CASE OF THE MONTH

Anterior knee pain

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Radiology

A 32-year-old female dancer presented with chronic anterior knee pain of several months' duration. There was no specific history of trauma or surgical intervention on the knee. Sagittal T_1 weighted and T_2 gradient echo MRI images of the knee at the level of the anterior cruciate ligament are shown in Figure 1.

What are the findings on MRI?

What is the diagnosis?

Are these changes acute or chronic?

Figure 1. Sagittal T_1 weighted and T_2 gradient echo images of the knee at the level of the anterior cruciate ligament.

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Diagnosis

Sagittal MRI scans of the knee show an intermediate signal lesion in the apex of Hoffa's fat pad between the inferior pole of the patella and the adjacent femoral condyle. The lesion's surface retains the shape of the adjoining femoral condyle, indicating chronic wedging that reflects the chronic nature of the lesion. The lesion was surgically excised. Histology showed adipose and synovial tissue with inflammation and fibrosis, supporting a diagnosis of Hoffa's disease. There was a significant improvement in the symptoms and function following surgery.

Discussion

The infrapatellar fat pad (Hoffa's fat pad) is an intracapsular but extrasynovial structure limited by the inferior pole of the patella superiorly, the joint capsule and patellar tendon anteriorly, the proximal tibia and deep infrapatellar bursa inferiorly, and the synovium-lined joint cavity posteriorly [1]. Functionally, the fat pad facilitates joint function by increasing the synovial area and helping to distribute lubricant in the joint [2].

Hoffa's fat pad is affected by a wide spectrum of disorders. Intrinsic causes arise from primary pathology in the fat pad, including Hoffa's disease, post-surgical fibrosis, focal nodular synovitis, and para-articular chondroma/osteochondroma. Extrinsic causes constitute involvement of the Hoffa's fat pad by adjacent intra-articular or synovial pathologies, *e.g.* joint effusion, synovial haemangioma, intra-articular loose bodies, and meniscal and ganglion cysts [1, 3].

Albert Hoffa in 1904 first described Hoffa's disease as being characterised by anterior knee pain caused by inflammation of the infrapatellar fat pad secondary to impingement. Inflammation results from either acute trauma or repetitive microtrauma in the form of hyperextension or rotational strain [4]. Hoffa's disease has a predilection for young patients, especially those in their

third decade [3]. The disease commonly presents with anterior knee pain, usually under the patella. In the acute phase, the presentation may be similar to that of ligamentous injury [5]. Acute inflammation, haemorrhage and oedema in the acute phase are seen as high-signal changes in the fluid-sensitive sequences on MRI. In the chronic phase, symptoms include infrapatellar discomfort and pain, which are exacerbated when going up or down stairs and when lifting heavy weights [3]. In this phase, inflamed fat pad hypertrophies become impinged, resulting in further inflammation and fibrosis, which is seen as a hypointense lesion on T_2 weighted images [2, 6]. Ossification may be seen in end-stage disease [1, 6].

The acute phase of Hoffa's disease is managed symptomatically. The chronic stage, with persistent symptoms or failure to conservative treatment, may require arthroscopic or open resection of the hypertrophied fat pad. Hoffa's disease is very common but is not often diagnosed, owing to a lack of awareness. This can lead to a delayed or incorrect diagnosis. Radiologists should be aware of this interesting entity in order to make an appropriate diagnosis and avoid unnecessary morbidity [3].

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