

Synovial Chondromatosis Presenting as a Locking Sensation of the Knee in a 65 Year Old Female Patient

UJJVAL DELIWALA, PINAKIN VORA, KALPESH MEHTA, VISHAL MEHTA, VIVEK KHAKHAR, NIDHI VORA

ABSTRACT

The knee joint is the most common site of synovial chondromatosis with a high prevalence in middle aged males. The following is the description of a 65 year old female who presented with a locking sensation during the motion of her right knee joint every time during movement, which was a less common occurrence at her age. The loose bodies in the right knee joint

were excised as much as possible by using arthroscopy. The patient was asymptomatic when she moved her knee after the arthroscopic synovectomy and the removal of the loose bodies. In spite of less chances of the malignant transformation of the synovial chondromatosis, a long term follow up has still been recommended in this female due to the supposed genetic abnormality.

Key Words: Synovial chondromatosis/Calcified multiple loose bodies/Arthroscopy

INTRODUCTION

Synovial chondromatosis is an unusual proliferative and metaplastic disorder which is characterized by the formation of multiple cartilaginous nodules in the synovial membranes of the joint, tendon sheath and the bursae [1, 2, 3, 4]. It is nearly mono articular, multiple joints are rarely affected and most commonly, it affects the knee joint. Synovial chondromatosis may occur in patients of any age group, although it is most often diagnosed during the third to fifth decades of life. It occurs twice as commonly in males as in the female patients [5,6,7,8,9]. Between the two forms of the disease, secondary synovial chondromatosis is typically presented with intra-articular osteocartilagenous loose bodies against a background of degenerative joint disorders whereas the relatively uncommon primary form is predominant with synovial soft tissue masses. This case study examines a 65 year old female who presented with synovial chondromatosis of the right knee with a locking sensation for 6 months, which was managed with arthroscopic synovectomy and removal of the loose bodies. Synovial chondromatosis can lead to complications which include degenerative arthritis, palsy and malignant transformation to synovial chondrosarcoma [2,10]. The malignant transformation of synovial chondromatosis to a low grade chondrosarcoma has

been documented but it is rare [2,10]. Based on the clinical symptoms of the patients, the differential diagnoses which are often considered are stress injury or fracture, trauma, patellofemoral malalignment, bursitis, infections, benign and malignant tumours and arthritis.

CASE REPORT

A 65 year old female suffered for 6 months from a painful disability with a locking sensation of the right knee during the motion of the knee joint. No traumatic history of the knee, systemic disease, loss of body weight, fever or night pain was noted during the present illness.

Her physical examination revealed a normal alignment with a full range of motion in the affected knee. The MacMurray's test, Lachman test, Anterior drawer test and the Posterior drawer test showed negative results, which revealed a lack of evidence for ligamentous laxity.

Radiographical film studies (X-ray) of the right knee revealed no mass or bony lesion and no marginal erosion of the bone. The X-ray of the right knee showed multiple calcified loose bodies, which were more in the lateral compartment [Table/Fig-1a, b].



[Table/Fig-1a & b]: Radiographic antero-posterior and lateral view showing right knee synovial chondromatosis with multiple calcified loose bodies



[Table/Fig-2a]: Intraoperative arthroscopic image showing multiple intraarticular calcified loose bodies in the right knee joint



[Table/Fig-2b]: Multiple sessile and pedunculated calcified loose bodies with synovial attachment after arthroscopic excision

The patient underwent arthroscopy and the loose bodies were easily visible [Table/Fig-2a]. The patient underwent arthroscopic synovectomy and the removal of the loose bodies as much as possible was done via a three portal arthroscopy including the anteromedial, anterolateral and accessory superolateral [Table/Fig-2b]. The operative findings were synovitis and multiple calcified loose bodies. Out of these, some bodies were pedunculated (loosely attached with the synovium) and some were sessile (completely attached with the synovium). The loose bodies varied in size from 4 mm to 12 mm. The microscopic pathological report revealed a hyaline cartilage with a lobulated configuration which was encapsulated by the synovial tissue. This was compatible with synovial chondromatosis. There was no evidence of malignancy in the specimen which was examined.

The post operative recovery progressed without any untoward incident and the patient returned to normal activities without crutches or supportive walkers in the post operative follow up period. The patient became ambulatory without any support within a week postoperatively.

DISCUSSION

A 65 year old female had a locking sensation during the motion of her right knee joint. The physical examination revealed a good functional stability, without any abnormal findings. The loose bodies in the right knee joint were removed as much as possible by arthroscopy. The lesion was confirmed to be a synovial chondromatosis histologically. The patient was asymptomatic when she moved her knee after the arthroscopic synovectomy and removal of the loose bodies.

On the basis of the clinical findings alone, the differential diagnosis of synovial chondromatosis includes numerous other mono-articular conditions such as the calcium crystal deposition disease, chondroma, pigmented villonodular synovitis (PVNS), synovial hemangioma, lipoma arborescens and synovial chondrosarcoma. The clinical presentation, image studies, the gross appearance and the microscopic appearance of the histology helps in the differentiation of each disease.

The knee and hip joints are the most common sites of intra-articular synovial chondromatosis [6,11] and they have been found to arise from uncommon sites such as the distal radio-ulnar joint, the acromioclavicular joint [12], the facet joint [13], the temporomandibular joint, the metacarpophalangeal joint [14], the

spine [15] and the glenohumeral joint [16]. In the present case, it occurred in the common joint but in a less common age group. The term "SNOW STORM KNEE" has been used to describe this condition, as is observed by arthroscopy, which presents the typical appearances of radio-opaque calcification and ossification on the synovial membrane of the involved joint [3]. This appearance was also noted in the present case. Synovial chondromatosis is a disease which principally affects the middle aged group and it occurs twice as commonly in males as in the female patients. Therefore, synovial chondromatosis is a less common occurrence in a 65 year female patient. No definite informative incidence was discussed in the current studies.

There is no uniform radiographical or MR imaging appearance for synovial chondromatosis. On the other hand, radiography is an often performed first, in order to rule out trauma, fractures or destructive bone lesions. Synovial chondromatosis may be seen in radiographical studies with typical appearances of radio-opaque calcification and ossification, although it may not be detected in 5-30% of the cases if the loose bodies lack the calcification [17]. The ossification and the calcification are dependent on the maintenance of the synovial blood supply and they may or may not be associated with the cartilage portion of the lesion [3]. Moreover, calcification and ossification tend to occur together [7]. In the present case, a characteristic radiographical finding of synovial chondromatosis was noted (Figure 2, A and B). In fact, we were able to identify lots of loose bodies during the arthroscopic surgery. The reason for this is a lack or inadequate ossification and calcification of some of the loose bodies.

CLASSIFICATION

Synovial chondromatosis can be divided into two categories: primary and secondary. The exact pathogenesis of primary synovial chondromatosis is still unknown. In a study by James et al [6], primary synovial chondromatosis was not found to be related to genetics. However, in recent researches, chromosomes 1p13, 12q13 and 6 have been found to play an important role in primary synovial chondromatosis, including some known tumour suppressor genes, growth factors and oncogenes in the formation of primary synovial chondromatosis [2,5]. Synovial chondromatosis may also be secondary to other joint disorders with synovial irritation such as degenerative osteoarthritis (most common), osteonecrosis, osteochondritis dissecans, trauma, neurological osteoarthopathy, rheumatoid arthritis and tuberculosis [6]. The radiological

characteristics of primary and secondary synovial chondromatosis are quite different, as was discussed by James et al [6]. In this case report, we speculated primary synovial chondromatosis due to the observation of almost the same ovoid shaped appearance of loose bodies in the arthroscopy, with no underlying joint disorders and with normal blood parameters.

TREATMENT OPTIONS

The treatment of either primary or secondary synovial chondromatosis requires surgery, which involves the removal of the loose bodies arthroscopically and by synovial excision, or more rarely, excision followed by joint arthroplasty [18]. The recommended treatment is the combined removal of the loose bodies with synovectomy due to the lower recurrent rates by the use of this method [19]. For the knee, arthroscopic synovectomy has replaced open synovectomy, with better results. Arthroscopy of the knee plays an important role not only in the diagnosis of chondromatosis but also in its treatment. Our present case also underwent this preferred treatment.

On a clinical basis, malignant transformation needs to be considered if a rapid recurrence following synovectomy, a sudden exacerbation of the symptoms or the extension of the process beyond the joint capsule occur [6,20]. On the basis of a pathological examination, the microscopic features which suggest a malignant transformation include a chondrocytic arrangement in sheets without a clustering architecture, a myxoid change in the stroma, a necrotic change and rarely, mitotic figures [8,21]. A radiological evidence of bony invasion or soft tissue/bone invasion on MRI should raise suspicion of a malignant change [2]. Neither the suddenly deteriorating symptoms and signs during the post operation follow up, nor the pathological features, were considered to be a malignant transformation in this case. Recently, there has been no research which has discussed the relationship between synovial chondromatosis (either primary or secondary) and malignant transformation, genetic abnormalities or the tendency of malignant transformation in either primary or secondary synovial chondromatosis. Due to the suffering which is inflicted by primary synovial chondromatosis, I suggest the importance of regular follow-up.

The benign nature of this lesion, with a rare incidence of malignant transformation and little possibility of recurrence, in patients who have received previous arthroscopic surgery, make the outcome favourable if a regular long term follow-up is maintained.

REFERENCES

- [1] Apte SS, Athanasou NA. An immunohistological study of cartilage and synovium primary synovial chondromatosis. *J pathol*.1992; 166:277-281.
- [2] Ko E, Mortimer E, Fraire AE. Extra articular synovial chondromatosis: Review of epidemiology, imaging studies, microscopy and pathogenesis. *Int J Surg Pathol*. 2004; 12:273-280.
- [3] Milgram JW. Synovial chondromatosis: a histopathological study of thirty cases. *J Bone Joint Surg [Am]*. 1997; 59:792-801.
- [4] Murphy FP, Dahlin DC, Sullivan R. Articular synovial chondromatosis. *J Bone Joint Surg [Am]*.1962; 44:77-86.
- [5] Buddingh EP, Krallman P, Neff JR, Nelson M, Liu J, Bridge JA, Chromosome 6 abnormalities are recurrent in synovial chondromatosis. *Cancer Genet Cytogenet*. 2003; 140:18-22.
- [6] Crotty JM, Monu JU, Pope TL Jr, Synovial osteochondromatosis. *Radiol Clin North Am*. 1996;34:327-342.
- [7] Davis RI, Hamilton A, Biggart JD. Primary synovial chondromatosis: a clinicopathologic review and assessment of malignant potential. *Hum pathol* 2001;29:683-688.
- [8] Maurice H, Crone M, Watt I. Synovial chondromatosis. *J Bone Joint Surg [Br]*.1998; 70:707-811.
- [9] Norman A, Steiner GC. Bone erosion in synovial chondromatosis. *Radiology* 1986; 161:749-752.
- [10] Kresnik E, Mikosch P, Gallowitsch HJ, Jesenko R, Just H, Kogler D et al., bone erosion and nuclear medicine; *Nucl Med Commun*. 2002; 23:683-688.
- [11] Koge N, Oda M, Yamauchi R, Imai T, Matsumoto H, Yokogushi K. Synovial chondromatosis which presented with cervical radiculopathy: a case report. *Spine*. 2003; 28 :396-400.
- [12] Kudawara I, Aono M, Ohzono K, Mano M. Synovial chondromatosis of the acromioclavicular joint. *Skeletal Radiol* .2004; 33:600-603.
- [13] Coolican MR, Dandy DJ, Arthroscopic management of synovial chondromatosis of the knee. Findings and results in 18 cases. *JBJS (br)*. 1989;71:489-490.
- [14] Hettiaratchy SP, Nanchahal J. Synovial chondromatosis of the metacarpophalangeal joint. *J Hand Surg (Br)*. 2002;27:104-106.
- [15] Gallia GL, Weiss N, Campbell JN, Mc Carthy EF, Tufaro AP, Gukaslan ZL. Vertebral synovial chondromatosis. Report of 2 cases and review of literature. *J Neurosurg Spine*. 2004;1; 211-218.
- [16] Jeon IH, Ihn JC, Kyung HS. Recurrence of synovial chondromatosis of the glenohumeral joint after arthroscopic treatment. *Arthroscopy*. 2004; 20:524-527.
- [17] Fisher M, Modder G. Radionuclide therapy of inflammatory joint diseases. *Nucl med commun*.1998; 23:829-831
- [18] Hallam P, Ashwood N, Cobb J, Fazal A, Heatly W. Malignant transformation in synovial chondromatosis of the knee. *Knee*. 2002; 8: 239-242.
- [19] Ogilvie-Harris DJ, Saleh K. Generalized synovial chondromatosis of the knee: a comparison of the removal of the loose bodies alone with arthroscopic synovectomy. *Arthroscopy*. 1994; 10:166-170.
- [20] Kenan S, Abdelwahab IF, Klein MJ, Lewis MM. Synovial chondrosarcoma which is secondary to synovial chondromatosis. *Skeletal Radiol* 1993; 22:623-626.
- [21] Bertoni F, Unni KK, Beabout JW, Sim FH. Chondrosarcoma of the synovium. *Cancer*. 1991; 67:155-162.

AUTHOR(S):

1. Dr. Ujjval Deliwala

CO-AUTHOR(S):

1. Dr. Pinakin Vora
2. Dr. Kalpesh A. Mehta
3. Dr. Vishal M. Mehta
4. Dr. Vivek Khakhar
5. Dr. Nidhi A. Vora

NAME OF DEPARTMENT(S)/INSTITUTION(S) TO WHICH THE WORK IS ATTRIBUTED:

Govt. Medical College and Sir. T. Hospital, Kalanala, Bhavnagar, Gujarat, India – 364001

NAME, ADDRESS, TELEPHONE, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Ujjval Deliwala
MBBS, M. S. (Ortho), FAANA (USA),
Dip. In Sports Traumatology (Portugal),
Fellow Arthroscopy (USA, Canada)
Mob: 09825225362
E-mail: contact@arthroscopy.in
Website: www.arthroscopyclinic.in

DECLARATION ON COMPETING INTERESTS:

No competing Interests.

Date of Submission: May 24, 2011
Date of Peer Review: May 05, 2011
Date of Acceptance: Jun 08, 2011
Date of Publishing: Aug 08, 2011