



## An unusual presentation of Hoffa's disease in an elderly patient with no trauma history: a case report

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Hoffa's fat pad disease usually occurs in young active patients participating in activities involving repetitive microtrauma to the knee joint. No specific radiographic findings associated with the disease has yet been defined. We report an elderly patient who presented with a 12-month anterior knee pain and limited knee extension, without any trauma history. Radiographs showed a calcified soft tissue mass in the Hoffa's fat pad. Magnetic resonance imaging showed the lesion had a generalized heterogeneous hypointensity on T1- and T2-weighted images and a poorly defined margin. The lesion was excised arthroscopically, and histopathological examination revealed fat pad adipocyte necrosis, mucoid degeneration, and dystrophic calcification, suggesting Hoffa's disease. The present report indicates that Hoffa's disease can occur in elderly patients with no trauma history, can be associated with a calcified lesion on radiographs, and can be linked to infrapatellar fat pad degeneration in such patients.

**Key words:** Degeneration; fat pad; Hoffa's disease; knee.

Hoffa's disease (or Hoffa's fat pad syndrome) is characterized by an impingement between the patellofemoral or femorotibial joints due to edematous changes in the infrapatellar fat pad, causing chronic anterior knee pain.<sup>[1]</sup> There is no consensus on the pathogenesis, clinical definition, or treatment of Hoffa's fat pad syndrome. This is reflected by the synonymous use of the terms patellofemoral pain syndrome, liposynovitis prepatellaris, anterior knee pain syndrome, and Hoffa's syndrome to describe similar symptoms.<sup>[2,3]</sup> Hoffa's fat pad disease usually occurs in young active patients participating in activities involving repetitive microtrauma to the knee joint. There are no specific radiographic findings associated with the disease.

We report an elderly patient who presented with a 12-month anterior knee pain and limited knee extension, without any trauma history. Radiographs showed a calcified soft tissue mass in the Hoffa's fat pad. Magnetic resonance imaging (MRI) and histopathological examination of the arthroscopically excised fat pad mass was consistent with Hoffa's disease. The patient experienced immediate pain relief following the surgery. This appears to be the first case of Hoffa's syndrome, involving an elderly patient with no trauma history and with a calcification on radiography.

### Case report

A 70-year-old woman presented with a 12 month anterior knee pain with no trauma history. The patient began intermittent non-steroidal anti-inflam-

matory medication when the condition became aggravated, which alleviated her symptoms. The pain was felt quite suddenly on the anterior aspect of the joint. The patient was unable to fully bend or fully extend her knee joint. Clinical examination revealed a Grade 1 effusion and limitation in the knee range of motion because of pain, mainly on full extension. Radiographs of the right knee showed a calcified soft tissue mass in the Hoffa's fat pad with mild to moderate osteoarthritis (Fig. 1a). MRI showed a mass-like lesion, encompassing the entire infrapatellar fat pad except for the anterior region just beneath the patellar tendon. The mass demonstrated a generalized heterogeneous hypointensity on T1- and T2-weighted images, with a poorly defined margin and amorphous internal clefts (Figs. 1b and c). These findings indicated inflammation and fibrosis in the Hoffa's fat pad, rather than a solitary mass, including intraarticular (osteo)chondroma or fibroma of the tendon sheath.

The infrapatellar area is difficult to see in arthroscopic examination using the conventional anteromedial and anterolateral portals. We, therefore, made two accessory portals on the far medial and lateral sides of the conventional portals. Arthroscopic examination through these two accessory portals revealed a mass at the posterior border of the patellar tendon. The mass had a firm consistency, a whitish surface (Fig. 2a), and a deep yellow interior (Fig. 2b).

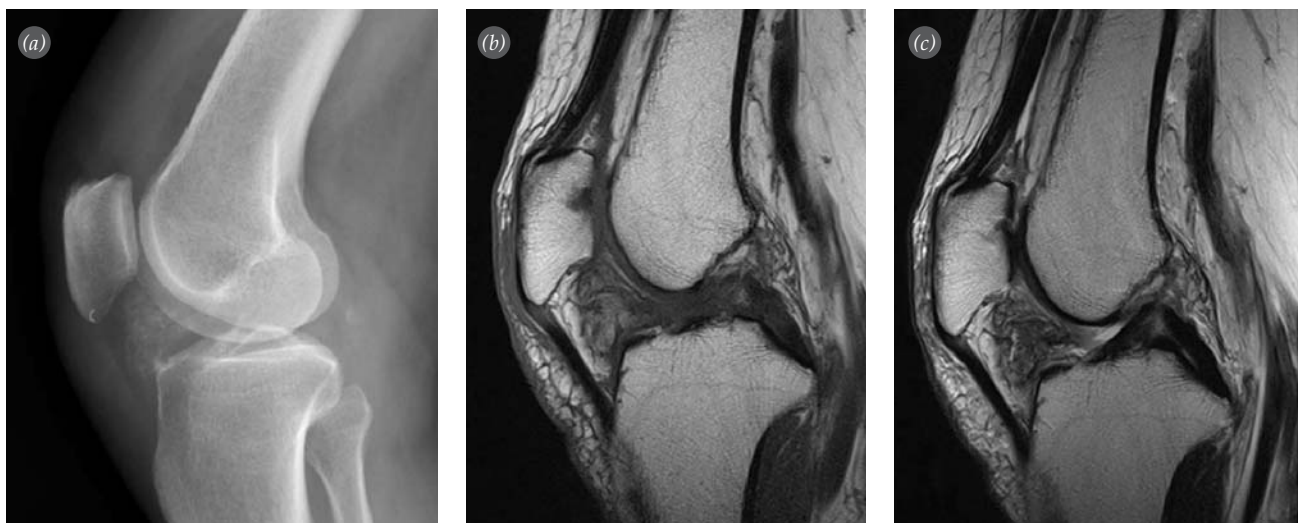
Arthroscopic resection of the mass was performed through the two accessory portals. The two far-side accessory portals were very useful in viewing and resecting the lesion, as it lay just posterior to the patellar tendon. Microscopy of the infrapatellar fat pad showed adipocyte necrosis (Fig. 3a), with the adipocytes surrounded by inflammatory cells showing mucoid degeneration (Fig. 3b) and dystrophic calcification (Fig. 3c), with no mitotic activity. These findings supported the diagnosis of Hoffa's disease and were consistent with the MRI findings.

Postoperative radiographs suggested the complete excision of the infrapatellar mass (Fig. 4). The patient experienced immediate pain relief. At the 20th month follow-up, the patient remained pain-free, with a full range of knee motion, and showed no evidence of recurrence.

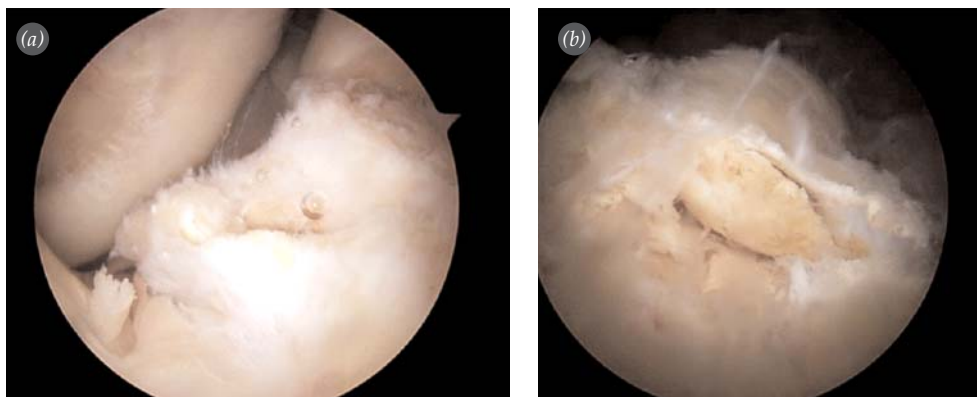
## Discussion

The infrapatellar fat pad facilitates the distribution of synovial fluid and may act to absorb forces generated through the joint, as it becomes flattened when the knee is extended. However, in cases of hypertrophy with inflammation, portions of the fat pad may impinge between the patellofemoral and femorotibial joints during extension. This condition is known as Hoffa's disease and causes anterior knee pain.

Hoffa's disease should be diagnosed after the exclusion of other possible conditions. Possible dif-



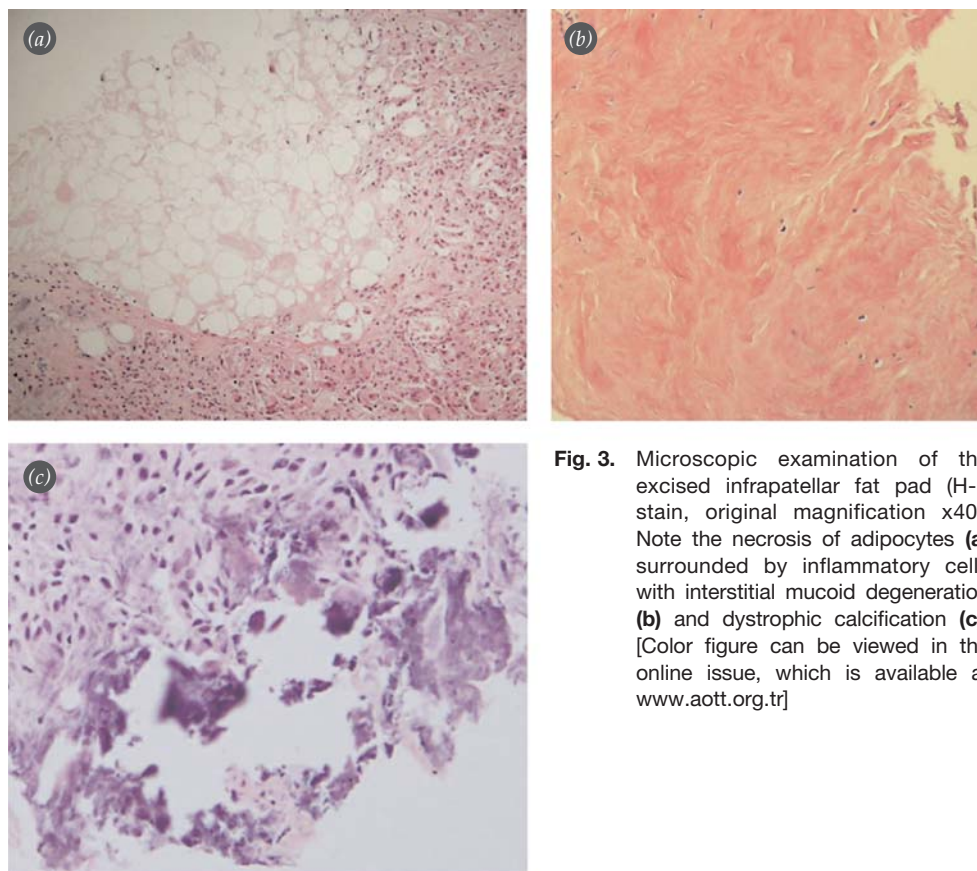
**Fig. 1.** Lateral radiograph of the knee (a) showing an infrapatellar calcified mass-like lesion. The infrapatellar fat pad lesion had a generalized inhomogeneous hypointensity on T1- (b) and T2- (c) weighted images, with a poorly defined margin and amorphous internal clefts.



**Fig. 2.** Arthroscopic findings. Note that the fat pad exhibits a whitish surface, a firm consistency **(a)** and a deep yellow interior **(b)**, rather than the normal yellowish appearance and soft consistency. [Color figure can be viewed in the online issue, which is available at [www.aott.org.tr](http://www.aott.org.tr)]

ferential diagnoses of the present patient included several pathological entities, including a benign mass (intraarticular osteochondroma, localized nodular synovitis, or fibroma of the tendon sheath), a malignant mass (synovial sarcoma), or Hoffa's disease. Dystrophic calcification of the infrapatellar fat

pad area was apparent on plain radiography of our patient and MRI did not show a solitary mass, but rather a poorly defined and confluent signal change in the fat pad. The cells seen on pathological examination were not multinucleated giant cells or xanthoma cells, and did not contain hemosiderin



**Fig. 3.** Microscopic examination of the excised infrapatellar fat pad (H-E stain, original magnification x40). Note the necrosis of adipocytes **(a)** surrounded by inflammatory cells with interstitial mucoid degeneration **(b)** and dystrophic calcification **(c)**. [Color figure can be viewed in the online issue, which is available at [www.aott.org.tr](http://www.aott.org.tr)]



**Fig. 4.** Postoperative lateral knee radiograph. Note the complete removal of the calcified infrapatellar lesion.

deposits. Such findings were inconsistent with intraarticular (osteo)chondroma, localized nodular synovitis, or fibroma of the tendon sheath. However, the calcification of the lesion present on plain radiography, and the heterogeneous appearance on MR imaging nonetheless may suggest a malignancy, such as synovial sarcoma. The pathological finding of fat necrosis with a degenerative stroma, surrounded by inflammatory cells, and dystrophic calcification was, however, more suggestive of Hoffa's disease, and ruled out synovial sarcoma.

In Hoffa's disease, no signs are generally detected on simple radiography. However, in the present case, there was a calcified mass along the whole infrapatellar fat pad. Kumar et al. classified Hoffa's disease into three categories: an acute lesion with fat pad inflammation (Type 1), a chronic lesion without fat pad fibrosis (Type 2), and a chronic lesion with fat pad fibrosis (Type 3).<sup>[4]</sup> The authors reported areas of cartilaginous or calcified degeneration in Type 3 lesions, but radiography findings remained normal. The present case may be classified as a modified Type 3 lesion because of the radiographic finding of a calcified lesion.

Although the etiology of the Hoffa's disease still remains obscure, Hoffa's disease is almost always related to a history of trauma in young patients, involving either a single direct impact or twisting injury, or recurrent minor trauma resulting in inflammation and impingement.<sup>[3,5,6]</sup> In addition, after arthroscopic surgery, the MRI findings in the infrapatellar fat pad is similar to those of Hoffa's disease.<sup>[7,8]</sup> The present case involved an elderly patient with no definite history of trauma and with mucoid degeneration of the infrapatellar fat pad on histopathologic examination. This suggests that degeneration of the infrapatellar fat pad may be a cause of Hoffa's disease. A recent study by Macule et al. examined 70 patients with knee osteoarthritis receiving total knee arthroplasty and found that patients who underwent concomitant infrapatellar fat pad resection were less likely to report pain at the 6th month follow-up, which may be due to a degenerative infrapatellar fat pad.<sup>[9]</sup> A recent animal study, using a monoiodoacetate injection osteoarthritis model, also suggested that infrapatellar fat pad degeneration resulted in Hoffa's disease.<sup>[10]</sup> In the cited study, adipocyte necrosis developed in the infrapatellar fat pad following monoiodoacetate injection. Furthermore, necrotic tissue debris, some of which showed early mineralization, lay close to and adhered to the synovial membrane in the infrapatellar fat pad. The fat pad adipocyte necrosis observed in the cited study concurs with the main histopathological findings of the present case.

The infrapatellar fat pad vascular supply is an anastomotic network derived from vertically oriented vessels arising from the superior and inferior genicular arteries. These vertical vessels are interconnected by horizontal arteries. Whereas the peripheral aspect of the infrapatellar fat pad is well supplied, there is a paucity of vascularity in the center.<sup>[7]</sup> We believe this poor vascularity may lead to a fat pad adipose tissue necrosis, as observed in the present case. Previous neurohistological studies demonstrated that ischemia induced the expression of substance P, a postulated neurotransmitter in nociceptive innervations of the knee.<sup>[2,11]</sup> Witonski and Wagrowska-Danielewicz reported a higher number of substance P fibers in patients with chronic anterior knee pain in the infrapatellar fat pad.<sup>[12]</sup> Substance P-mediated hypervascularization by vasodilatation, an extravasation of plasma proteins,

and leukocyte adhesion, may cause fat pad edema. Magi et al. proposed that fat pad adipocyte necrosis might be an end-point of chronic Hoffa's syndrome.<sup>[13]</sup>

Traditionally, surgical excision for Hoffa's disease is performed in cases recalcitrant to conservative treatment. Hoffa himself stressed the importance of conservative treatment before surgery for fat pad impingement. However, controversy remains regarding the optimum surgery timing for Hoffa's disease. A recent retrospective study of Hoffa's disease reported that the gain in the Lysholm score was inversely proportional to the duration of symptoms before surgery.<sup>[4]</sup> Therefore, the cited study recommended that surgery not be delayed beyond three months if impingement of the fat pad is suspected on clinical grounds. A study of ultrasound-guided alcohol ablation of the infrapatellar fat pad found that patients experiencing symptoms for more than 21 months failed to respond to conservative treatment.<sup>[14]</sup> However, the postoperative clinical outcome was satisfactory in our patient who experienced symptoms for 12 months.

In conclusion, Hoffa's disease should also be considered in elderly patients with no history of trauma and with radiological findings of a calcified mass in the infrapatellar fat pad.

**Conflicts of Interest:** No conflicts declared.

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