A Case Study of Secondary Synovial Osteochondromatosis of knee

Abstract

Synovial osteochondromatosis (SOC) is a proliferative synovial disease. Which has a rare incidence and presents as numerous osteo-cartilaginous nodules in bursae, synovial joints and tendon sheaths.). Diagnostic modalities for synovial chondromatosis include radiographs, CT scan or MRI, with definitive characteristics being determined by histological examination. Therapeutic options commonly include either arthroscopic or open procedures which prevent further articular and peri-articular damage and abolish symptoms The following case report describes a 42 year male patient presenting with a secondary synovial osteochondromatosis of knee managed successfully with open procedure for the removal of the loose bodies.

Keywords : Synovial osteochondromatosis , intra-articular loose bodies, benign

Introduction

"Synovial osteochondromatosis (SOC) is a proliferative synovial disease usually affecting a single joint. Rare in incidence, it usually present as multiple osteo-cartilaginous nodules in bursae, synovial joints and tendon sheaths"[1-3]. Although generally a primary condition, it can occur secondary to osteoarthritis of the affected joint. This disease is prevalent between fourth to fifth decades. Males are more frequently affected than females (1).

"Synovial chondromatosis commonly manifests in single large joints, which includes the knee, hip, elbow, shoulder, ankle, etc" (4). "However, it may occasionally affect smaller joints, including the distal radioulnar, tibio-fibular, metacarpophalangeal and metatarsophalangeal joints" (5-8). "Patients with synovial chondromatosis may either be relatively asymptomatic or may present with pain, swelling and restriction of functional movements of the involved joints" (8). "The etiology factors associated with the disease are uncertain. Synovial chondromatosis generally presents with decreased range of motion, palpable swelling, effusion, and crepitus"(9). "Milligram classified synovial chondromatosis into three distinct phases: Early phase (active intra-synovial disease without loose bodies), transitional phase (active disease with loose bodies), and late phase (multiple loose bodies but with no intra-synovial disease)" (10). Clinical management of the condition is usually surgical and involves either open or arthroscopic procedure (11) to prevent further articular and peri-articular damage and to relieve symptoms (12). "Diagnostic modalities for synovial chondromatosis include radiographs, CT scan or MRI, with definitive characteristics being determined by histological examination" (13). "However, radiography is the most commonly used diagnostic method, as it can identify ossified nodules" (14).

The following study illustrates synovial osteochondromatosis of the knee in a patient with conventional symptoms.

Case report

42-year-old gentleman, farmer by profession, presented to the OPD of the Department of Orthopedics, Government Medical College, Amritsar complaining of pain and swelling left knee for 1 year. The patient reports that the pain started around a year back and progressed from a sporadic type of pain to become continuous and with increasing intensity. The swelling was progressive and led to restriction of movement of the knee from the last 3 months. The patient had great difficulty during the functional range of movements his left knee.
On physical examination, the patient presented with a reduced range of motion and a diminished muscle power.

Patient had a previous history of spinal injury 22 years back due to a fall from height, leading to bilateral lower limb weakness. This gradually led to the development of hip and knee flexion contractures of the left lower limb for which contracture release was performed on the left knee at a private hospital.

Radiographic images of the knee were ordered and these showed an osteoblastic mass in and around the knee joint. For superior explication of the diagnosis, MRI scan of the left knee was requested. This demonstrated numerous similar sized intra-articular loose bodies (largest measuring 4x2.8 cm) of variable signal intensity in the knee joint, supra-patellar bursa, and popliteal fossa, with signs of osteoarthritis grade IV with secondary synovial chondromatosis.

The patient was treated with an open surgical procedure, with total excision of the affected snovium and the removal of the associated loose bodies , which were sent for histopathological examination. Post-operatively skin traction was applied to the limb and physiotherapy was initiated. Two weekly follow-up was done following the operative procedure, and the patient's functional range of motion in this left knee had improved.

The report of the histopathological examination confirmed that this was a case of synovial chondromatosis.

Fig 1 :Pre operative X-Ray

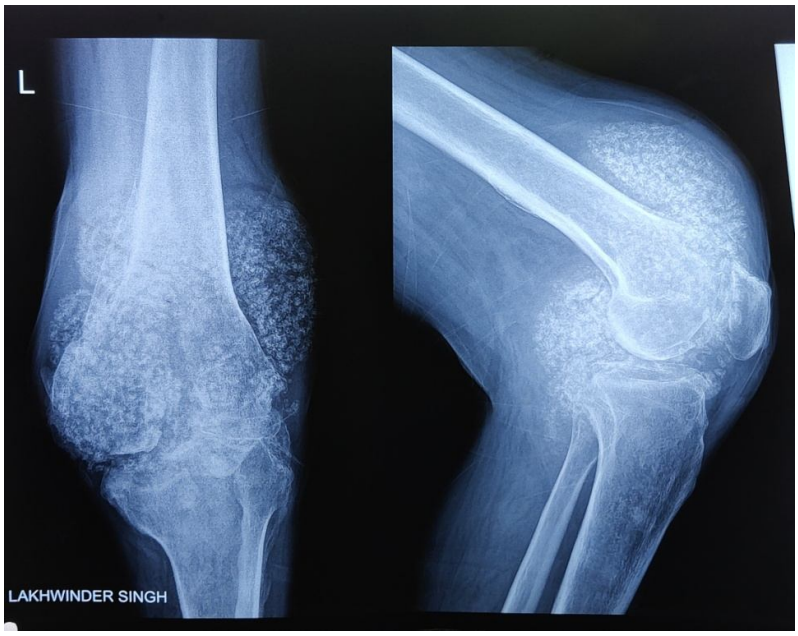
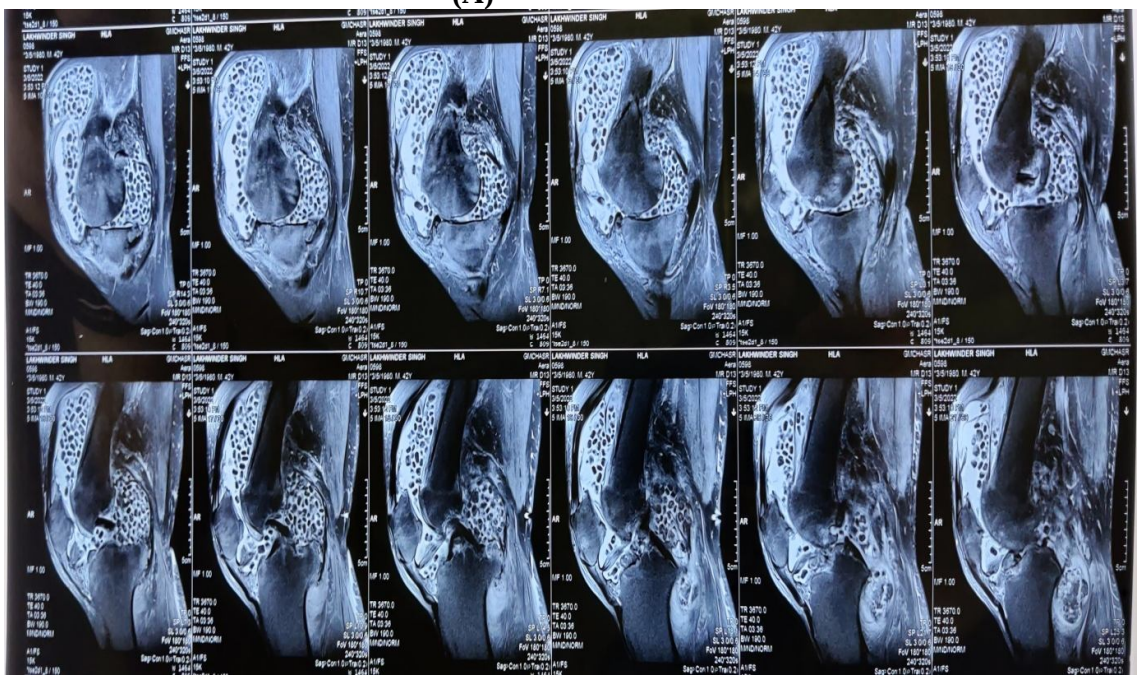


Fig 2(A-B): Pre operative MRI demonstrating numerous osteochondral loose bodies in and around the knee joint.

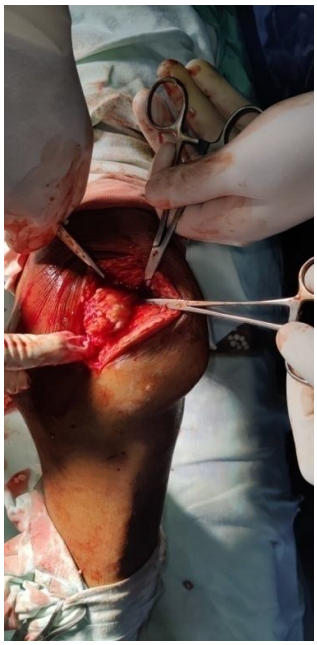
(A)



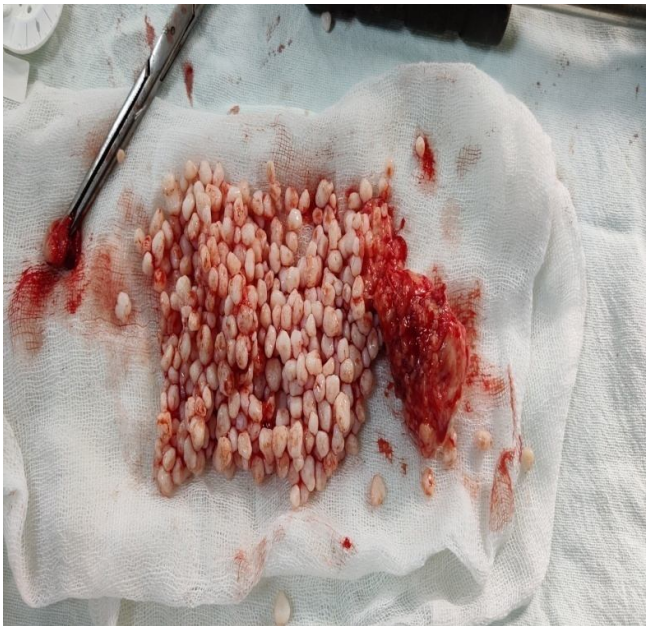
(B)

Fig 3(A-C): Intra operative pictures showing multiple loose bodies.

(A)

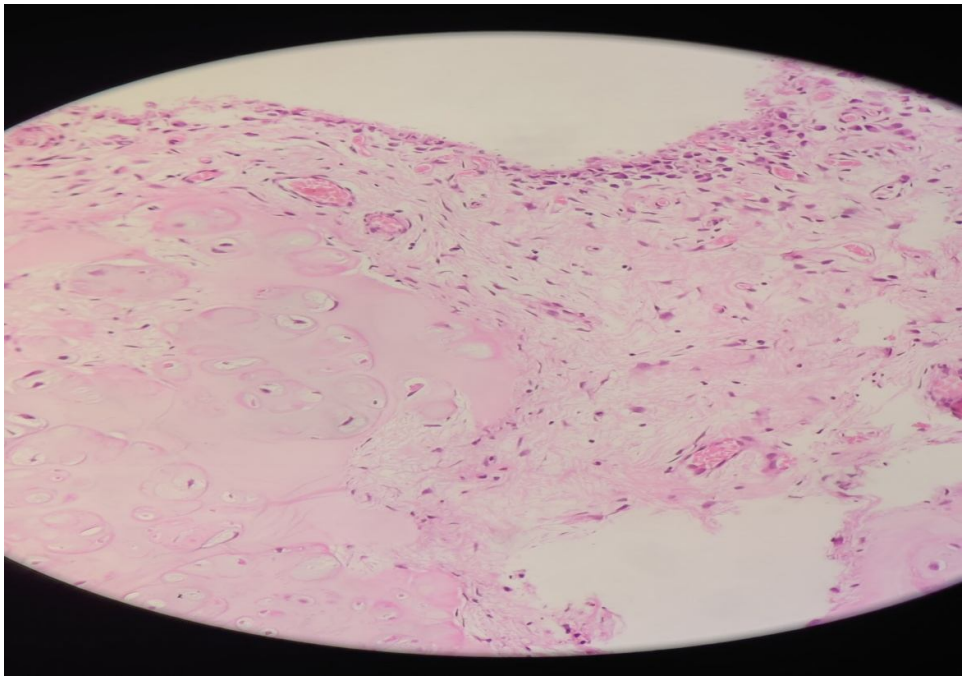


(B)



(C)

Fig 4: Histopathological image of the biopsy specimen showing synovial chondromatosis with active synovitis



Discussion

"Synovial chondromatosis is a benign, infrequent mono-articular neoplasm with an unknown etiology. It can originate from any structure that has synovial tissue. The disease is described by cartilaginous nodule formation secondary to metaplasia of the synovium. These nodules may later get calcified apart from synovial tissue. Although it is generally progressive, it can be self limiting and may regress on its own"[3].

The natural course of synovial chondromatosis includes three phases. Phase 1-.Metaplastic changes of synovium with active synovitis but with absence of loose bodies. Phase 2– Active synovial disease along with the formation of cartilaginous loose bodies. Phase 3 – calcification of loose bodies with subsidence of synovitis [2]. Primary synovial chondromatosis is a very rare mono-articular synovial disease[10]. "Secondary synovial chondromatosis is common, where articular cartilage is shred from the surface and found as loose bodies in the joint. Extra-articular synovial chondromatosis is rare and can be classified as bursal chondromatosis or tenosynovial chondromatosis depending on the site of origin"[15]. "The radiologic features of disease can vary according to the stage of the disease. In the first stage, the swelling is only around the involved joint" [16]. "The most common radiographic finding is the radiopaque free bodies of varying sizes, which can be seen at any site in the joint cavity" [17]. "Calcification of the cartilaginous loose bodies occurs at the last stage and may not be evident in every patient" [18]. Matsumoto et al [19] reported that "the MRI scan is much more helpful than CT scan for the disease. Loose bodies on MRI exhibit a low signal intensity on T1-weighted images and a high signal intensity on T2-weighted images, although there may be a low signal intensity on all images when there is extensive mineralization of the loose bodies" (21) Ultrasound also is an useful diagnostic tool that can show multiple echogenic loose bodies, effusion, and synovial hypertrophy (21).

The differential diagnosis include synovial hemangioma, synovial cyst, pigmented villonodular synovitis(PVNS), lipoma arborescence, and malignant neoplasms, such as synovial sarcoma or synovial chondrosarcoma(19). Patients typically present with an insidious onset and gradually increasing mechanical symptoms, such as pain (> 85% of cases), swelling (42%-58%), and reduced motion (38%-55%) of the affected joint(20,21,22).

"Arthroscopy has circumspectly replaced the traditional incision surgery, as it requires only a small skin incision and causes very little pain; patients exhibit a faster post-operative recovery and arthroscopic removal of the diseased tissue is more effective treatment than loose body removal alone" (23,24). Urbach *et al* (25) proclaimed that "the loose body removal, combined with localized synovectomy, was able to remove the abnormal synovial tissue and prevent a recurrence".

Conclusion

In inference, Synovial osteochondromatosis with monoarticular involvement is a very rare disease. The clinical diagnosis is quite tough. The clinical, radiological, and histological findings should be correlated for reaching to a diagnosis. After the diagnosis synovial excision, as complete as possible, removal of loose bodies, and a close follow-up are warranted.

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

Consent

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

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