the sensation that his knee locked during hyperextension. He had a previous resection of his medial meniscus 5 years ago. Although he did not experience pain, he was concerned that he might have a meniscal tear. He sought medical advice and was referred for magnetic resonance (MR) imaging. What do MR scans of the knee (Figs. 1a & b) show? What is the diagnosis?

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IMAGE INTERPRETATION

Coronal and axial MR scans refute the diagnosis of a meniscal tear. Instead, a fluid collection just above the level of the lateral femoral epicondyle confirmed the diagnosis of iliotibial band (ITB) syndrome. On coronal MR images (Fig 1a), a 4 cm long oval hyperintense mass was seen deep to the hypointense iliotibial band (ITB). On axial images (Fig 1b), the mass was located between the ITB laterally and the patellar retinaculum medially.

DIAGNOSIS

Iliotibial band syndrome

CLINICAL COURSE

He was offered but refused a trial of non-steroidal anti-inflammatory drugs. Two years after his initial detection of the lump, he has remained well. The mass is still present and remains unchanged in size. He remains an avid cyclist and skier, but has discontinued his weight training.

DISCUSSION

ITB syndrome is an overuse syndrome resulting in lateral distal thigh or lateral knee pain[1]. It is attributed to the constant rubbing motion of the ITB across the lateral femoral epicondyle. Although initially felt to be a syndrome exclusive to marathon and long-distance runners, it is now frequently seen in cyclists and other athletes[1,2]. The presence of tenderness over the lateral femoral epicondyle and pain at 30° of flexion during compression of the ITB against the lateral femoral condyle suggest the diagnosis of ITB syndrome clinically. However, in the majority of cases, the pain is poorly localised and may be confused with other causes of lateral knee pain, including a lateral meniscal tear, lateral collateral ligament injury, hamstring strain, and osteochondritis dissecans.

In the equivocal case of lateral knee pain, radiographs should be the initial radiological examination. It may demonstrate the presence of a Segond fracture, osteochondritis dissecans or osteochondral fracture. In the case where radiographs are negative and there is a strong clinical suspicion of soft tissue injury, or if radiographs are positive leading one to suspect additional soft tissue injury, MR imaging should be performed. MR imaging is the best, and in subtle cases the only modality for demonstrating muscle, tendon, and ligament injuries. Although ultrasound may reliably demonstrate injury to the muscle, tendons, and/or ligaments, it is not capable of excluding meniscal and cruciate ligament injury. As injury to these latter structures may alter the clinical management, MR imaging is superior to ultrasonography for the evaluation of equivocal lateral knee pain. If however, isolated ITB syndrome is strongly suspected, then ultrasound serves as a sufficient imaging tool.

MR findings which are suggestive of the diagnosis of ITB syndrome include: a) a localised fluid collection deep to the ITB and superficial to the lateral femoral epicondyle (Figs 1a & b), b) ill-defined oedema deep to the ITB, and c) focal thickening of the ITB at the level of the lateral femoral epicondyle or its tibial insertion (Fig 2)[3,4]. The ganglion cyst of the ITB syndrome should not be mistaken for a lateral meniscal cyst, a fluid collection typically arising from a meniscal tear (Figs 3a & b). Although meniscal cysts usually occur at the knee joint line, they may extend above (adjacent to the femur) or below (adjacent to the tibia) the knee joint. The presence of a meniscal tear strongly supports the diagnosis of a meniscal cyst[5,6].

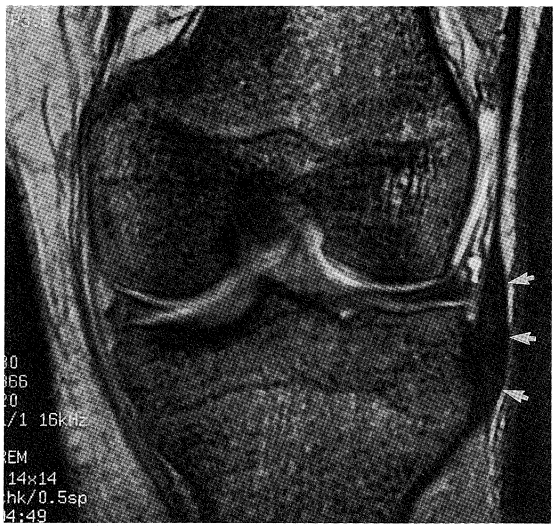

Fig 2 – Coronal MR image (MPGR sequence, TR 366/TE 20) of the left knee of another patient with the ITB syndrome. Moderate thickening (0.8 cm) of the ITB (arrows) at its insertion onto the lateral tibial condyle is seen.

Ill-defined soft tissue oedema is seen with lateral collateral ligament (LCL) and/or hamstring muscle injury (Fig 4). The relatively-posterior location of these soft tissue changes distinguishes them from the more anterolateral soft tissue injury seen in the ITB syndrome. Non-visualisation of the LCL supports the diagnosis of LCL tear. The Segond fracture refers to an avulsion injury of the lateral tibial rim (Fig 5). This tiny sliver of avulsed bone, easily detected on radiographs, is highly significant because of its frequent association with anterior cruciate ligament injury. Thus MR imaging is warranted following the detection of a Segond fracture[7,8].

MR imaging may also be indicated in the setting of osteochondritis dissecans (OCD), a subchondral fragment of bone which appears separate from the remaining femur. OCD, usually traumatic in origin, has a predilection for the lateral femoral condyle and the non-weight bearing portion of the medial femoral condyle. Patient management is based upon whether the subchondral bony fragment is completely or partially separate from the remaining femoral condyle. The osteochondral fragment is considered loose if MR imaging demonstrates fluid surrounding the entire bony fragment and breaching the femoral articular cartilage. Loose fragments are stabilised via internal fixation whereas conservative measures are undertaken for partially loose or attached fragments.

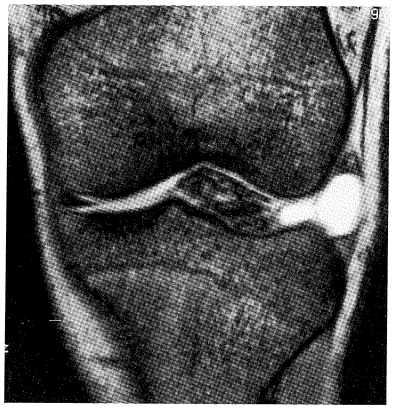

Fig 3a

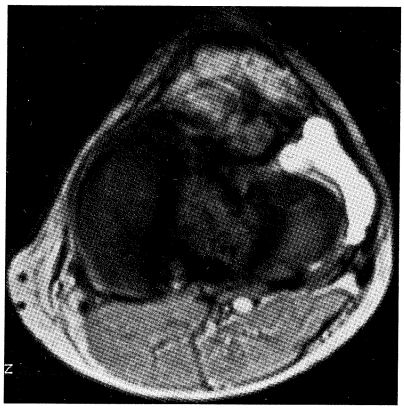

Fig 3b

Fig 3a & b – Patient with meniscal cyst arising from a lateral meniscal rear. (a) Coronal (MPGR sequence, TR 350/TE 20) MR image of the left knee shows a high signal intensity T-shaped collection originating from the lateral meniscus. (b) Axial (MPGR sequence, TR 483/TE 20) MR image shows a 3.8 cm x 1.5 cm x 1.5 cm fluid collection within the anterior two-thirds of the meniscus (the anterior horn and body).

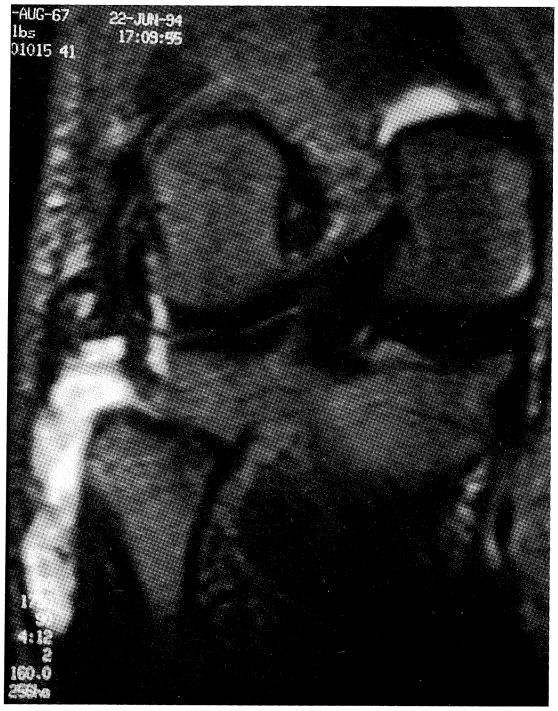

Fig 4 – Patient with lateral collateral ligament (LCL) tear. Coronal spin-echo T2-weighted (TR 1750/TE 80) MR image of the right knee shows an ovoid predominantly high signal intensity fluid collection between the fibular head and the conjoint tendon. The collection is consistent with a haematoma in the lower LCL.

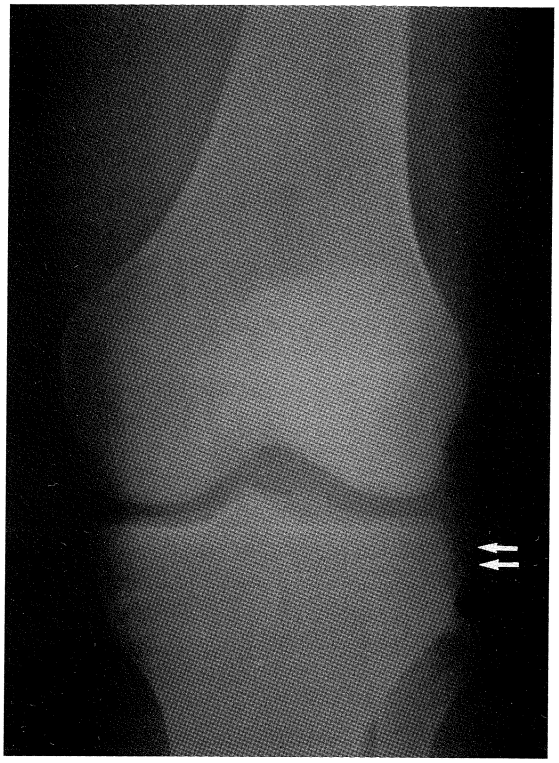

Fig 5 – Posteroanterior radiograph of the left knee. The curvilinear bone fragment adjacent to the lateral tibial condyle represents a Segond fracture (arrows). Anterior cruciate ligament tear was excluded on MR scans (not shown).

Once the diagnosis of the ITB syndrome has been established, a trial of stretching, icing, rest and/or non-steroidal anti-inflammatory drugs may provide symptomatic relief. Cyclists may benefit from bicycle adjustments or training modification. If the ITB syndrome is unresponsive to these forms of treatment, the distal ITB may be surgically excised or released.

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ABSTRACT

A 51-year-old male cyclist presented with a mass over the lateral portion of his knee. MR scans showed a cystic collection deep to the iliotibial band (ITB). Diagnosis of the ITB syndrome and its differentiation from other cause of painful lateral knee masses, such as meniscal cyst, lateral collateral ligament injury and Segond fracture, are discussed.

Keywords: iliotibial band syndrome; lateral knee pain; knee mass; magnetic resonance imaging