

CASE REPORT

A Rare Case of Synovial Osteochondromatosis of the Elbow

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ABSTRACT

Synovial osteochondromatosis is an unusual, rare and benign tumour. This disease is characteristically monoarticular, most commonly found in knee joint, however it is rarely found in the elbow. A 49-year-old Indian man presented to hospital with a 6-month history of pain, swelling, intermittent locking, loss of range of motion of right elbow and a considerable size of elbow with no recollection of associated trauma. Plain radiographs of right elbow showed numerous radiopaque round and oval loose bodies within the right elbow joints. Computer Tomographic (CT) scan showed multiple bony mass within the right elbow joint. Arthroscopic synovectomy, debridement, excisional biopsy and loose body removal combined with mini-arthrotomy of the right elbow was performed due to limited exposure for removal of larger loose bodies. Histopathological examination of the tissue sample is consistent with the diagnosis of synovial osteochondromatosis. The clinical and radiological evaluation at 6th month postoperatively showed marked reduction in the volume of the elbow, further improvement of elbow range of motion of this patient and the Mayo elbow performance score before surgery and at 6 months postoperative, with an increase from 50 to 80 points. Synovial osteochondromatosis of the joints is a rare condition. The signs and symptoms are not specific and may be suggestive of other pathology conditions. Arthroscopic synovectomy and removal of loose body is the standard operative procedure till today. However, combination of arthroscopy and mini-arthrotomy in cases of large loose bodies may provide a good clinical and functional outcome.

INTRODUCTION

Synovial osteochondromatosis is an independent disease which is unusual, rare, benign, chronic, and progressive metaplasia of the synovium of joints^{1, 2}, and may arise from tendon sheath or bursae. Synovial formation of cartilaginous or osteochondral bodies^{3, 4} is the characteristic of synovial osteochondromatosis which are typically intra-articular or may be extra-articular⁵. The cartilaginous tissues undergo calcification and ossification producing multiple osteochondral nodules and the cause of the metaplasia is still unknown. In 1558, this disease was first described in the knee by Ambrose Paré⁶ and later in 1813, Laennec reported that loose bodies within the joints arose from the subsynovial tissues⁷. Brodie confirmed that the loose bodies originated from synovium although he noted that it could arise outside the synovial membrane in some cases⁸.

The disease is characteristically monoarticular, most cases involve the knee¹. A case of synovial osteochondromatosis in the elbow was reported firstly in 1918 by Henderson⁹, but it could involve in any other joints¹.

Synovial osteochondromatosis occurs either in primary or secondary form. High levels of BMP-2 and BMP-4 have been isolated from diseased synovium and free bodies although the molecular basis is still unclear¹⁰. Primary synovial osteochondromatosis is being described as the presence of ectopic cartilage in synovial tissue and as loose bodies

in the joint cavity with or without calcification in the otherwise normal joint, and secondary synovial osteochondromatosis is a similar proliferative disorder of synovium in joints with degeneration of articular cartilage and subchondral bone often containing previous loose bodies that arose secondary to fracturing of the joint surface¹¹. These two forms of synovial osteochondromatosis can be differentiated based on a histopathological examination of the surgically excised loose bodies¹².

We wish to review the clinical and surgical treatment options in a rare case of synovial osteochondromatosis of the elbow. Arthroscopic synovectomy and excision of loose bodies is the standard treatment of synovial osteochondromatosis till today. However due to the limitation of arthroscopic portal to remove the larger loose bodies, mini open arthrotomy was converted and this combination technique has never been never mentioned in any literatures till today and still provide a good clinical and functional outcome.

CASE PRESENTATION

A 49-year-old Indian man with underlying hypertension, hypercholesterolaemia presented to hospital with a 6-month history of pain, swelling, intermittent locking, loss of range of motion of right elbow and a considerable size of elbow with no recollection of associated trauma. Other joints appeared to be normal. The right elbow lacked 15° of full extension and had 100° of flexion (Figure 1A, 1B, 1C).

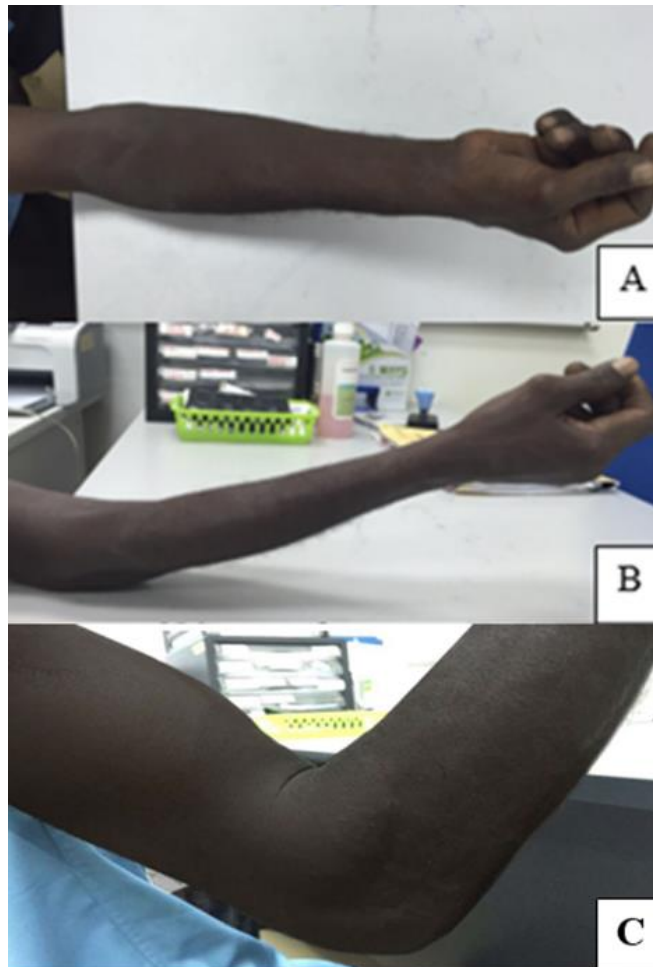


Figure 1 Figure 1A (anterior view), 1B (lateral view in extension) – right elbow lacked 15° of full extension, 1C (lateral view in flexion) – right elbow lacked 45° of full flexion

However, pronation and supination were substantially complete; crepitus was appreciated throughout elbow motion typically when the elbow was brought from flexion to extension and. No vascular or neurologic compression symptoms were

observed. A plain radiographic showed numerous radiopaque round and oval, calcified loose bodies widespread throughout the right elbow joint. Multiple large loose bodies were seen within the coronoid fossa region (Figure 2A, 2B).

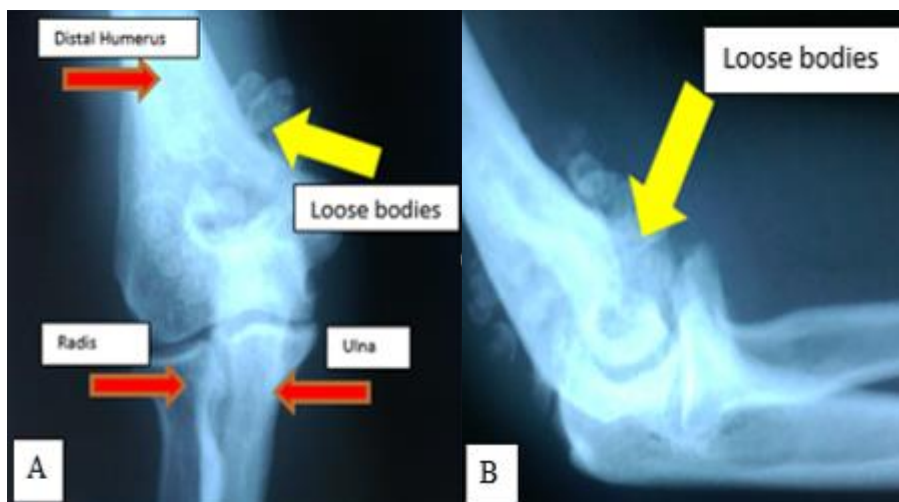


Figure 2 Figure 2A – anteroposterior view and 2B – lateral view. Plain radiographs of right elbow showed numerous radiopaque round and oval loose bodies within the right elbow joints. Note the large loose body within the coronoid fossa region.

CT scan showed multiple calcified nodules with a ring and arc patterns of mineralisation (central focus with peripheral calcification) surrounding the right elbow joint (Figure 3). These changes can be visible

on plain radiographs, however they are better appreciated on CT scan. Diagnosis of synovial osteochondromatosis of the right elbow was made.



Figure 3 CT showed multiple calcified nodules with a ring and arc patterns of mineralisation (central focus with peripheral calcification) surrounding the right elbow joint. Although these changes can be visible on plain films, they are better appreciated on CT

During surgery, arthroscopic synovectomy, debridement, excisional biopsy and loose body removal was performed under general anaesthesia. By using proximal anterolateral and anteromedial approaches, the anterior joint space of the right elbow was visualized, multiple osteochondromata were found adherent to the thickened synovium and loose bodies within the joint space and at the coronoid fossa region (Figure 4). Proximal

posterolateral and direct posterior approaches were used to remove numerous loose bodies. Decision was made to convert to mini open by using direct posterior approach due to difficulty in removing multiple larger sizes of loose bodies via arthroscopic portal sites. A partial synovectomy and removal of loose bodies was done, all visible loose bodies were removed (Figure 5).

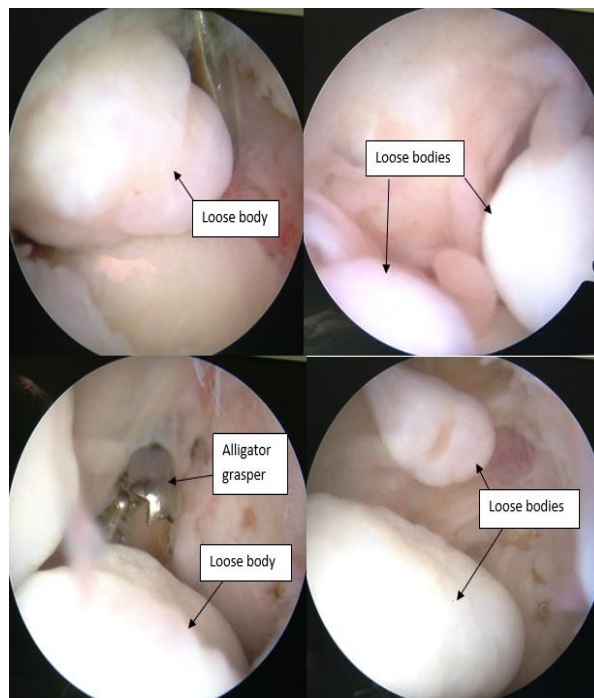


Figure 4 Arthroscopic image of numerous loose bodies



Figure 5 Total of 21 calcified loose bodies removed from the right elbow joint space and collected. Largest size documented 1 × 0.8cm.

Microscopic examination showed hyperplasia of synovial tissue lining with nodules of cartilage embedded in the synovial tissue (Figure 6). Chondrocytes of

varying cellularity with pyknotic dark staining nuclei seen in the nodules with absence of nuclear atypia. Histopathology confirmed the diagnosis.

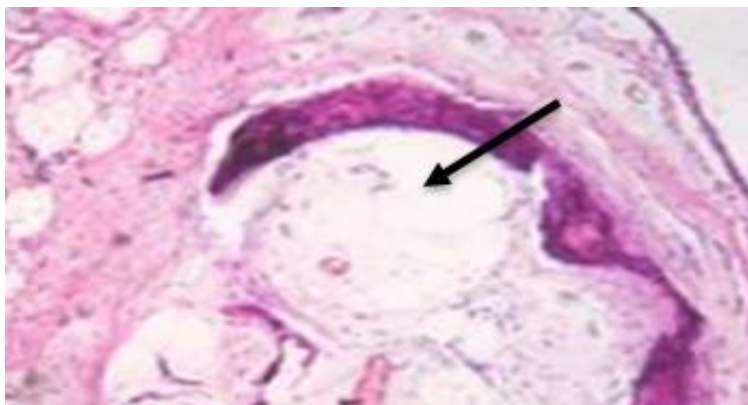


Figure 6 Photomicrograph showed hyperplasia of synovial tissue lining with nodules of cartilage embedded in the synovial tissue (black arrow) (haematoxylin and eosin stain, 10×)

Postoperatively, the elbow was supported in a sling for one week while allowing passive range of motion. Physiotherapy on passive and active range of motion started at week 2 post-operatively and continued for 6 weeks. Oral analgesia (Acetaminophen and NSAID) was prescribed regularly for one week

post-operatively followed by PRN basis. Post-operation day 14, range of movement of right elbow has significantly improved. The right elbow lacked 5° of full flexion and lacked 15° of flexion and had achieved the functional range of motion (Figure 7).



Figure 7 Post operation day 14, the range of motion of the right elbow achieve functional range of motion. The right elbow lacked 5° of full flexion and lacked 15° of flexion.

The clinical and radiological evaluation at 6th month postoperatively showed marked reduction in the volume of the elbow, further improvement elbow range of motion at 5° – 140°, no change in the preoperative pronosupination of the elbow, and no peripheral neurological deficits.

The patient was assessed using the Mayo elbow performance score¹³ before surgery and at 6 months postoperative, with an increase from 50 to 80 points. The Mayo Clinic functional scale considers of four criteria (range of motion, pain, function and stability) and ranges from 10 – 100 points. Resultant scores higher than 90 is excellent; 75 – 89 is good; 60 – 74 is fair, and lower than 60 is poor.

DISCUSSION

Synovial osteochondromatosis of the joints is a rare condition. The signs and symptoms are not specific and may be suggestive of other pathology conditions such as chronic articular infection, osteoarthritis, pigmented villonodular synovitis, mono-articular inflammatory arthritis and periarticular neoplasms like synovial sarcoma¹⁴. The symptoms such as pain and/or loss of range of motion in most cases. Incapacity to perform complete extension may be the first symptoms, followed by locking joints in some cases. In this case, the patient had a painful, loss of range of motion and intermittent locking elbow without any signs and symptoms of compression of nerves.

Conservative treatment and surgery can be used in the treatment of osteochondromatosis. It has been reported that the pain was relieved with conservative management. However, majority of authors recommend surgery, although the extent of the intervention varies. For definitive resolution of the primary synovial chondromatosis, the only effective treatment is surgical removal of loose bodies with or without a synovectomy¹⁵. It has been recently reported that the rate of

recurrence with loose body removal alone has been reported as 3% to 60%¹⁶. In 2006, Lim et al. concluded that incomplete synovectomy resulted in a greater rate of recurrence however one must weigh the lower recurrence rate with complete synovectomy against the higher surgical risk in procedure involving total synovectomy¹⁷.

Arthroscopic surgery is recommended in a recent literature. Arthroscopic management results in lower morbidity, a shorter rehabilitation course, earlier return to function, decreased postoperative pain, and earlier active range of motion compared with open management^{3, 16, 18, 19}. Depending of the size of the chondral loose bodies, removal can be performed via an arthrotomy or arthroscopy. The arthroscopic approach is an effective option available for treating synovial osteochondromatosis of the elbow; it is minimally invasive and has many advantages over traditional open surgery. Immediate and lasting improvement should be expected after the treatment.

Longer postoperative rehabilitation is required for treatment of synovial osteochondromatosis by using open arthrotomy. Full visualization of the entire joint space is often difficult, requiring a manoeuvre to shift the loose bodies from the other aspects of the elbow joints. Arthroscopic techniques have fewer comorbidities and a shorter course of rehabilitation in comparison to open arthrotomy technique.

In this reported case, arthroscopic approach to the elbow was performed initially to both anterior and posterior compartment of the elbow. While recognizing the multiple large size loose bodies, decision for 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 elbow stiffness post-operatively. However, during

the procedure, the working portal had to be enlarged to accommodate the extraction of the loose body. Subsequently, there was loss in the tamponade and collapse of the joint space. Arthroscopic surgery to the elbow joint had to be abandon as arthroscopic procedure in a non-distended joint space may potentially injure the adjacent neurovascular structures. A mini-arthrotomy at the posterior compartment was done to remove the rest of the loose particles.

Significant improvement in the elbow joint range of motion was noted as early as 2 weeks postoperatively. This is most likely due to the small incision of arthroscopic portals and a posterior mini-arthrotomy which allow quick rehabilitation. The functional outcome slightly improves further at 6 months and there was no signs of recurrence.

CONCLUSION

Synovial osteochondromatosis of the elbow is very rare. Arthroscopic synovectomy and removal of loose body is useful to prevent recurrence and elbow stiffness. However, combination of arthroscopy and mini-arthrotomy in cases of large loose bodies may still provide a good clinical and functional outcome.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this case.

CONSENTS

Written informed consent was obtained from the patient to publish the case with its related pictures. A copy of the written consent is available for review by the Chief Editor.

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