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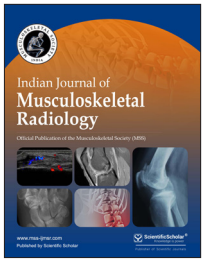

Case Report

A Case Report of Synovial Hemangioma: A Rare Cause of Opacity in Hoffa's Fat Pad

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ABSTRACT

The infrapatellar fat pad of Hoffa is an intracapsular structure which is a common site for inflammatory processes. However, it can also be involved by neoplastic pathologies. We report a case of synovial hemangioma in this location which presented a diagnostic challenge due to unusual clinical presentation. The patient was managed with multiple sessions of ultrasound-guided injection sclerotherapy with partial resolution of the lesion.

Keywords: Synovial hemangioma, Hoffa, Synovial tumor, Fat pad, Benign tumor

INTRODUCTION

The infrapatellar fat pad of Hoffa is visualized on various imaging modalities and is a common site of inflammatory pathologies. Synovial hemangioma is a rare benign neoplasm commonly affecting children and young adults. It most commonly involves knee joint with a predilection for Hoffa's fat pad.[1] It has non-specific imaging features on plain radiography and ultrasound. However, magnetic resonance imaging (MRI) has high sensitivity and specificity for the diagnosis of this entity.[2] We present a case of synovial hemangioma of Hoffa's fat pad where diagnosis remained elusive for almost a year due to confounding history of trauma.

CASE REPORT

A 15-year-old girl initially presented to a hospital with mild pain in the left knee preceded by a history of minor trauma. Clinical examination at initial presentation revealed mild swelling in the infrapatellar region. No other abnormalities were detected. The patient was managed conservatively as a case of knee contusion. The patient had partial relief from symptoms following the treatment.

The patient reported to our tertiary care center in Southern India after 1 year of initial presentation due to incomplete resolution of pain and persistence of swelling. At our center, the clinical examination revealed persistent swelling in the infrapatellar region. There were no local tenderness, skin changes, or restricted joint movements. Routine hematological and biochemical investigations were normal. Her medical, developmental, and family history were otherwise unremarkable.

Initially, a plain radiograph of both knees [Figure 1] was performed, which revealed a homogenous soft tissue density radio-opacity filling the Hoffa's fat pad on the left side with loss of normal fatty

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density. Subsequently, ultrasound of the left knee was done where a lobulated heterogeneously hypoechoic lesion was seen in the infrapatellar fossa. On Doppler imaging, multiple vessels were seen within the lesion with the low-velocity venous flow [Figure 2].

MRI of the left knee joint with multiplanar T1-weighted images (T1WI), T2-weighted images (T2WI), gradient echo (GRE) images, and proton-density fat-saturated (PDFS) sequences was acquired followed by post-gadolinium T1-weighted fat-saturated images.

An ill-defined lesion was seen on MRI epicentered in the infrapatellar fat pad measuring ~ 37 mm × 55 mm × 47 mm (AP × TR × CC). It was isointense to muscle on T1WI and heterogeneously hyperintense on T2WI [Figures 3a and b]. Multiple serpiginous flow voids and thin septa were seen within. GRE images showed multiple foci of signal blooming [Figure 3c]. These foci of blooming showed variable signal intensity on T1WI and T2WI representing blood degradation products in different stages. The lesion showed avid heterogeneous post-contrast enhancement [Figure 3d]. There was no evidence of infiltration into the surrounding soft tissues or bones. No synovial effusion or bony erosions were seen. These MRI findings were characteristic of synovial hemangioma. The initial presentation following an episode of trauma was likely to be due to acute hemorrhage from the lesion which partially resolved with conservative therapy.

This patient was managed with multiple sessions of injection sclerotherapy by an interventional radiologist who led to partial reduction in the size of the lesion [Figure 4]. She has been planned for further sessions of sclerotherapy.

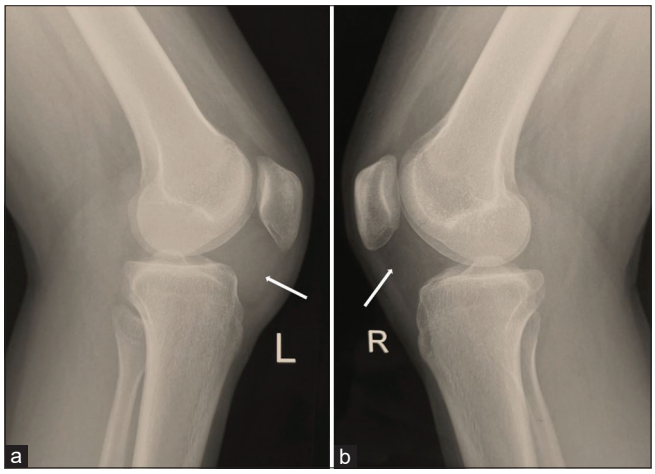

Figure 1: Radiograph of both knees – lateral view. (a) A homogenous soft tissue density radio-opacity (arrow) is seen filling the infrapatellar fat pad on the left side. (b) Normal appearance of infrapatellar fat pad (arrow) for comparison.

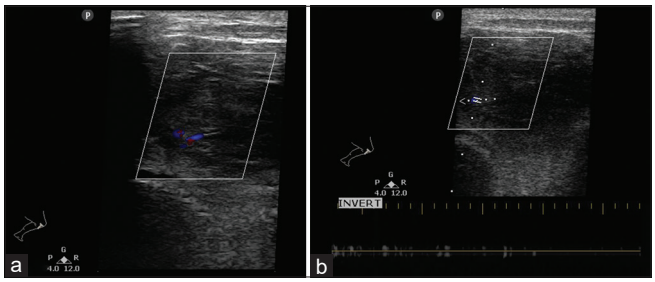

Figure 2: Doppler ultrasound images of the left infrapatellar fat pad. (a) A homogenous hypoechoic lesion is seen with internal vascularity. (b) Spectral Doppler shows low-velocity venous flow in these vessels.

DISCUSSION

The infrapatellar fat pad of Hoffa is one of the several well-defined fat pads within the knee joint. It is intracapsular but

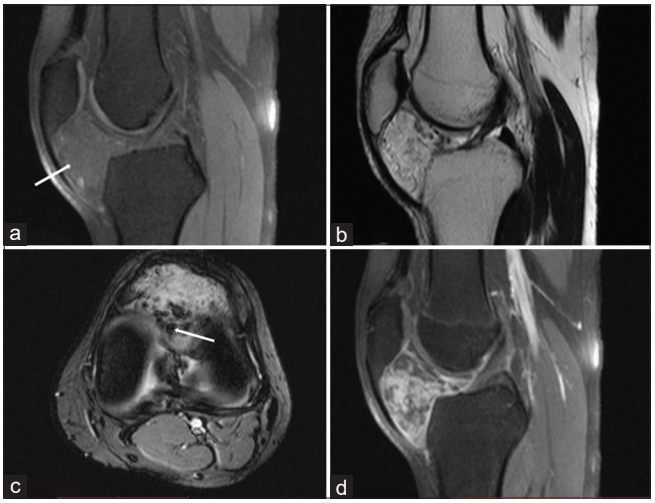

Figure 3: Magnetic resonance imaging images of the left knee. (a) T1-weighted (T1W) fat-saturated sagittal and (b) T2-weighted sagittal images show an ill-defined T1 isointense and T2 hyperintense lesion (arrow) in infrapatellar fat pad. (c) GRE axial images show multiple foci of signal blooming (arrow) within the lesion. (d) Post-gadolinium fat-saturated T1W sagittal images show avid heterogeneous post-contrast enhancement in the lesion.

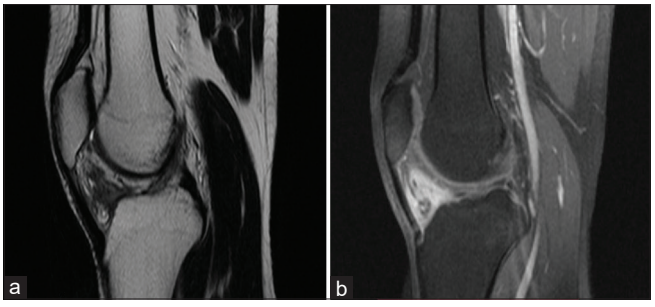

Figure 4: Magnetic resonance imaging images of the left knee. Post-sclerotherapy (a) T2-weighted sagittal images and (b) post-gadolinium fat-saturated T1-weighted sagittal images show partial reduction in the size of the lesion with the reduction in the previously seen bulging of infrapatellar fat pad and in the extent of enhancing lesion.

extrasynovial in location. There are several disease processes that characteristically involve this fat pad[3] including but not limited to joint effusion, Hoffa disease (infrapatellar fat impingement), intracapsular chondroma, nodular synovitis, post-surgical fibrosis, meniscal cyst, ganglion cyst, pigmented villonodular synovitis (PVNS), and synovial osteochondromatosis.

Synovial hemangioma is a rare tumor most commonly affecting the knee joint. It has a predilection for Hoffa's fat pad and is one of the entities to be considered in the differential diagnosis of radiographic opacity in this location. This tumor commonly affects children and young adults. The clinical presentation is with pain and joint swelling. Patients may also present with restricted joint movements, local tenderness, and joint effusions (hemarthrosis). The diagnosis of this entity is often delayed due to the non-specific nature of the symptoms.[4]

Radiographs are normal in around half of the cases.[5] The common abnormalities seen on plain radiographs are soft tissue opacity and joint effusions. Phleboliths and bony erosions are rarely seen. Radiographs may also show complications of repeated hemarthrosis in around 5% of cases in the form of osteoporosis, limb-length discrepancy, early epiphyseal maturation, and periosteal reaction.[4,6] This condition may even mimic hemophilic arthropathy in some cases.

Ultrasound supplemented by color Doppler is useful in demonstrating the benign nature of the lesion with internal vascularity. The findings on computed tomography are non-specific. This modality should be avoided to reduce the exposure to ionizing radiation in this age group.

MRI is the modality of choice in evaluating soft tissue masses and shows high sensitivity and specificity for the diagnosis of synovial hemangiomas.[6,7] It appears as a poorly defined, intra-articular mass lesion with a lobulated configuration. It is usually of intermediate intensity on T1WI. There may be areas of T1 hyperintensity within due to intratumoral fat. It is hyperintense on T2WI and PDFS reflecting pooled blood in vascular spaces of the lesion. Multiple linear T2 hypointense structures may be seen within which represent fibrous septa or vascular channels. The lesion can also show multiple T2 hypointense foci within which show signal blooming on GRE images and represent phleboliths. It shows marked heterogeneous post-contrast enhancement.[8]

The aim of management is to prevent cartilage damage caused by recurrent bleeding. There is no consensus on the best treatment modality for this condition. The treatment options include arthroscopic/open surgery, embolization, use of sclerosing agents, and radiotherapy.[9] Arthroscopic total resection is suitable for small lesions. For the lesions occupying most of the synovial membrane, open resection with synovectomy is a better option.[10]

The differential diagnosis on MRI includes PVNS, hemophilic arthropathy, synovial osteochondromatosis, and lipoma arborescens. PVNS shows diffuse synovial proliferation with associated joint effusion and juxtacortical erosions. Hemophilic arthropathy has a specific cause and leads to early-onset arthritis with cartilage destruction, synovial hypertrophy, reduction of joint space, and bony erosions. Synovial osteochondromatosis can be primary or secondary (associated with osteoarthritis, osteochondral disorders, and avascular necrosis). The imaging shows synovial proliferation with the formation of cartilaginous nodules (which may also show endochondral bone formation). Lipoma arborescens shows diffuse frond-like synovial proliferation with fat signal intensity on all sequences.

CONCLUSION

In a patient with a history of refractory knee pain and swelling followed by trauma, uncommon conditions should be considered if conservative management fails to relieve symptoms. MRI is the modality of choice in such patients and should be used early in the diagnostic algorithm.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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