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Vamsi Krishna Reddy Gadireddy
S. Nijalingappa Medical College & H.S.K. Hospital & Research Centre, Navanagar, Bagalkot, Karnataka, India

Shiddanna M Patted
S. Nijalingappa Medical College & H.S.K. Hospital & Research Centre, Navanagar, Bagalkot, Karnataka, India

Jagdish L Katwa
S. Nijalingappa Medical College & H.S.K. Hospital & Research Centre, Navanagar, Bagalkot, Karnataka, India

Harsha Kyalakond
S. Nijalingappa Medical College & H.S.K. Hospital & Research Centre, Navanagar, Bagalkot, Karnataka, India

Corresponding Author:
Vamsi Krishna Reddy Gadireddy
S. Nijalingappa Medical College & H.S.K. Hospital & Research Centre, Navanagar, Bagalkot, Karnataka, India

Diffuse tenosynovial giant cell tumor of knee with largest loose body: A rare case report

Vamsi Krishna Reddy Gadireddy, Shiddanna M Patted, Jagdish L Katwa and Harsha Kyalakond

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Abstract
Background: Tenosynovial Giant Cell Tumor (TGCT), also known as Pigmented Villonodular Synovitis (PVNS), is a rare, benign yet locally aggressive tumor affecting the synovium of joints, most commonly the knee. It exists in localized and diffuse forms, with the diffuse type being more extensive and associated with higher recurrence rates. Presentation with large intra-articular loose bodies is exceedingly uncommon.
Case Presentation: We report a rare case of diffuse TGCT in a 58-year-old male presenting with a 3-month history of knee pain, swelling, and locking. Clinical examination revealed palpable loose bodies and restricted range of motion. Imaging showed multiple calcified loose bodies in the suprapatellar and lateral parapatellar areas of the right knee. Arthrotomy revealed multiple loose bodies, with the largest measuring 7×5×2.5 cm—one of the largest reported in literature in the context of TGCT. Histopathological examination confirmed the diagnosis of diffuse TGCT, showing hemosiderin-laden monocytes, foam cells, and multinucleated giant cells.
Management and Outcome: Complete open synovectomy was performed, resulting in improved range of motion from 90° to 140° intraoperatively. The patient was mobilized on postoperative day one and remained symptom-free at one-month follow-up.
Conclusion: Diffuse TGCT with giant loose bodies is a rare presentation that may mimic synovial chondromatosis. This case highlights the importance of thorough evaluation and surgical management in atypical presentations of knee joint pathology. To our knowledge, this represents one of the largest TGCT-associated intra-articular loose bodies reported to date.

Keywords: Tenosynovial giant cell tumor, pigmented villonodular synovitis, knee, loose bodies, synovectomy

Introduction
Tenosynovial Giant Cell Tumor (TGCT) also known as Pigmented villonodular synovitis (PVNS) [1] locally aggressive benign tumor of synovium of joints and tendon sheaths its most common form is a monarticular synovial proliferative disorder affecting adults in the third or fourth generation of life and knee is the most commonly affected joint [2]. TGCT is a rare condition first described in 1852 by Chassaignac as a nodular lesion of the flexortendon sheath [3]. It exsists in two forms localised and diffused forms of TGCT. Simon gave the first description of the the localised form [4]. Moser first described the diffuse form in the knee [5]. Its, incidence is 1.8 cases per 1,000,000 persons [6]. Our present case shows diffuse Tenosynovial Giant Cell Tumor which was presented as the multiple loose bodies with largest loose body known in the knee joint.

Case report: A 58 years old male farmer presented with 3 months history of pain, swelling and locking of right knee joint. Symptoms were insidious in onset gradually progressive with no past history of trauma. His general health was excellent, and never had any other surgeries, and was on no longterm medications. Physical examination showed healthy male with significant findings only related to knee. On examination moderate effusion was noted in the knee joint with two loose bodies palpable at suprapatellar and lateral parapatellar areas of the knee joint which were mobile associated with pain and crepitus. There was moderate effusion of knee with reduced range of movements (0-90 degrees), with no ligamentous or meniscal pathology noted. X-ray of knee joint shows multiple calcified loose bodies present in supra patellar and lateral parapatellar areas (Fig-1). Blood investigations showed no signs of any active infection or inflammation. Knee joint was aspirated with around 40 ml thick orange brown fluid. Arthrotomy was performed by suprapatellar midline incision and multiple loose bodies were removed. The largest was found to be 7X5X2.5 cm, second largest was found to be 6x3.5x1cms (Fig-2, 3).

Fig 1

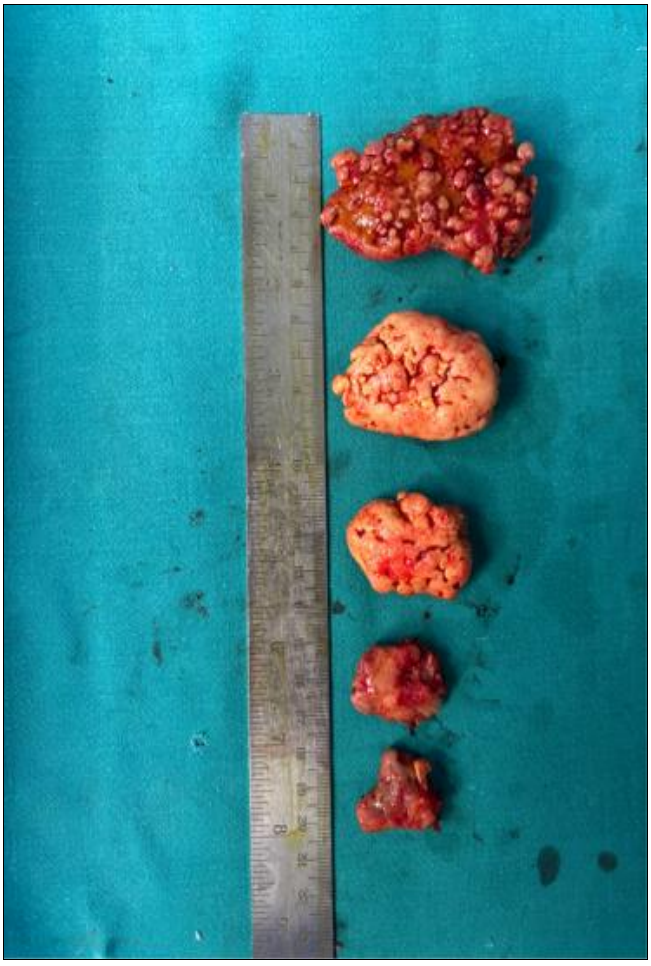

Fig 2

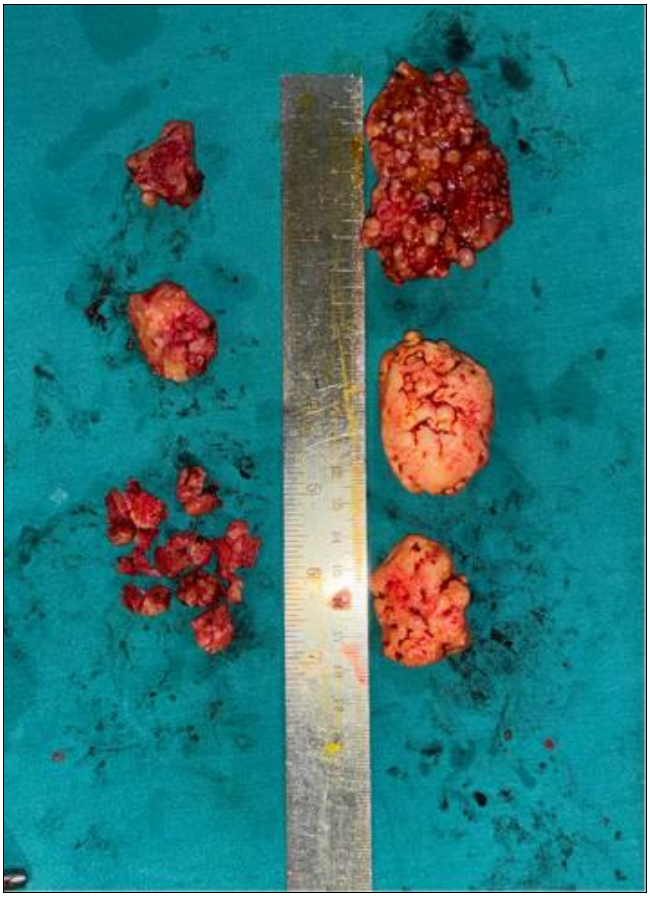

Fig 3

Synovium was reddish brown thickened with rubbery consistency having nodular masses with numerous finger like villi (Fig-4).

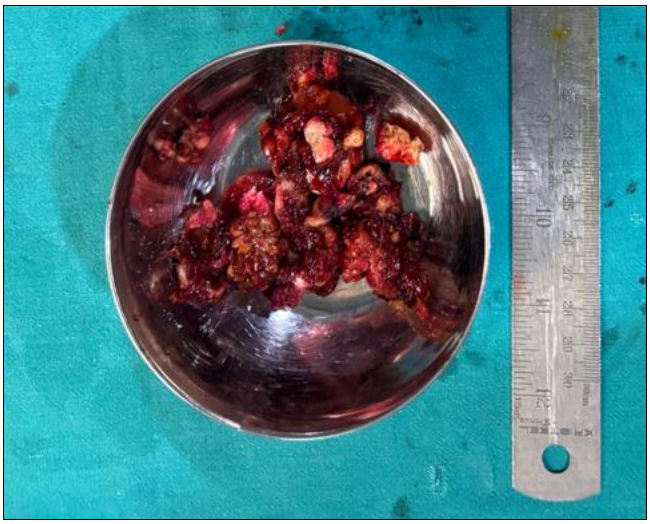

Fig 4

Cautery was used to perform synovectomy, followed by lavage. Intra-operatively patients knee range of movements improved from 90 degrees of flexion to 140 degrees. Post operatively antibiotics and analgesia were given as per institutional protocols and patient was allowed for full weight bearing from post-op day-1. Physiotherapy was started on post-op day-1with Active & passive Knee (Continued Passive Motion) ROM exercises. Patient was

symptomless on 1 month followup and has started his day to day activities without any trouble Microscopy of villous structures and nodules covered by synovium infilterated by cells mixed population of foam cells with hemosiderin stained monocytes with multiple giant cells. (Fig-5, 6)

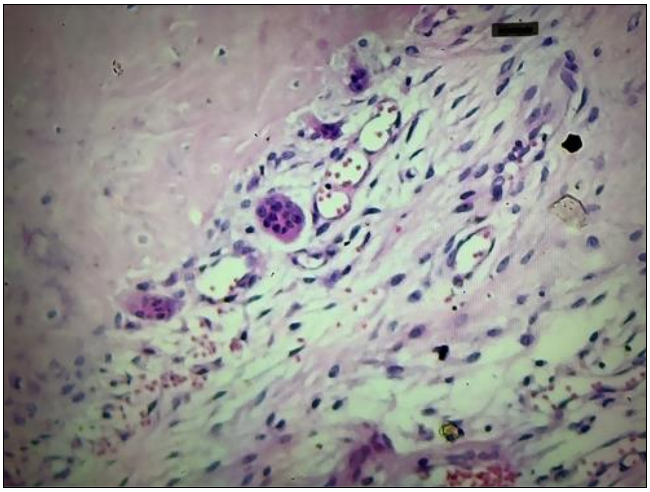

Fig 5

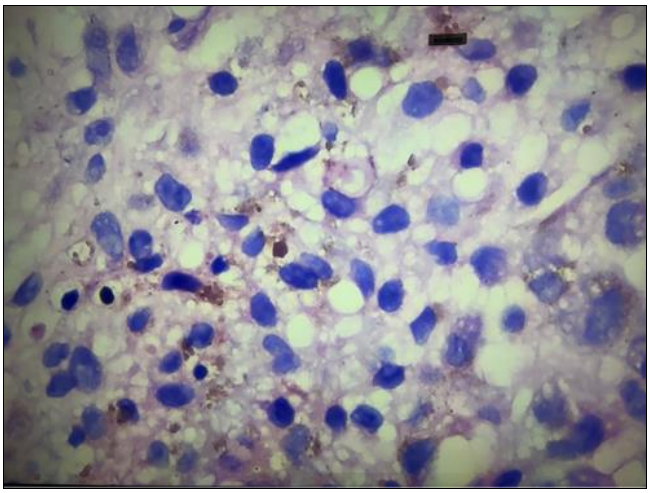

Fig 6

Discussion

Tenosynovial Giant Cell Tumor is the most common form of monarticular synovial proliferative disorder affecting adults in the third or fourth generation of life and knee is the most commonly affected joint [2]. While the more prevalent diffuse type of TGCT affects the whole synovial lining of the joint, the localised form is distinguished by a focal involvement of the synovium by nodules or masses. Clinically, the diffuse form is a continuously developing illness that involves a slightly older patient population. Adults in their third and fourth decades of life are typically affected by the local form, which frequently manifests as an acute knee injury [5]. Pain, swelling and locking of the knee joint with limitation of ROM being the main symptoms of the diffuse type which are less pronounced in the local form. Gross appearence shows multiple finger like reddish brown villi on the base of fibrous connective tissue. Diagnosis can be made with MRI which is the most sensitive study showing blooming artifacts however, histopathology of the biopsied tissue is gold standard for the diagnosis. Microscopy of villous structures and nodules covered by synovium infilterated by cells mixed population of foam cells with hemosiderin stained monocytes with multiple giant cells. Microscopy shows foam cells in nodular masses and the peculiar multinucleated giant cells with hemosiderin pigmented monocytes with increased rate of recurrence in diffuse form than the localized form of TGCT [7]. Treatment protocol involves partial synovectomy for localised form of TGCT & partial to complete synovectomy for the diffuse form of the disease (Open/Arthroscopic) with or without external beam radiation therapy [8]. Recurrence rates are almost none in local TGCT cases but despite its benign histological appearance, Diffuse TGCT has a high but variable recurrence rate of 8% to 60% [9]. Coming on to the present case on X-ray multiple loose bodies were seen in the knee joint with effusion which was initially thought to be synovial chondramatosis due to its typical presentation. After arthrotomy by midline incision multiple loose bodies were removed. The largest was found to be 7 X 5 X 2.5cm, which has pedunculated attachment to synovium which was severed with cauterty, (Fig-1, 2). Hemosiderin pigmentation is more commonly seen in diffuse form of TGCT than in its localized form [10, 11] as seen in this case there were reports in literature stating loose bodies as large as 10cms in the knee [12], but TGCT presenting with loose bodies is rare. Although loose bodies associated with TGCT has been reported as 2.5cms by Robert *et al*. [11], the loose bodies extracted from our case are so far one of the largest reported in the literature. The giant loose bodies found by others were in relation to other conditions-Dr. Kaushal [13] (OA knee) & by Dr. Ekjot singh *et al*. [12] (OA knee) & by Pandey *et al*. [14] (Synovial chondramatosis).

Conclusion

There were reports in literature stating loose bodies as large as 10cms in the knee but they were in relation with other conditions like Osteoarthritis of knee or synovial chondramatosis, but TGCT presenting with loose bodies is rare. The loosebodies extracted from our case are so far one of the largest reported in the literature.

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