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Case Report

A rare case of giant cell tumour arising from anterior cruciate ligament: Its diagnosis and management

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ABSTRACT

Tenosynovial giant cell tumour is a locally aggressive tumour arising from the synovia of the fibrous tissue surrounding the joints, tendon sheaths and tendons. Areas of predilection are the hand, and in the case of synovial joints, the knee joint is particularly affected. We describe a rare case of an intra-articular localized tenosynovial giant cell tumour arising from the anterior cruciate ligament (ACL) in a 27 year male who presented with pain and giving way of his left knee without prior history of any trauma. Tests for internal derangement of knee without prior history of any trauma. MRI reported an ACL tear with a heterogeneous fibrous mass attached to the distal part, most probably an organized haematoma. It was decided to do a diagnostic arthroscopy before proceeding for ACL reconstruction. Arthroscopy revealed a purple coloured mass attached to distal part of ACL. The mass was removed piecemeal using an additional posterolateral portal. ACL was found intact. Histopathology reported it to be tenosynovial giant cell tumour. The patient was asymptomatic at each subsequent follow up. It is a rare diagnosis which presented as an ACL tear; in such suspected cases it is prudent to perform a diagnostic arthroscopy before going for ACL reconstruction.

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1. Introduction

Tenosynovial giant cell tumour is a locally aggressive tumour arising from the synovia of the fibrous tissue surrounding the joints, tendon sheaths, mucosal bursas, and tendons.^{1,2} The various synonyms used to describe the tumour are: giant cell tumour of tendon sheath, nodular tenosynovitis, pigmented

villonodular synovitis, fibroxanthoma and fibrous histiocytoma.³ The four clinicopathologic variants of tenosynovial giant cell tumour are localized, diffuse extra-articular, diffuse intra-articular (diffuse pigmented villonodular synovitis), and malignant.^{4,5} The localized type of tenosynovial giant cell tumour is defined as a circumscribed lesion that is microscopically not infiltrating into the fat or skeletal muscle. Areas of predilection are the hand, and in the case of synovial joints,

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the knee joint is particularly affected.⁵ Only a few cases of the tumour arising from the knee have been reported in literature. This article describes a case of an intra-articular localized tenosynovial giant cell tumour arising from the anterior cruciate ligament (ACL). We discuss the dilemma in the diagnosis along with its MRI features and management of this rare condition.

2. Case report

A 27 year male, a software engineer by profession, otherwise healthy, presented to us with complaint of pain in his left knee and a sense of giving way for last six months without any prior history of trauma. To begin with, it was more of a sense of heaviness rather than pain. The pain was on-going and worsening gradually. Patient also complained of a sense of apprehension of falling down, while walking briskly. There were no complaints of swelling or catching of knee. No complaints of pain or swelling of any other joint was present.

On clinical examination there was no swelling or joint line tenderness. Knee range of motion was equal and comparable to the normal side. Tests for internal derangement of the knee viz. Lachmans's test, anterior and posterior drawer tests, valgus and varus stress tests, McMurray's test and pivot shift test were all negative.

Routine laboratory investigations including the ESR, CRP and serum uric acid levels were normal. Antero-posterior, lateral and skyline radiographs were also normal.

Patient had an MRI scan with him (which was done elsewhere) which reported a post-traumatic tear in the distal part of ACL along with a circumscribed heterogeneous mass,

measuring $20 \times 10 \times 17$ mm, attached to distal part of ACL and occupying the anterolateral recess of the joint, mostly an organized haematoma (Figs. 1 and 2). The menisci looked normal on the scan.

In view of the complaints and the MRI findings, patient was planned for ACL reconstruction but the senior surgeon was sceptical about the diagnosis as there was no history of trauma and the clinical examination was also not supporting it. So it was decided to go for a diagnostic arthroscopy prior to graft retrieval.

Arthroscopy was performed using the anteromedial and anterolateral portals. Intra-operatively a circumscribed mass with a purple hue was found attached to the distal part of ACL (Figs. 3 and 4). The mass was removed piecemeal and was sent for histopathology. An intralesional piecemeal excision was performed using a shaver, with meticulous attempts not to damage ACL. Strength, tension and integrity of ACL were checked after the resection and ACL was found to be intact (Fig. 5). No meniscal, ligamentous or cartilaginous lesions were detected. Rest of the knee joint was normal with no evidence of synovitis or hyperplasia. The ACL reconstruction was not required.

Histopathology revealed a giant cell tumour of tendon sheath with infarcts (Figs. 6 and 7). It was performed by The Professor of Department of Pathology of our institute. The post-operative course was uneventful and the patient was discharged the next day.

The patient was asymptomatic at each subsequent follow up and did not complain of any locking or giving way sensation. At 6 months follow-up a repeat MRI was performed which showed no signs of recurrence.

Fig. 1 – Fat-saturated proton density weighted sagittal MRI images of the left knee demonstrating altered signal intensity of distal part of ACL with a circumscribed heterogeneous mass attached to its distal part.

Fig. 2 – T-2 weighted coronal image of the left knee demonstrating a heterogeneous mass occupying the anterolateral recess of the knee joint.

Fig. 3 – Arthroscopic image showing a well circumscribed mass in the anterolateral recess.

Fig. 5 – Arthroscopic image after complete excision showing an intact ACL.

3. Discussion

Tenosynovial giant cell tumour, as mentioned earlier, arises from the synovial tissue of the joints, tendon sheath, mucosal bursas, and fibrous tissues adjacent to tendons.¹ The aetiology and histogenesis of tenosynovial giant cell tumours are not completely understood.^{6–8} It can present in localized and diffused forms. The pigmented villonodular synovitis represents the diffuse intra-articular form and has a high rate of local recurrence in the extrasynovial localization.⁸ The localized form presents as a solitary and well defined mass. It can be intra-articular or extra-articular. Most commonly occurs in hands and wrist. Large joints like knees are less commonly affected.^{6,8} When affected, clinically, patients have signs of mechanical derangement. With the knee joint, meniscal symptoms and locking are often present. Thorough clinical examination is prudent in such cases. It usually occurs in the age group of 30–50 years with a male predominance. MRI has been reported to be the best non-invasive technique to

diagnose this tumour.^{6,8} MRI diagnosis must be confirmed by histopathological examination. Arthroscopic excision is a safe and effective procedure for the treatment of these tumours.^{9–12} To the authors' knowledge, few reports of tenosynovial giant cell tumours arising from the ACL have been

Fig. 4 – Arthroscopic image after partial excision of the mass showing its origin from ACL.

Fig. 6 – Microscopic appearance of the tumour showing the basic cellular composition of polygonal mononuclear cells with foci of multinucleated giant cells and a few vacuolated xanthoma cells.

Fig. 7 – Microscopic appearance of the tumor with a higher magnification ($\times 400$) showing two multinucleated giant cells with eosinophilic cytoplasm in the stroma of mononuclear cells.

published in the literature.^{13,14} Lee et al.¹³ reported a case of 29-year-old man affected by an intra-articular localized tenosynovial giant cell tumour of the tendon sheath arising from the ACL. On MRI the mass was situated behind the ACL and was attached near to its femoral attachment. The authors performed arthroscopy through a posteromedial and a posterolateral portal and excised it piecemeal. The knee was found to be stable after the excision.¹³ In our case to begin with, the diagnostic arthroscopy was performed through anteromedial and anterolateral portals. A posterolateral portal was used to gain better access for complete excision of the tumour.

Otsuka et al.¹⁴ reported the first case of intraarticular tenosynovial giant cell tumour arising from ACL. In this case the patient presented with symptoms of locking and effusion. The mass was removed arthroscopically and was confirmed to be a giant cell tumour on histopathology. The patient became symptom free after the excision.¹⁴

A few reports of tenosynovial giant cell tumour arising from posterior cruciate ligament (PCL) have also been published.^{2,15,16} Kim et al.² reported a case of 28-year-old man with 5-year history of left knee pain with an intra-articular giant cell tumour attached to the PCL. Magnetic resonance imaging revealed a regular contoured mass arising from the PCL. The lesion was removed arthroscopically, and the pathological findings confirmed the diagnosis of localized tenosynovial giant cell tumour. No recurrence had occurred at 2-year follow-up. They concluded that arthroscopic local excision of localized pigmented villonodular synovitis is the treatment of choice.²

4. Conclusion

Tenosynovial giant cell tumour can present with symptoms of instability and can be misdiagnosed as an ACL tear. Such cases should undergo meticulous scanning both clinically and radiologically. Secondly, a diagnosis of ACL tear without a history of significant prior trauma should be given a second thought. In such a case it is prudent to go for a diagnostic arthroscopy prior to graft retrieval intraoperatively.

Conflicts of interest

All authors have none to declare.

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