Posttraumatic dislodgement of the infrapatellar fat pad: An unusual type of superolateral impingement

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Summary
The authors report a rare case of dislodgement of the infrapatellar fat pad induced by traumatic hyperflexion. Because of the unusual clinical presentation, open excision was performed to exclude a possible tumoral etiology. This entity seems to be an acute form of superolateral fat pad impingement.

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Introduction

Impingement of the infrapatellar fat pad is a rare entity which is often diagnosed by elimination in the presence of persistent anterior knee pain [1]. These are traumatic or microtraumatic syndromes, with two main entities: posterior impingement in the femorotibial joint space in Hoffa’s disease and superior impingement with the lateral femoral condyle which is less well known but which seems to be more frequent [2]. The authors describe an atypical presentation of superolateral impingement whose diagnosis could only be made postoperatively. The clinical, therapeutic and etiopathogenic signs of this unusual form are discussed with a review of the literature.

Case report

A 50-year-old patient who was an amateur weight-lifter, consulted for left knee pain which had persisted for 15 days following traumatic hyperflexion from a fall. There was no prior history of trauma or pain in this knee. He presented with mechanical anterolateral pain which had begun after the fall, had continued since when walking and which was worse when going up or down stairs. The patient did not report any fluid accumulation, locking or instability. On clinical examination, knee alignment was normal, the knee was dry and range of motion was normal. There was no ligament laxity. There was palpable swelling above the lateral femorotibial joint space which corresponded to the source of pain. This was a solid mass that was painful when touched. Extension of the knee did not increase pain, but there was acute pain at 20° of flexion and the mass disappeared under the lateral condyle. There was no patellar instability. X-rays of the knee were normal, with no patella alta or patellar subluxation. Proton density MRI with fat suppression (PD fat sat) revealed an abnormal image of the superior infrapatellar fat pad with a heterogeneous oval mass near the lateral
joint capsule. On axial and coronal slices with the knee in extension, the mass came in contact with the iliobibial band with a peripheral high intensity signal (Fig. 1).

The results suggested a traumatic infrapatellar fat pad injury, but the unusual features of the mass posed a problem of differential diagnosis with a tumoral or pseudotumoral lesion. Open surgical excision was decided to release impingement and for histology. Surgery was performed by lateral parapatellar approach. The swelling rose from under the joint capsule in front of the iliobibial band. Arthrotomy revealed dislocation of the superior infrapatellar fat pad in the anterolateral joint space with an area of compression across from the lateral condyle and an edema in the area corresponding to the oval lesion seen on MRI (Fig. 2). The dislocated part of the fat pad was excised and an aspiration drain was placed in the joint before closing. The histolopathological analysis of the resected tissue (measuring 1 × 3 cm) confirmed the absence of tumoral proliferation and showed inflammation and contusion of the adipose tissue. The postoperative course was uneventful. The patient went back to work 2 months after surgery and began biking and swimming after 3 months. Seven months after surgery, he reported occasional infrapatellar pain, with no patellofemoral pain syndrome. The knee was dry with normal range of motion and there was no amyotrophy of the quadriceps.

Discussion

Traumatic infrapatellar fat pad lesions are a rare entity which may occur following an anterior cruciate ligament tear, patellar instability or arthroscopy; or they may be part of a fat pad impingement syndrome [2]. Hoffa’s disease described in 1904 [3] is the most well-known form of this entity and includes posterior impingement in the femorobibial joint space due to infrapatellar fat pad hypertrophy following acute trauma or microtraumas [4]. The mechanism is repeated hyperextension or rotational strains [5]. In the acute stage, hypertrophy is associated with an edema from hemorrhage and inflammation. In the chronic stage, fibroblast proliferation transforms the inflammatory adipose tissue into fibrous scar tissue [3,4]. Features of superolateral impingement were recently been described on MRI [6] as a result of damage to the superior infrapatellar fat pad from chronic impingement between the patellar ligament and the lateral femoral condyle. Patella alta and/or patellar tracking anomalies are predisposing factors. Although it is not well known and has rarely been reported in the literature, superolateral impingement may be more frequent than Hoffa’s disease [2].

In the present case, an acute form of Hoffa’s disease was first suspected, but several elements did not support this. First, the Hoffa test was negative. This is performed with the knee in flexion by applying pressure to the infrapatellar fat pad on the border of the patellar ligament, then the knee is extended. The test is positive if pain is worse when the knee is extended [3]. Also, the palpable mass extended well beyond the patellar ligament and was accompanied by unusual acute pain.

MRI confirmed the damage to the infrapatellar fat pad, but did not provide a definite diagnosis. The increased signal intensity of the superior infrapatellar fat pad did not correspond to features of Hoffa’s disease, but was more

Figure 2 Anterolateral arthrotomy revealing the dislocated part of the infrapatellar fat pad.
suggestive of chronic superolateral impingement characterized by disappearance of the superior fat pad between the patellar ligament and the lateral femoral condyle [2]. The anterolateral oval mass was also characteristic of the formation of nodules found in superolateral impingement [6]. However, the clinical history did not correspond to chronic impingement and the patient did not have predisposing factors. Moreover, the volume and heterogeneous feature of the mass could also suggest a tumoral lesion of the infrapatellar fat pad which was revealed by trauma. A chondroma or lipoma was improbable because there were no visible calcifications which are characteristic of the former, or low intensity signal on fat saturation sequences for the latter. On the other hand, it might have been a synovial hemangioma or a sarcomatous malignant tumor whose characteristics are non specific on MRI [7]. Histological evaluation of the mass was therefore necessary to avoid missing the diagnosis of a tumor.

Surgery is only indicated in Hoffa’s disease after unsuccessful medical treatment and normally includes arthroscopic resection of the diseased area [1,4]. There is no generally accepted protocol for treatment of superolateral impingement and there are no series in the literature. Functional measures are effective and the outcome is often good [6]. In this patient, surgical treatment was indicated to exclude a suspected tumor and because of the functional impairment from acute pain. Open surgery was therefore decided upon for direct access to the lesion and to perform complete resection without dissemination. The pathologic examination excluded the diagnosis of a tumor and the fat pad dislocation corresponded to a posttraumatic form of superolateral impingement. It may have developed from tearing of the superior attachments of the infrapatellar fat pad on the patella and the anterior rim of the lateral condyle, as well as from a lesion of the infrapatellar plica during hyperflexion.

Conclusion

The presentation of traumatic dislocation of the infrapatellar fat pad in this patient seems to be an acute form of superolateral fat pad impingement which has not yet been described. Because of the atypical clinical signs and MRI features, the diagnosis could only be made after surgery and histological evaluation of the excised tissue.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References