



## TOTAL KNEE REPLACEMENT WITH SYNOVECTOMY IN SYNOVIAL CHONDROMATOSIS

### Orthopaedics

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### ABSTRACT

**Introduction:** A synovial chondromatosis is a rare benign neoplasm on the synovium. Although described as a benign disease, it can be very destructive and can cause severe osteoarthritis and pain. This is the first case encountered by us with such a degree of osteoarthritis and got treated by a total knee arthroplasty.

**Case presentation:** A 55 year old man presented with right knee pain and repeated effusion caused by diffuse intra-articular and extra-articular synovial chondromatosis. He underwent careful preoperative imaging and planning followed excision of the loose fragments with total knee replacement and synovectomy in order to completely eradicate the disease. He has regained full range of movement and is free of his symptoms.

**Conclusions:** Although synovial chondromatosis is described as a benign disease, it can be very destructive and debilitating. A challenging management dilemma arises when confronted with both synovial chondromatosis and osteoarthritis.

### KEYWORDS

Total Knee Arthroplasty, High Tibial Osteotomy, Loose Body, Synovial Chondromatosis, Unicompartmental Knee Replacement

### INTRODUCTION :-

A synovial chondromatosis is a rare benign neoplasm that is caused by metaplasia of the synovium into chondrocytes [1]. The aetiology of the disease is uncertain. Milligram classified the disease into three phases: early (active intrasynovial disease but no loose bodies), transitional disease (active disease and loose bodies), and late (multiple loose bodies but no intrasynovial disease) [2].



**Fig. 1 pre op xray**

The disease is commonly mono-articular and mostly affects the knee [3]. It occurs twice as frequently in men than women and usually presents with increasing joint pain and swelling during the third to fifth decade of a patient's life [4]. A patient with synovial chondromatosis experiences a decreased range of motion, palpable swelling, effusion, and crepitus [4].

The disease is usually intracapsular, but can also be extracapsular on rare occasions [5]. In this case report, we describe a patient with both intra- and extra-articular diseases. To the best of our knowledge, this is the first case in our institution with such an extensive presentation of intra- and extra-articular disease of the knee joint.

### CASE REPORT :-

A 55-year-old man presented with a 7 year history of progressively worsening right knee pain with associated swelling. The pain was present when the patient was at rest, and worsened when the leg was bearing weight, thus restricting his walking to short distances. Patient complained of pain while standing up from chair, climbing stairs and squatting.

He had intermittent episodes swelling which lasted for 3-4 days and subsided on rest. He denied any symptomatic night pain, locking, or a giving way of his knee. The patient was otherwise fit and well. His medical history was unremarkable and he was only taking ibuprofen for the pain.

Upon examination, the patient had tenderness in the medial joint line and wasting of vastus medialis muscle. On palpation no intra-articular swelling was demonstrable. He could fully extend his knee, and flexion was not restricted but painful. There was no ligamentous instability and a McMurray test proved equivocal. An examination of the patient's hip revealed no abnormality.

A plain radiograph of the patient's knee B/L knee in standing position revealed multiple calcific densities within the soft tissues surrounding the right knee joint (Figure 1). Although some of these appeared to lie within the capsule, the majority appeared to be outside of it. The findings were however thought to be consistent with very extensive synovial chondromatosis (Figure 1).

The patient was planned for a total knee replacement and excision of the loose bodies resembling the osteochondral fragments on the x ray.

Through a midline parapatellar approach, and mid vastus approach to the knee joint, skin and soft tissue retracted and synovium reached.

Multiple loose bodies found in the extra as well as intra synovial space, with some attached to the synovium and the size ranging from a 3mm to about 4 cm. A total synovectomy performed and the loose bodies excised.



**Fig. 2 exposure with intra-op**

The field was then prepared for a total knee replacement by proceeding with the usual tibial cuts, distal femoral cuts.

The ligaments erased and appropriate cuts were taken using the extramedullary jig for the tibia and intramedullary jig for the distal femur.



fig. 3 post excision with synovectomy

The flexion and extension gap was checked and the construct was found to be stable so we proceeded with the implant placement. The construct was stable and the wound was closed in layers with the drain placed in situ.



fig.4 post total knee arthroplasty

Post operative protocol – patient was advised static quadriceps exercises on day 2 of surgery and knee range of motion exercises from day 4. Patient was mobilised with non-weight bearing walking with walker support till 4 weeks and full weight bearing by the end of 8 weeks post operatively.

#### DISCUSSION :-

Cartilage cells are absent inside the synovial membrane. It follows therefore that the development of synovial chondromatosis depends on metaplastic transformation of the synovial cells into chondrocytes via an unknown stimulus [1]. These chondrocytes become pedunculated and encrusted inside the synovium and eventually expelled into the joint as loose bodies [6].

Extra-articular synovial chondromatosis is rare, but the combination of intra- and extra-articular diseases described here is an extremely rare condition. Given the initial X-ray image of large extra-articular calcification, we felt that the patient was more likely to have idiopathic tumoral calcinosis. Our patient, however, was Caucasian and the x ray scan showed a single lesion with an monoarticular involvement. Florid synovial chondromatosis was thus a more likely diagnosis. This was also confirmed by a histological examination.

Extra-articular diseases can be classified as tenosynovial chondromatosis or bursal chondromatosis depending on the origin [8]. In this case, we propose that either intra-articular synovial chondromatosis had penetrated the patient's popliteal bursas, or bursal chondromatosis had infiltrated his knee joint. To the best of our knowledge, this pattern of disease in the knee has only been reported twice in the literature and never to this extent [5, 9]. This obviously raises concerns regarding a possible transformation to synovial

chondrosarcoma. However, histological investigation revealed no significant nuclear atypia, thus ruling out malignancy. The literature reports only 33 cases of malignant transformation in the setting of histologically confirmed synovial chondromatosis [6]. A key feature of all these cases is the recurrence of benign disease prior to a diagnosis of malignant disease.

The extent of the disease and the presence of severe osteoarthritis also presented a challenging management problem. The combination of synovial chondromatosis and degenerative arthritis is a common finding in the advanced stage of the disease [3]. Primary synovial chondromatosis over time can lead to cartilage degeneration by mechanical wear via the loose bodies and through nutrient deprivation to the articular cartilage [3]. However, degenerative arthritis can lead to secondary synovial chondromatosis [3]. As radiotherapy and chemotherapy have no effect on synovial chondromatosis, surgical excision is the preferred treatment [4]. In cases that involve localized intra-articular disease, complete excision of the abnormal synovium seems to provide a cure. Generalized intra-articular disease with pain and swelling requires total synovectomy and a removal of the loose bodies. Extra-articular disease treatment aims for complete excision [10].

Three surgical options were considered, namely high tibial osteotomy (HTO), excision of the synovial and bursal chondromatosis alone, or excision combined with a total knee replacement. The ideal treatment for severe arthritis limited to the medial compartment in someone within the same age range as our patient is a unicompartamental knee replacement. However, without complete synovectomy, our patient's synovial chondromatosis could recur and thus compromise his joint replacement. HTO with realignment of the joint forces may lengthen the lifespan of the joint and delay the need for joint replacement. Total knee arthroplasty (TKA) has been proven to be an effective treatment for synovial chondromatosis.

However, even with complete synovectomy alongside a TKA, recurrence of the disease has been reported [3]. This is probably due to incomplete synovectomy at the time of operation, which leaves remnants of pathological synovium [3]. Excision of the chondromatosis formed the initial surgical treatment plan.

Therefore our plan primarily included excision of the fragments with synovectomy and a total knee replacement since the patient fell into grade IV of KELLEGREN AND LAWRENCE classification of degenerative joint disease.



fig. 5 post TKR

#### CONCLUSIONS

A synovial chondromatosis is a rare condition but one which can be highly aggressive and destructive. This case, with its rare presentation of intra- and extra-articular disease, highlights the importance of careful clinical assessment, lateral thinking, appropriate use of investigation, and careful pre-operative planning so as to relieve the patient of his symptoms.

#### REFERENCES :-

1. Bullough P: Benign Soft-Tissue Tumours. Orthopaedic Pathology. Edited by: Bullough P. 2004, New York: Mosby, 290-293. 4Google Scholar
2. Symeonides PJ: Bursal chondromatosis. Bone Joint Surg Br. 1966, 48 (2): 371-373. Google Scholar
3. Dunn AW, Whisler JH: Synovial chondromatosis of the knee with associated extracapsular chondromas. J Bone Joint Surg Am. 1973, 55 (8): 1747-1748.
4. Jeffreys TE: Synovial chondromatosis. J Bone Joint Surg. 1967, 3: 530-534. Google Scholar
5. Miligram JW: Synovial osteochondromatosis. J Bone Joint Surg. 1977, 59-A: 792-793. Google Scholar
6. Ackerman D, Lett P, Galat DD, Parvizi J, Stuart MJ: Results of total hip and total knee

- arthroplasties in patients with synovial chondromatosis. *J Arthroplasty*. 2008, 23 (3): 395-400. 10.1016/j.arth.2007.06.014.View ArticlePubMedGoogle Scholar
7. Temple HT, Gibbons CL: Tumors and tumor-related conditions about the knee. Oxford Textbook of Orthopaedics and Trauma. Edited by: Bulstrode C, Buckwalter J, Carr A, Marsh L, Fairbank J, Wilson-Macdonald J, Bowden G. 2002, Oxford: Oxford University Press, 2: 1153-1154. 1Google Scholar
  8. Sim FH, Dahlin DC, Ivins JC: Extra-articular synovial chondromatosis. *J Bone Joint Surg*. 1977, 4: 492-495.
  9. Synovial chondromatosis of the knee: A comparison of removal of the loose bodies alone with arthroscopic synovectomy Author links open overlay panelM.B., Ch.B., F.R.C.S.(C)D.J.Ogilvie-HarrisM.D.K.Saleh Show more [https://doi.org/10.1016/S0749-8063\(05\)80088-X](https://doi.org/10.1016/S0749-8063(05)80088-X)
  10. BARNETT, C. H., DAVIES, D. V., and MACCONAILL, M. A. (1961): Synovial joints. London: Longmans, Green. JAFFE, H. L. (1959): Tumors and Tumorous Conditions of the Bones and Joints. Philadelphia : Lea and Febiger. JONES, H. T. (1924) : Loose Body Formation in Synovial Osteochondromatosis. *Journal of Bone and Joint Surgery*, 6, 407.