Giant Cell Tumor of the Infrapatellar Fat Pad of the Knee: A Case Report

Ahmad Jiblawi1*, MD; Hani Chanbour2, MD; Wassim Alwan3, MD; Khaled Jiblawi4, MD
1Department of Diagnostic Radiology, American University of Beirut Medical Center, Beirut, Lebanon
2Department of Neurological Surgery, Vanderbilt University Medical Center, United States
3Department of Orthopedic Surgery at Dar Al Shifaa Hospital, Tripoli, Lebanon
4Department of Diagnostic Radiology at Dar Al Shifaa Hospital, Tripoli, Lebanon.

Abstract

Giant Cell Tumor is a rare benign soft tissue tumor occurring in two forms: localized and diffuse. The two subtypes differ in their location at presentation, shape, recurrence after treatment and prognosis. MRI is still essential in the diagnosis, however pathology remains the gold standard for the final diagnosis. In this article, we report a case of Giant Cell Tumor involving a very rare location with very few reports in the literature; the infrapatellar (Hoffa’s) fat pad of the knee. We discuss its keen clinical and radiological features. The tumor was

Introduction

First described by Chassaignac in 1852, Giant Cell Tumor (GCT) is a benign soft tissue tumor [1]. It is a rare disease, associated with synovial inflammation due to hemosiderin deposition. GCT occurs in two forms: localized GCT and diffuse formerly known as pigmented villonodular synovitis. The former typically consists of small well circumscribed, nodule or pedunculated mass that might be intra- or extra-articular, most commonly (85%) in the small joints (ex: hands and feet) while the latter is typically intra-articular with an infiltrative growth pattern commonly occurring in large joints (ex: ankles and knees) [2–4]. Both share similar histologic features; however they have different biological behavior, treatment outcome and prognosis. Thus the importance of differentiating between the two entities [5,6].

MRI is considered essential for the diagnosis, staging, preoperative planning and clinical follow-up of GCT. The mass appears of iso/low signal intensity on T1 and T2 weighted images. In addition to joint effusion and synovial proliferation. Some “blooming” artifact of low signal might be noted on echo-gradient because of the magnetic susceptibility from hemosiderin deposition [1,2].

In this article, we report the first case in Lebanon (to our best knowledge) of a rare, localized Giant Cell Tumor originating in the infrapatellar (Hoffa’s) fat pad, emphasizing on its radiologic manifestation.

Case Report

We report a case of a 35-year-old gentleman, previously healthy, complaining of a 4-month history of recurrent and painful left knee locking. The patient denies any trauma, any recent surgery, no accompanying systemic symptoms as of fever, rash, diffuse arthralgia, or myopathy. His presentation was mimicking that of a meniscal tear injury.

An MRI of the left knee was performed using 1.5 Tesla Philips Ingenia Unit,
manufactured in the Netherlands. The following planes and sequences: A sagittal T1 weighted (T1W), proton density (PD) and STIR image, a coronal STIR and an axial STIR image (Figure 1 A-E). Result showed the presence of a soft tissue-like lesion arising directly anterior to the anterior cruciate ligament in between both femoral condyles estimated to be 3 cm in its transverse diameter, 2.7 cm in its antero-posterior diameter and 1.2 cm in its supero-inferior diameter. The lesion showed iso-intensity to the cartilage on T1W as well as on PD but showed an increase signal intensity on STIR weighted images. The lesion relaxes directly on the ACL posteriorly which is of adequate continuity and signal. Minimal associated excess of joint fluid filling the suprapatellar bursa. Both menisci, anterior cruciate ligament, posterior cruciate ligament and medial and lateral collateral were normal. No capsule-meniscal separation is seen. The overall radiologic impression was for a Cyclops lesion or a soft tissue tumor such as Giant Cell Tumor.

The patient underwent an arthroscopic excision of the soft tissue tumor. Procedure went uneventful. The tissue was sent to pathology. Microscopic examination showed fragments of fibrous tissue involved by sheets of fibroelastic to epithelioid cells with band nuclei and moderately abundant cytoplasm. They are intermixed with osteoclast-like giant cells and foamy histiocytes. There was no evidence of malignancy. Findings suggestive of Giant Cell Tumor of the Tendon Sheath. Unfortunately, the patient was lost to follow up, thus recurrence could not be reassessed.

Discussion

Giant Cell Tumor is a rare benign soft tissue tumor arising from the synovial tissue of the joints, tendon sheath, mucosal bursas, and fibrous tissues adjacent to tendons. Multiple terms are found in the literature to describe this entity; pigmented nodular tenosynovitis, fibrous xanthoma of synovium, benign synovioma, xanthogranuloma and tenosynovial giant cell tumor [1]. Etiology and histogenesis of which is not completely understood, but many risk factors were mentioned in the literature such as trauma, infection, vascular abnormalities, lipid metabolism disorders, osteoclastic proliferation, and immune system disorders.
It can present in two forms: localized and diffuse [3,7]. Localized GCT presents mainly in small joints (85% observed in fingers while 12% is observed in large joints, GCT in the knee is rare) [4], either intra-articular or extra-articular. Diffuse form occurs mainly in the extra-articular space [8]. However, extra synovial soft tissue forms of localized GCT are very rare and mainly concern the knee joint. Around 50% of patients with a localized GCT arising primarily within the infrapatellar fat pad have a history of trauma but the exact etiology is still unknown [9]. The onset age of localized GCT is older than that of the diffuse type (i.e. localized type usually occurs above 40 years of age) [10]. When affected, patient presents clinically with mechanical derangements, progressively worsening over time. Meniscal symptoms and locking are often present within the knee joint. The main symptoms are swelling (86%), pain (82%), stiffness (73%), limited range of motion (64%) and joint instability (64%) [7,10].

MRI is an effective and highly sensitive diagnostic tool; however pathology is still the gold standard of final diagnosis. On T1 and T2 weighted images, dense collagen and hemosiderin presents with homogenous low or intermediate signal. The most typical feature of a localized GCT is a well circumscribed, nodular mass with low signal intensity on T1, T2 and proton weighted images and high signal intensity on STIR images [4,6,9,10]. Microscopically, GCT is characterized by multinucleated giant cell, lipid-laden macrophages, hemosiderin deposition and fibroblast proliferation [5].

Various pathological conditions should be considered in the differential diagnosis, for example: Synovial Chondromatosis, Cyclops lesion, Rhabdomyosarcoma, Fibroma of tendon sheath, Synovial Sarcoma, Amyloid Arthropyathy, Haemophilic Arthropathy, Lipoma Arborescens and Rheumatoid Arthritis [6,9].

The ability to differentiate between the diffuse and localized forms of GCT is paramount to give patients a realistic outlook on future prognosis, chance of recurrence and optimal treatment course [5]. Several treatment options are present: surgery, radiotherapy, pharmacology or a combined solution of the listed methods. Important to note, local recurrence after treatment was reported in 18-46% of cases. However, this might be linked to incomplete resection of satellite nodules in the area of initial change. Other risk factors for recurrence are the location of the disease (more common in the knee), history of previous surgeries and positive surgical margins.

**Conclusion**

To the best of our knowledge, our case is the first to be reported in Lebanon. It is very rare to have a localized GCT in the extra-synovial infrapatellar (Hoffa's) fat pad of the knee. The rarity of the presented case suggests that GCT should be considered in the differential diagnosis of a painful knee locking in a young patient. Accurate diagnosis will lead to successful treatment associated with low recurrence rate resulting in a better patient outcome.

**Conflict of Interest:**

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

**References**


**DOI**: 10.55920/JCRMHS.2022.01.001026

**Citation**: *Ahmad Jiblawi*, Giant Cell Tumor of the Infrapatellar Fat Pad of the Knee: A Case Report. Jour of Clin Cas Rep, Med Imag and Heal Sci 1(3)-2022.