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Intra-Articular Synovial Fibroma of the Knee in a Young Boy

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ABSTRACT

Synovial fibroma, a benign fibro collagenous soft tissue tumour, arising in the knee joint is a rare entity. It is even rarer in the paediatric age group. The clinical symptoms, investigations, diagnosis, and treatment with the literature reviews are presented for this uncommon occurrence in an 11-year-old boy.

KEY WORDS

Arthroscopy, Intraarticular, Knee joint, Synovial fibroma

INTRODUCTION

Fibromas of tendon sheaths (FTS) are rare soft tissue tumours that usually arise from synovium of tendon sheaths and occasionally from synovial membrane of joint capsule.[1-3] They are commonly seen in the fingers, hands and wrists.[4] The large joints are rarely affected, knee being the commonest site among them.[5] Those arising from the synovial membrane of a joint are more appropriately termed as synovial fibromas.[6] Less than 20 cases of intra-articular synovial fibromas in the knee joint have been reported till date.[5] Synovial fibromas present as slowly growing painless mass with a peak incidence between 20 and 50 years of age and a higher predilection for men.[7]

This report presents a rare case of synovial fibroma in an 11-year-old boy, in the intercondylar notch of his right knee, between the anterior and posterior cruciate ligaments. Synovial fibroma in this location in a paediatric knee has not been previously reported. Although not a common entity, synovial fibroma should be included in the differential diagnoses for a young person having a mass in the knee. Diagnosis, treatment and literature reviews of the case are discussed.

CASE REPORT

An 11-year-old boy presented to Suvekchya International Hospital, Kathmandu, in September 2016 with pain in the right knee, limp while walking and inability to fully extend the joint for 3 months. The pain was aggravated while extending the knee. He had no previous history of significant trauma, febrile illness or other joints pain and no previous treatment before presenting to us.

On physical examination, the affected knee had full flexion with an extension deficit of 15 degrees during passive and active extension. There was no obvious effusion or any deformity. Palpation of the joint did not reveal localized tenderness, a rise in temperature or any palpable mass. The muscle bulk and power of the muscles around the knee was normal. Examinations for the ligaments and menisci were normal. Neurovascular examinations were within normal limits. The laboratory investigations and the plain radiographic findings were unremarkable. The plain magnetic resonance imaging (MRI) of the right knee suggested 2 x 0.8 x 1.5 cm intraarticular well defined lesion in the intercondylar notch. The lesion demonstrated hyper-intense signal in T2 Fat Saturation images and isointense

signal in T1 images (fig. 1). The differential diagnoses of the lesion included, localized pigmented villo-nodular synovitis (PVNS), xanthoma, giant cell tumour (GCT), intra-articular nodular fasciitis (NF), intra articular fibroma and developmental ganglion cyst.

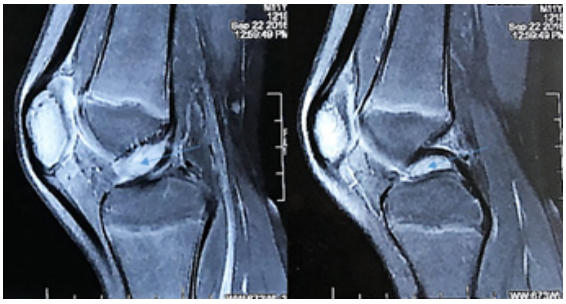

Figure 1. Sagittal sections of T2 Fat Saturation image showing lobular high signal intensity lesion (arrows) in the intercondylar notch in-between the Anterior Cruciate and Posterior Cruciate ligaments.

Arthroscopic examination of the knee (fig. 2) revealed a hard mass just above the anterior cruciate ligament (ACL) within the intercondylar notch. The mass was free from the ACL but was attached to the lateral wall of the intercondylar notch and to the anterior surface of the posterior cruciate ligament (PCL). Mass was excised carefully from its attachment preserving the PCL and sent for biopsy. There were no other intra-articular derangements on arthroscopic examination.

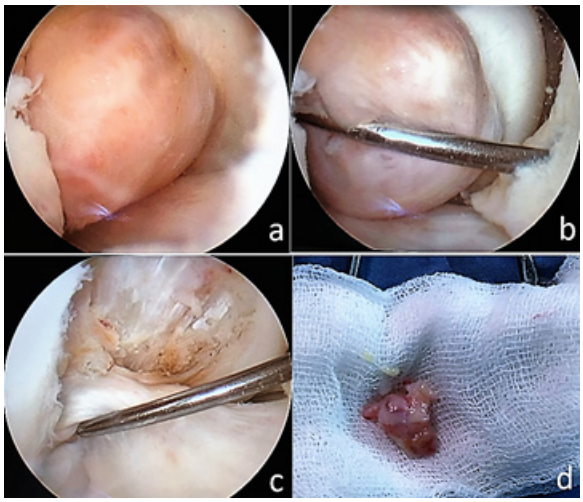

Figure 2. Arthroscopic view of the mass in the intercondylar region (a, b) and view after excision of the mass (c). Gross appearance of the excised mass (d).

Histopathological examination (fig. 3) showed spindled fibroblasts embedded in a collagenous stroma with cellular regions and areas of relative cellular paucity and few "slit-like" blood vessels. The individual cells were spindle shaped with elongated to oval nuclei having bland chromatin pattern. Mitosis, necrosis or cellular atypia was not seen. The absence of multinucleated giant cells, hemosiderin deposits and xanthoma cells were helpful in excluding other differential diagnoses.

Excision of the mass led to the relief of symptoms post operatively. In one year follow up, the range of motion was full and the patient had no complaints and no signs of local recurrence.

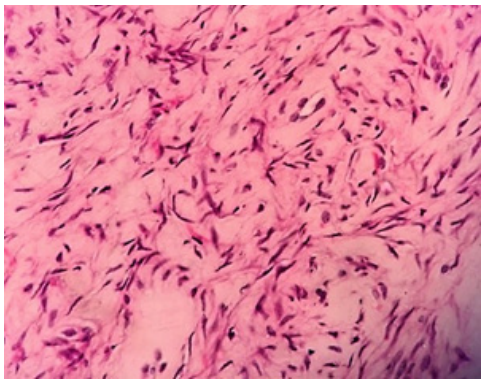

Figure 3. Photomicrography showing moderately cellular tumor cells, composed of spindle shaped cells with little cytoplasm between prominent eosinophilic bands of collagen arranged in storiform pattern. (H&E x 40)

DISCUSSION

FTS was first described by Geschickter et al. in 1949.[8] The largest series of 138 cases was published by Chung and Enzinger in 1979.[9] Trauma has been attributed to its aetiology, however pathogenesis still remains unclear.[9] FTS related to large joints are rare and there are less than 20 cases reported in the knee joint.[1,2,5,6,10-19] Most of them were associated with the PCL and posterior joint capsule, few were related to infrapatellar fat pad, medial patello-femoral compartment, supra patellar pouch, patella tendon sheath and lateral joint capsule.[7] In the present case, the tumour was located lying over the ACL, but attached to the PCL anterior surface and the lateral wall of the intercondylar notch in the right knee of an 11-year-old boy. Pilania et al. and Rathore et al. have also described FTS in a young boy and a girl respectively, but at different locations: the patellar tendon and the iliotibial band.[5,16]

Clinically, it can present as a painless mass around the knee joint or a mass causing pressure signs to the surrounding tissues as irritation and pain during motion. Range of motion of the knee joint may be affected, as in the present case with an active and passive extension deficit of the knee due to the impingement of the mass on the anterior intercondylar notch during extension. Plain radiographs may be normal in small lesions. It may be visible as a soft tissue shadow if it is large and compressing surrounding tissues or if there is erosive bony changes.[7,20]

In majority of the cases, the MRI scans, in T1-weighted images, show a homogenous well defined lesion that has low to iso-signal intensity in comparison to muscle.[1,3,14-15,21] The T2-weighted images may show various patterns, from a low signal intensity to high signal intensity and their various combinations.[1,7,15,17] MRI findings are reflected well with the histologic correlation,[22] and may be dependent on

maturity of the tumour including hyalinised or sclerosed forms and vascularity.[19] The accurate diagnosis based on the plain or contrast MRI findings alone cannot be done due to the lack of typical characteristic findings in them. PVNS, which is a much more common condition than synovial fibroma in the knee, and intra-articular nodular fasciitis (NF) have also shown to have similar findings on MRI. Differentiating synovial fibroma from them based on MRI findings only is difficult.[6,16] A high index of suspicion is required during MRI interpretation of these types of lesion.

Histologic diagnosis has been the mainstay of diagnosing synovial fibroma.[16] Microscopic examination of synovial fibromas show that the tumour is composed mostly of spindle-shaped fibroblastic cells containing elongated nuclei, scattered cleft-like vascular spaces, and a dense collagenous matrix.[17] Fibromas can be differentiated from PVNS by the absence of multinucleated giant cells, xanthoma cells and hemosiderin-laden macrophages.[23] Nodular Fasciitis (NF) is a benign soft tissue lesion which originates from the surface of fascia and extends into subcutaneous tissue or occasionally muscle but very rarely it may be intra-articular.[5] Histologically, synovial fibroma is more hypocellular and densely collagenous than NF and characteristic slit like vascular spaces of synovial fibroma are not seen in NF.[24]

The choice of treatment of synovial fibroma of knee is complete excision, either by arthroscopic or open methods. Recurrence is most likely after an incomplete excision of the lesion, however the recurrences were reported in fingers and hand and not in the knee.[11] A close follow up of the patient is needed to observe for recurrence as there is no definitive confirmation of tumour being completely removed.

Although not a common entity, synovial fibroma of knee should be in the differential diagnoses of soft a tissue tumor arising in the knee joint of a young boy. Definitive diagnosis and treatment is by open or arthroscopic excision and biopsy of the tumour.

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