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Synovial osteochondromatosis in a master runner - a case report with clinical and radiological findings

Ali Eraslan[1], Ali Eroglu[2], Bekir Erol[3]
[1]*Antalya Education and Research Hospital, Department of Sports Medicine, Antalya, Turkey*
[2]*Erenköy Physical Medicine and Rehabilitation Hospital, Department of Sports Medicine, Istanbul, Turkey*
[3]*Antalya Education and Research Hospital, Department of Radiology, Antalya, Turkey*

Abstract. In this report, we presented a 49 year-old master athlete with synovial osteochondromatosis of the knee joint. His main complaints were pain and limitation of movement. Both intraarticular (posterior recess) and extraarticular (popliteal bursa, semimembranosus tendon) involvements were present in the affected knee. He initially refused the surgery, therefore a conservative treatment was planned. However symptomatic relief was temporary, and after 2 years he inevitably experienced arthroscopic surgery. Returning to sports was achieved, but it was not at previous level. Symptomatic or radiological recurrence was not observed at 18 months follow-up. The presence of extraarticular osteochondromatosis in semimembranosus tendon have been firstly described in the literature.
Key words: *synovial osteochondromatosis, athlete, knee.*
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Introduction

Synovial osteochondromatosis (SOC), is an etiologically unknown disease characterized by development of osteocartilaginous foci within the synovial membrane. According to the classical view, these foci originate from metaplastic transformation of the synovial tissue. But in recent years, the primary form of the disease has been suggested to be benign neoplastic formations caused by cytogenetic abnormalities rather than metaplasia (1,2). On the other hand, secondary form of SOC has been associated with trauma, degenerative joint disease, osteochondritis dissecans and inflammatory arthropathy. Primary SOC can be seen in both young and elderly, while secondary SOC usually occurs after the age of 40. The developmental process of SOC was divided into three phases for the first time by Milgram (3). *Early phase;* active intrasynovial disease only, no loose bodies. *Transitional phase;* both active intrasynovial proliferation and free loose bodies. *Late phase;* multiple free loose bodies, no demonstrable intrasynovial disease.

Knee is the most commonly affected joint in patients with SOC. Hip, shoulder, elbow and ankle also can be affected. Symptoms consist of pain, swelling, restricted joint movement and catching (1). Synovial involvement may not always be intraarticular. Extraarticular forms of SOC can arise from other synovial membranes, such as tendon sheaths and bursae. Extraarticular involvement is seen mostly in the hand, foot, wrist, ankle and less frequently in the knee (1,4).

Case Report

A 49 year-old, male master runner was admitted to the clinic with pain and limited range of motion on his right knee. He had participated in several sports like skiing and tennis for many years, but the complaints forced him to give up the sport 1 year ago. He had no benefit from medical treatment. In the history, he had many minor knee injuries that did not require long break for the sports, but he had no history of major knee trauma, knee surgery or chronic illness. In physical examination, there were slight swelling, slight tenderness on the medial retropatellar facet and a painful flexion blockage (at 120 degrees) on the right knee. Ligamentous laxity was not found on specific tests of the knee. There was a tenderness on the medial area of popliteal region when deeply palpated.

Radiographs showed multiple radio-opaque masses in the posteromedial and popliteal regions of the knee, in addition to moderate osteoarthritic changes (Figure 1).

Mild effusion, synovitis, minimal horizontal tear in medial meniscus and femoral chondropathy were identified with magnetic resonance imaging (MRI). Furthermore, in many MRI sections, multiple ossified bodies smaller than 1 cm were observed in posterior intraarticular recess, popliteal bursa and semimembranosus tendon (Figure 2).

Biochemical and rheumatologic parameters were normal in laboratory tests. In the light of these clinical and radiological findings SOC was considered for diagnosis.

Surgical treatment was recommended to the patient as a result of orthopedic consultation, but he did not accept the operation. Thereupon, a conservative treatment of 15 sessions was planned. This treatment aimed to relieve the pain, reduce the flexion limitation and increase the muscular strength. It consisted of TENS, ultrasound, short wave diathermy and therapeutic exercises. Exercise program is seen in the TableI. Due to the presence of free loose bodies, open-kinetic-chain exercises of the knee (leg extension, leg curl) were not selected. Symptomatic remission was observed with the treatment. Pain score (evaluated by visual analog scale) fell from 6 to 2. Active knee flexion became 130 degrees and squatting was almost fully provided.

Figure 1. Multiple radio-opaque masses (white arrows) are seen in the popliteal region (A, lateral view) and in the posteromedial region (B, anteroposterior view) of the knee joint

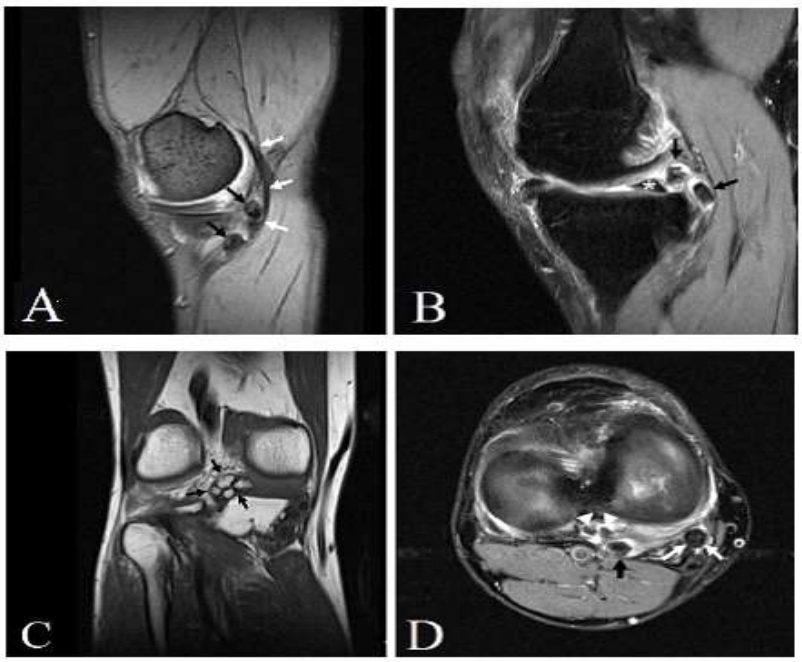

Figure 2. **A**: Sagittal MRI demonstrates ossified bodies (black arrows) in the semimembranosus tendon (white arrows) **B**: In another sagittal section, black arrows indicate an intraarticular loose body adjacent to medial meniscus (asterisk) and a loose body located in the popliteal bursa **C**: Coronal image shows multiple intraarticular ossified bodies (black arrows) **D**: Axial image shows osteochondral masses in the posterior intraarticular recess (arrow heads), popliteal bursa (black arrow) and semimembranosus tendon (white arrows).

Table I. Therapeutic exercise program

Knee ROM exercises	Passive flexion, Active assisted flexion
Knee isometrics	Quadriceps, Hamstrings, Adductors, Abductors
Hip exercises with resistance band	Flexion, Extension, Adduction, Abduction
Closed-kinetic-chain exercises	Mini squat, Half leg press
Proprioceptive training	Rocker board, Wobble board, Mini trampoline

Figure 3. At 18 months postoperatively, there was no new mass formation in radiography. Unremoved masses (in the semimembranosus tendon) are seen.

Then the patient continued to exercises with home-based programme.

After 2 years, patient's complaints increased again. Repeated MRI showed no increase in number and size of the bodies, but showed increase in arthritic changes. He was admitted to an outer medical center and underwent surgical treatment. We reached the 'operative report' which contains arthroscopically synovectomy, excision of loose bodies, partial meniscectomy and cartilage debridement. There was no surgical intervention to the masses in the semimembranosus tendon.

The patient began to knee exercises on the 1st postoperative day. Squatting type activities were restricted for 3 weeks. Effusion gradually decreased, and the knee regained painless full range of motion at 8 weeks after the surgery. He avoided running or other intense sport activities as precaution, and continued activity with brisk walking and swimming. At the postoperative 18th months, symptomatic recurrence or radiological new mass formation was not observed (Figure 3).

Discussion

SOC is a benign but insidiously developing disease. Symptoms usually become apparent with the increase of intraarticular osteochondral bodies. The mineralisation and size of the osteochondral lesions can differ. The disease most frequently affects knee joint and male gender (1). Our case also was a man with knee involvement.

There are usually pathognomonic findings on plain radiographs (1). However, the diagnosis of SOC with radiography may be difficult if there is not adequate ossification in loose bodies (5,6). Computed tomography (CT) or magnetic resonance imaging (MRI) should be used in such situations (4). MRI is also especially useful in determination of extraarticular synovial tissue involvement. SOC was diagnosed in our case due to the presence of typical radiological masses in radiographs and extraarticuler involvement in MRI. It was thought as "secondary SOC" taking into consideration the patient's age (49 years), presence of degenerative arthritis and history of many sports traumas.

There were combined intraarticular and extraarticular lesions (popliteal bursa and semimembranosus tendon) in our case. Cases with extraarticular SOC localised in the popliteal bursa have already been reported in previous studies (6,7). However, the presence of extraarticular SOC lesions in the semimembranosus tendon have been identified for the first time. To our knowledge, there was no such information in the literature.

Irritative mechanical effects such as displacement of loose bodies in the joint space may lead to secondary osteoarthritis in chronic phase of SOC (1,5). Therefore, following the diagnosis of SOC, patients should undergo surgery without delay. Besides the removal of all osteocartilaginous bodies, synovectomy is an appropriate method in SOC treatment to prevent possible recurrence (3,8). The current patient had played sports for many years and experienced many knee injuries, so these factors might have accelerated the development of SOC. Also, surgical treatment was delayed for two years due to his own refusal. During this time, the size and number of the masses did not increase significantly, but their irritative effects may be responsible for the increased degenerative changes and symptoms. Despite surgical treatment, returning to previous sports level was not achieved.

There are several publications mentioning about SOC in athletes. The affected joint of an athlete may be knee (as in our case) or another joint such as shoulder, elbow, hip (9,10,11). In the sports medicine practise, the possibility of SOC should be considered in an athlete with joint pain and refractory ROM limitation. These frequently encountered symptoms may be signs of such a rare disease. On the other hand, repetitive activities in the sports may increase joint damage especially at the early phase of disease or in the absence of apparent symptoms.

Differential diagnosis of SOC includes osteochondritis dissecans, crystal deposition diseases, pigmented villonodular synovitis, inflammatory arthritis, granulomatous infections and neuropathic arthropathy (1,3,5). Also, patients with SOC should be long term followed-up due to a 6.4% incidence of malignant transformation (synovial chondrosarcoma) (12).

References

1. Murphey MD, Vidal JA, Fanburg-Smith JC, Gajewski DA (2007). Imaging of synovial chondromatosis with radiologic-pathologic correlation. *Radiographics*; 27(5): 1465-88.
2. Robinson D, Hasharoni A, Evron Z, Segal M, Nevo Z (2000). Synovial chondromatosis: the possible role of FGF 9 and FGF receptor 3 in its pathology. *International journal of experimental pathology;* 81(3):183-189.
3. Milgram JW (1977). Synovial osteochondromatosis: a histopathological study of thirty cases. *J Bone Joint Surg;* 59(6): 792-801.
4. Resnick D, Kang HS, Pretterklieber M (2007). Synovial Joints: General Concepts. In: *Internal derangements of joints (2nd edition).* Saunders Elsevier, Philadelphia, pp. 209-228.
5. Ahearn N, Sheridan BD, Sarangi PP (2011). Synovial chondromatosis of the shoulder without calcification on plain radiograph. *Shoulder & Elbow;* 3(3): 175-177.
6. Abu-Yousef MM, El-Khoury GY (1985). Case report 307. Diagnosis: synovial osteochondromatosis limited to a popliteal cyst. *Skeletal Radiology;* 13(3): 234-8.
7. El Andaloussi Y, Fnini S, Hachimi K, Ouarab M, Trafeh M (2006). Osteochondromatosis of the popliteal bursa. *Joint bone spine;* 73(2): 219-220.
8. Ogilvie-Harris DJ, Saleh K (1994). Generalized synovial chondromatosis of the knee: a comparison of removal of the loose bodies alone with arthroscopic synovectomy. *Arthroscopy;* 10: 166–170.
9. Baums MH, Klinger HM, Otte S, Härer T (2002). Synovial chondromatosis as an unusual cause for subacromial impingement in a tennisplayer. *Sportverletz Sportschade*; 16(2): 80-1.
10. Micallef-Stafrace K, Pecotic G, Buttigieg N, Bernard AA (2007). Synovial osteochondromatosis of the elbow in a basketball player: A case study and brief review. *International Sportmed Journal*; 8(4): 220-226.
11. Doward DA, Troxell ML, Fredericson M (2006). Synovial chondromatosis in an elite cyclist: a case report. *Arch Phys Med Rehabil*; 87(6): 860-5.
12. Evans S, Boffano M, Chaudhry S, Jeys L, Grimer R (2014). Synovial Chondrosarcoma Arising in Synovial Chondromatosis. *Sarcoma*. vol. 2014,. Article ID 647939.

Corresponding author
Ali Eraslan
Antalya Education and Research Hospital, Department of Sports Medicine
Kazım Karabekir Caddesi, 07100 Antalya, Turkey
Phone: +90 242 249 44 00
Email: *eraslanali@yahoo.com*

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