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Synovial Chondromatosis of Knee Managed with Combined Arthroscopic and Limited Open Technique: A Case Report

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ABSTRACT

Synovial chondromatosis is a condition affecting the synovium, leading to severe joint disability and dysfunction, with surgical management, either open or arthroscopic, being the primary treatment approach. We present a case of a 35-year-old male patient with a 12-month history of right knee pain and swelling who underwent arthroscopic excision of intra-articular loose bodies, combined with a limited open technique for extra-articular loose bodies and showed significant improvements immediately from postoperative day 1, including reduced knee joint volume and enhanced knee range of motion (0°-140°), with no recurrence noted at the 12-month follow-up. This case highlights the effectiveness of combining arthroscopy and mini-arthrotomy techniques for managing synovial chondromatosis, particularly in cases with large loose bodies, achieving favorable clinical and functional outcomes.

1. Introduction

Synovial chondromatosis is a rare, benign condition characterized by abnormal cartilage growth in the synovium, leading to severe disability and dysfunction of the affected joint. This condition can occur in any synovial joint, but the knee is the most commonly affected. The earliest recorded description of synovial chondromatosis in the knee dates back to 1558, courtesy of Ambrose Pare.[1] Later, in 1813, Laennac proposed that intra-articular loose bodies originate from sub synovial tissues.[2] Typically, synovial chondromatosis presents as a monoarticular disease, although rare instances of multiple joint involvement have been documented in the literature. A hallmark of synovial chondromatosis is the formation of cartilaginous or osteochondral bodies within the synovium.[3] These bodies can be either intra-articular or extra-articular.[4] Over time, the cartilaginous tissue undergoes calcification and ossification, developing multiple osteochondral nodules. Clinically, patients with synovial chondromatosis typically present with symptoms such as pain, swelling, and limited joint mobility.[5] Treatment primarily involves surgical intervention, which can be performed through open or arthroscopic procedures.[6, 7] Hereby, we present a case report in which we have discussed diagnostic methodology and management. For intra-articular loose bodies, arthroscopic loose body excision was done with all arthroscopic methods combined with limited arthrotomy for extra-articular loose bodies.

2. Case presentation

A 35-year-old Indian factory worker sought the services of the Department of Orthopedics, Gautam Buddha Chikitsha Mahavidhayala, Dehradun, India, with a complaint of pain in his right knee that he had for around twelve months. The patient reported that the pain had started about twelve months earlier and had progressed from sporadic pain to become continuous, with moderate to severe intensity. For the last two months, the patient had reduced range of movement in his right knee and difficulty walking and squatting. On physical examination of the right knee, mild synovial effusion diffused tenderness around the knee, and multiple non-tender bony hard swellings were palpable. The patient had a fixed flexion deformity of 15, with further flexion up to 110 degrees. Multiple free loose bodies were palpable in the supra-patellar region. No ligamentous instability and no vascular or neurological compression symptoms were observed. Other joints appeared to be normal. A plain radiograph of the left knee joint, anteroposterior and lateral view, revealed multiple radiopaque, round and

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oval, calcified loose bodies in the intra-articular and extra-articular surfaces (Fig. 1).

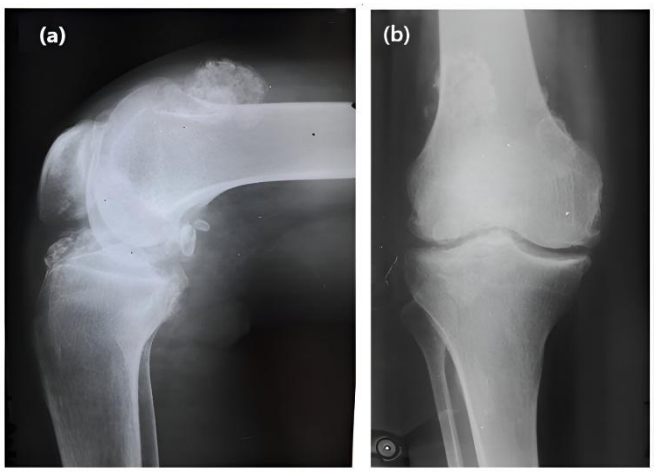

Fig. 1. Pre-op radiographs (a) lateral and (b) anterior-posterior (AP) view of a knee joint showing multiple loose bodies.

During surgery, arthroscopic synovectomy, debridement, excisional biopsy, and loose body removal were performed under spinal anesthesia. By using the proximal anterolateral and anteromedial portal, the diagnostic arthroscopy of the right knee was done, which revealed multiple osteochondromas were found adherent to the thickened synovium (Fig. 2a) and loose bodies within the joint space globally ACL and PCL were found to be intact. Cartilage was abraded with patchy loss (Fig. 2b). A partial synovectomy and removal of loose bodies were done, and all visible loose bodies were removed. Limited supra-patellar arthrotomy was done using a direct midline approach for large extra-articular loose bodies arising from the supra-patellar area and extending into the quadriceps (Fig. 2c). Multiple loose bodies were removed from this region, the largest of which was 3.5 X 2.5 cm (Fig. 2d). Loose bodies were subjected to histopathological evaluation, which suggested synovial chondromatosis (Fig. 3).

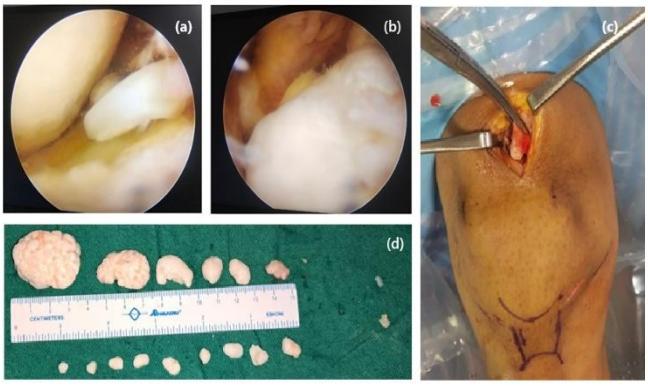

Fig. 2. (a) Intraoperative arthroscopic images showing osteochondromata adherent to the thickened synovium (b) Intraoperative arthroscopic images showing numerous loose bodies. (c) An intra-operative (anterior-midline approach) image showing a mini-open technique for removal of large extra-articular loose bodies. (d) Fifteen calcified loose bodies were removed from the right knee joint space and collected. The largest size noted is 3.5 X 2.5 cm.

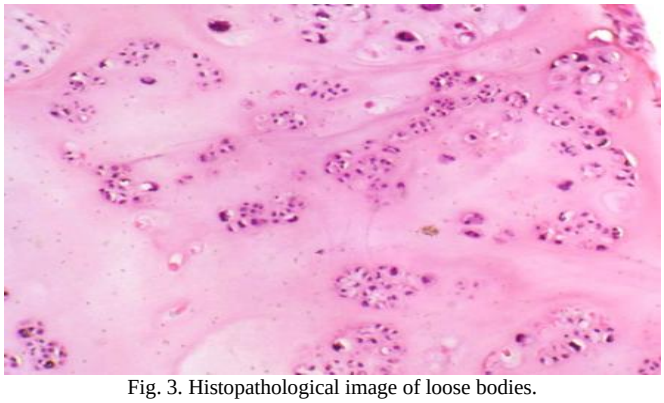

Fig. 3. Histopathological image of loose bodies.

Postoperatively, the patient started knee active range of motion exercises as tolerable on postoperative day 1, and post-procedure radiographs were done (Fig. 4). Quadriceps and Hamstring exercises were started on postoperative day 3. The knee range of motion gained was 0 - 125° on postoperative day 7 (Fig. 5a). The patient was regularly followed up at 1-month intervals as an outpatient. The clinical evaluation at the sixth month postoperatively showed a marked reduction in the volume of the knee joint and further improvement in the knee range of motion at 0° − 140° (Fig. 5b). There was no recurrence at six months after the surgery.

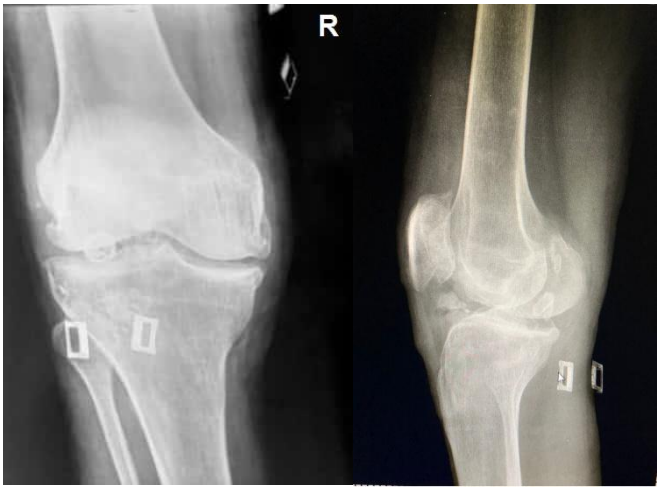

Fig. 4. Postoperative anteroposterior (AP) and lateral view of the right knee joint.

Fig. 5. (a) Range of motion of the right knee achieves a functional range of motion on the postoperative seventh day. (b) The range of motion of the right knee at 6 months postoperative.

3. Discussion

Synovial osteochondromatosis is typically an idiopathic condition, but it can also occur secondary to various underlying diseases, including osteoarthrosis, neuropathic arthropathy, and osteoarthritis. This condition usually presents as a monoarticular disease, rarely affecting bilaterally, with the knee being the most commonly affected joint.[8] Synovial osteochondromatosis exhibits a significant gender disparity, with males being two to three times more likely to develop the condition than females. The disease typically affects individuals between the ages of 30 and 50, with the highest incidence observed within this age group.[9] The disease process of synovial chondromatosis can be divided into three distinct phases: Phase 1: Characterized by the metaplasia of the synovium, accompanied by active synovitis, but without the presence of loose bodies. Phase 2: Marked by active synovitis and the formation of loose bodies, which are initially cartilaginous. Phase 3: Characterized by the calcification of loose bodies, accompanied by subsidence of synovitis.[10] The primary management strategy for synovial chondromatosis is surgical intervention. Both open and arthroscopic procedures can be employed to treat this condition. To achieve definitive resolution, surgical removal of loose bodies combined with synovectomy is the most effective treatment approach. Recent studies have reported a recurrence rate of 3% to 60% when loose body removal is performed alone. A study published in 2006 by Lim et al. found that incomplete synovectomy resulted in a higher recurrence rate. However, it is essential to weigh the benefits of complete synovectomy, which offers a lower recurrence rate, against the increased surgical risk associated with this more extensive procedure.[11] Recent literature recommends arthroscopic surgery as the preferred treatment approach for synovial chondromatosis. This method offers several advantages over open surgery, including lower morbidity, a shorter rehabilitation period, earlier return to functional activities, reduced postoperative pain, and active range of motion restoration.[12] Depending on the size of the loose bodies, they can be removed through arthroscopy or arthrotomy. In this reported case, an arthroscopic approach to the knee was performed. While recognizing the multiple large-size loose bodies, an arthroscopic approach was made as it would allow a more thorough synovectomy, which is important to prevent recurrence. A smaller incision in arthroscopy will also lead to less scarring and fibrosis, thus less joint stiffness postoperatively. However, during the procedure, a mini-arthrotomy at the anterior midline was done to remove the rest of the loose particles, which were extra-articular. Significant improvement in the knee joint range of motion was noted as early as two weeks postoperatively. This is most likely due to the small incision of arthroscopic portals and mini-arthrotomy, which allow quick rehabilitation. The functional outcome slightly improved at 6 months, and there were no signs of recurrence.

4. Conclusion

Surgical management of synovial osteochondromatosis using the arthroscopic technique for synovectomy and removing loose bodies effectively prevents recurrence and joint stiffness. However, a combined approach of arthroscopy and mini-arthrotomy may provide optimal clinical and functional outcomes for cases with large, loose bodies. Ultimately, the goal of treatment should be to minimize the risk of recurrence, and a combined arthroscopic and limited open-operative technique for synovectomy and complete excision of the loose bodies is recommended for adequate management with minimal postoperative complications.

Conflict of Interest

The authors declared that there is no conflict of interest.

Acknowledgments

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References

[1] Barwell R. Clinical lectures on movable bodies in joints. British medical journal. 1876;1(796):403-05. https://doi.org/10.1136/bmj.1.796.403.

[2] Evans S, Boffano M, Chaudhry S, Jeys L, Grimer R. Synovial chondrosarcoma arising in synovial chondromatosis. Sarcoma. 2014;2014(1):647939. https://doi.org/10.1155/2014/647939.

[3] Rodrigues TC, Serfaty A. MRI Assessment of Benign Tumor and Tumor-Like Synovial Diseases. InSeminars in Roentgenology 2022;57(3)191-200. https://doi.org/10.1053/j.ro.2022.02.005.

[4] Aydogan NH, Kocadal O, Ozmeric A, Aktekin CN. Arthroscopic treatment of a case with concomitant subacromial and subdeltoid synovial chondromatosis and labrum tear. Case Reports in Orthopedics. 2013;2013(1):636747. https://doi.org/10.1155/2013/636747.

[5] Paraschau S, Anastasopoulos H, Flegas P, Karanikolas A. Synovial chondromatosis: A case report of 9 patients. EEXOT. 2008;59(3):165-9.

[6] Gerard VY, Zema RL, Johnson RW. Synovial osteochondromatosis: a case report and review of the literature. Journal of the American Podiatric Medical Association. 2002;92(4):247-54. https://doi.org/10.7547/87507315-92-4-247.

[7] Qi PP, Xu ZW. A case of synovial chondromatosis of the knee with 87 free bodies and review of literature. European Review for Medical & Pharmacological Sciences. 2024;28(7):2670.

[8] Neumann JA, Garrigues GE, Brigman BE, Eward WC. Synovial chondromatosis. JBJS reviews. 2016;4(5):e2. https://doi.org/10.2106/JBJS.RVW.O.00054.

[9] Temple HT, Gibbons CL. Tumors and tumor-related conditions about the knee. Oxford Textbook of Orthopaedics and Trauma. 2002;1:1153-4.

[10] Milgram JW. Synovial osteochondromatosis: a histopathological study of thirty cases. JBJS. 1977 Sep 1;59(6):792-801.

[11] Lim SJ, Chung HW, Choi YL, Moon YW, Seo JG, Park YS. Operative treatment of primary synovial osteochondromatosis of the hip. JBJS. 2006 Nov 1;88(11):2456-64. https://doi.org/10.2106/JBJS.F.00268.

[12] Ozmeric A, Aydogan NH, Kocadal O, Kara T, Pepe M, Gozel S. Arthroscopic treatment of synovial chondromatosis in the ankle joint. International Journal of Surgery Case Reports. 2014;5(12):1010-3. https://doi.org/10.1016/j.ijscr.2014.10.083.

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