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A Chronic Gonalgia Revealing Hoffa's Disease, a Rare Cause of Anterior Knee Pain

Wilson BIZIMANA*, Arthur Semedo INSUMBO, Laila JROUNDI, Fatma Zahrae LAAMRANI
Department of Emergency Radiology, UHC IBN SINA, Mohamed V University, Rabat, Morocco

Corresponding author: Wilson BIZIMANA, M.D, Department of Emergency Radiology, UHC IBN SINA, Mohamed V University, Rabat, Morocco. E-mail: wilson.bizimana@gmail.com

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Abstract

Hoffa's disease or Hoffite is a benign and a rare pathology. It is defined as an acute or chronic inflammation of infrapatellar fat. In this presentation, after having demonstrated the mechanisms of its installation, we showed the main role of MRI imaging in diagnose and his contribution to locate the disease because there are others differential diagnoses that are announced by anterior pain knee. For that, it is important to think of it when faced with chronic gonalgia, which is difficult to diagnose as we observed to our case.

Keywords: Hoffa's disease; Knee; Infrapatellar fat pad; MRI

Introduction

Hoffa's disease, a rare cause of anterior knee pain, appears to be an under-recognized condition [1]. This condition can be confused with frequent meniscal pathologies of the knee joint [2]. The infrapatellar fat pad is one of the three pads located on the anterior knee together with the anterior suprapatellar, quadriceps and prefemoral fat pads [3]. The infrapatellar fat pad or Fat of Hoffa is bordered 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 [4]. Hoffa's pad syndrome is hypertrophy following an inflammation of Hoffa's fat resulting of recurrent acute trauma or micro trauma and surgical procedures on the knee joint [5]. We present a case of a 56 -old -year women with chronic gonalgia in order to describe the mechanism of this condition and emphasize the roles of MRI in its early diagnosis.

Patient and Observation

A 56-old-year women with no specific history is monitored in rheumatology for right anterior knee pain that dates back for several months. Physic exam notes a large painful knee at any mobilization especially in flexion. The evolution is becoming more and more disabling hindering walking especially when going up and down stairs. A standard X-ray of the knee required three times returning to normal, an ultrasound of the knee noted heterogeneous echogenicity of Hoffa fat with slight vascularization on color doppler and effusion in quadriceps recess. The patellar tendon was free from abnormalities and the patella was at its place. His doctor decides to explore this pain by a Magnetic Reasoning Imaging (MRI) of the knee. So, MRI of 1,5 Tesla is required using T1 ,T2 Protonic density sequence on coronal, sagittal and axial planes. However, MRI is showing hypertrophic Hoffa's fat with heterogeneous hyposignal T1 (Figure 1), hypersignal on Protonic Density (Figures 2, 3) with articular effusion and meniscal cyst (Figure3). In addition, other associated lesion found for this case was Stoller's grade III meniscal fracture of the anterior horn of extern meniscal. The diagnosis of Hoffa's disease was made associated with meniscal fracture .Then, as the treatment medical has failed, the patient underwent arthroscopic therapy for resection of Hoffa's fat and repair the meniscus fracture. The near evolution of the treatment was promising.

Discussion

Hoffa's disease can affect people of all ages. It affects women more than men and concerns mostly elderly women [6]. Hoffa's disease is an inflammation of the infrapatellar fat pad [3]. It is also known as Hoffitis, infrapatellar fat pad ossification, patellar tendon-lateral femoral condyle friction syndrome, fat pad impingement syndrome and liposinovitis prepatellaris [2]. Hoffa's disease was first described in 1904 by Albert Hoffa as anterior knee pain caused by inflammatory hyperplasia of the infrapatellar fat pad [1]. In advanced stage, this may lead to transformation of the fibrocartilage tissue and ossification of the infrapatellar fat pad. Some cases can be associated with tumors or tumor-like condition [2].

Anatomy

The infrapatellar fat pad is one of three fat pads located in the anterior aspect of the knee. Hoffa's fat pad is intracapsular but extra-synovial and therefore extra-articular [2]. It is partly adipose wedge-shaped mass which is a constant structure bounded superiorly by the inferior pole of the patella, inferiorly by the anterior tibia, intermeniscal ligament, meniscal horns and infrapatellar bursa, anteriorly by the patellar tendon and posteriorly by the femoral condyles and intercondylar notch [6]. There are 2 clefts identified macroscopically and, especially in the presence of an effusion, via MR imaging; one vertical cleft in the superior aspect of the fat pad and horizontal cleft in the postero-inferior aspect of the fat pad [7]. It consists of adipocytes and connective tissue. Unlike subcutaneous fat, Hoffa's fat pad contains pluripotent cells that can differentiate into osteoblasts and chondrocytes [8].

Its vascularization is rich at periphery and poor in the center and has two vertical arteries located on either side of the patellar ligament with two to three horizontal arteries, which connect the vertical arteries [9]. Innervation comes from anterior fibres of the popliteal plexus connected to the posterior articular nerve, which is a branch of tibial nerve [10]. There are two synovial folds in Hoffa's fat pad (superior and inferior fold) [11].

The fat pad functions to reduce friction between the patella, patellar tendon, and deep skeletal structures by distributing lubricant in the joint through several synovial recesses and fat alae, so it is a nourishing structure of the patellar ligament, ensures the protection of the anterior horn of the meniscus, and finally ensures the protection of the patellar tendon [2].

Mechanisms

Hoffa's disease occurs when the infrapatellar fat pad is inflamed after being squeezed between the patella and femoral condyles because of acute or recurring traumas [1]. The disease is commonly seen in athletes, Squatting, running, climbing stairs, dancer, trauma and postsurgical scarring [9]. Fat pad impingement may also occur in the absence of prior injury secondary to joint space narrowing attributable to any cause, so it is called Hoffa's syndrome [4]. Initially, acute or repetitive trauma to the fat pad causes hemorrhage, the inflamed fat pad then becomes hypertrophied which predisposes it to crushing or impingement between the femur and tibia and to further injury and inflammation. The disease has 3 stages of evolution: acute, subacute and chronic phases. In advanced stage, fibrous tissue may be transformed into fibro cartilaginous tissue, which rarely may give ossification [6]. Excessive hyperextension of the knee predisposes the knee to fat pad impingement and biomechanical factors therefore that are worth considering that may predispose an individual to such a condition are genu recurvatum, anterior pelvic tilt, tight quadriceps [12].

In summary, the disease results in vicious cycle of bleeding, acute inflammation with necrosis and fibrosis, or even ossification after chronic trauma.

The Clinic

The clinical presentation of the Hoffa's fat pad disease is monoarticular pain, swelling, limp and difficulty in walking [11]. The examination of the knee joint, show tender swelling in the infrapatellar region, along anterior aspect of the knee, and Hoffa's test was positive in all patients suffering from Hoffa's fat pad disease [10].

Imaging

MRI is the method of choice for analyzing Hoffa's fat pad. The standard sequences (proton density with fat saturation and T1) are sufficient for the diagnosis of Hoffa's disease and the most informative sections are the axial and sagittal views.

The most suggestive MRI sign is the presence of a significant oedema of the infrapatellar fat pad associated with a fibrous area, which may contain deposits of haemosiderin and calcifications [7]. In the acute phase, we have areas of increased signal intensity on T2-weighted MR images represent acute edema and hemorrhage within the swollen fat, bowing of the patellar tendon from mass effect is seen frequently and a small joint effusion may be present [9]. Subacute and chronic phases: fibrin and hemosiderin have low signal intensity on both T1 and T2 weighted MR images [9].

X-ray has a limited role in diagnosis of Hoffa's disease [11]. Radiography is only useful in the particular at the ossified stages [8]. Ultrasound reveals enlargement of the fat pad, obscuration of normal fat manifest as decreased echogenicity within the fat pad or hyperechoic, edematous fat, and increased vascularity due to concomitant inflammation [13]. Hoffa's fat pad disease histopathologically show synovial proliferation with chronic nonspecific perivascular inflammatory cell infiltrate, predominantly composed of lymphocytes [10].

Differential diagnosis

The differential diagnoses group lipoma, villonodular synovitis, osteochondroma, synovitis, synovial chondromatosis, ganglion cyst, chondroma [10]. In addition, we have suprapatellar fat pad impingement and peripatellar bursitis or meniscal tear [11].

Treatment

In acute or subacute phases, it recommended conservative therapy. Options include physical therapy, taping, muscle training, gait training, or fat pad injections with corticosteroids and anesthetic [13]. In case of failure, or in chronic phase, arthroscopioc resection is required [8]. Biopsy at time of surgery is recommended to confirm diagnosis and if there is any doubt of the presence of impingement normal histology should prevent excision [7]. Operative treatments include fat pad excision, debridement of hypertrophic fibrosis, anterior interval release, synovectomy, infrapatellar plica release, and denervation of the inferior patellar pole [6].

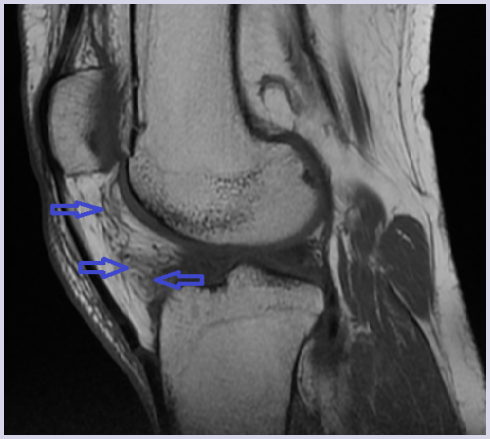

Figure 1: Hyperhemia of Hoffa's fat with heterogeneous hypointense T1 FSE sequence on sagittal section, Knee MRI.

Figure 2: Hypersignal on proton density propeller FS sequence interesting more than 2/3 of Hoffa's Fat, sagittal plane, Knee MRI.

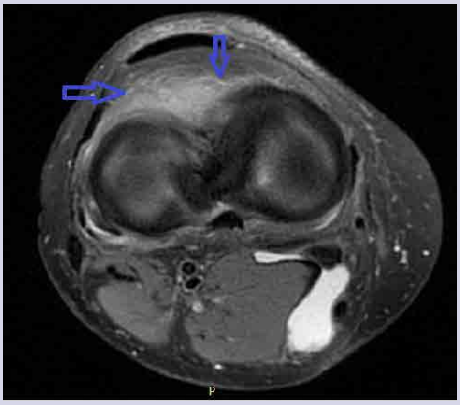

Figure 3: Axial plane, MRI Knee, showing the hypersignal on proton density propeller FS sequence into Hoffa's Fat, meniscal cyst and moderate quadricipital and articular effusion.

Conclusion

Hoffa's disease or Hoffitis is a rare condition causing the anterior knee pain. Trauma or repetitive micro trauma are the most causes of this disease observed at all ages. To date, MRI is the imaging of choice and the radical treatment is the excision of fat pad when conservative treatment is failing.

Conflicts of Interest

We declare not to have any conflicts.

Author's Contribution

Wilson BIZIMANA, MD: Conception of the work, Drafting the work and corresponding author.
Arthur Semedo INSUMBO, MD: Acquisition of images, rereading and approval.
Laila JROUNDI, Professor: Critically for important intellectual content and final approval.
Fatma Zahrae LAAMRANI, Professor: Conception agreement, revising and Approval.

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