Synovial Osteochondromatosis of the Carpometacarpal Joint

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Synovial osteochondromatosis is an uncommon lesion characterized by cartilagenous and osseous metaplasia of the synovial membrane of the joint and the tendon sheath. It is classically monoarticular, and is found in large joints such as the knees, hips, shoulders, and ankles; it rarely occurs in the small joints of the hand. We present an extremely rare case of synovial osteochondromatosis involving the carpometacarpal joint of the thumb.

Case Report

A right-handed man in his 20s complained of a 6-month history of increasing pain and swelling of the dorsal aspect of the right hand. He had no history of trauma. Physical examination showed a firm, ill-defined, tender mass on the dorsal aspect of the carpometacarpal (CM) joint of the thumb.

Hematochemical examinations showed no abnormal findings. Plain radiographs showed a few radiopaque bodies around the CM joint of the thumb and soft-tissue swelling with erosion of the base of the first metacarpal bone and trapezium (Figure 1). Computed tomography revealed a nodular body with peripheral lamellar ossification on the dorsal aspect of the CM joint of the thumb, and the trapezium was shifted palmarly (Figure 2).

At 7 months after onset, plain films showed that ossification of the nodule had matured, and the tumor was removed. During surgery, the hypertrophic joint capsule of the CM joint of the thumb was incised, and the osteocartilaginous tumor attached to the capsule was removed (Figure 3). The capsule was preserved. The articular surface of the joint was intact. Histologic examination of the tumor revealed cartilaginous tissue and bone formation within synovial tissue, but no evidence of malignancy (Figure 4). The diagnosis was synovial osteochondromatosis.

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At follow-up 1 year postoperatively, there was complete resolution of the patient's symptoms, and there was no evidence of recurrence on plain radiographs.

Discussion

Synovial osteochondromatosis occurring in the hands is rare. Most reported cases involved the tenosynovium and were therefore extra-articular.[1,2] A review of the English-language literature on intra-articular synovial osteochondromatosis in the hands found 10 cases in which this occurred in the metacarpophalangeal joint,[3-9] 5 cases in the proximal interphalangeal joint,[9-11] 2 cases in the distal interphalangeal joint,[12,13] and 2 cases in the interphalangeal joint of the thumb.[14,15] We have found no case of synovial osteochondromatosis involving the CM joint of the thumb.

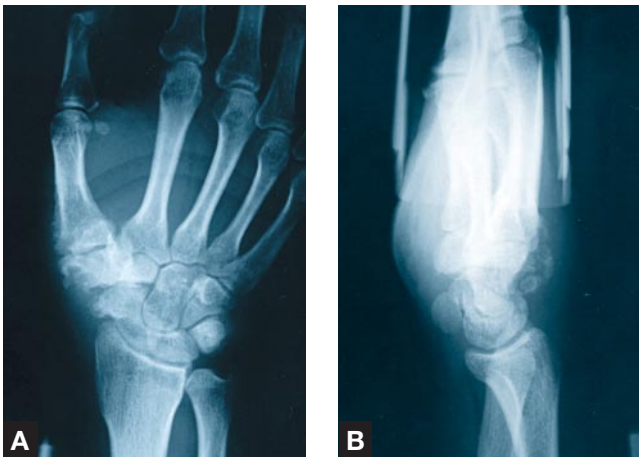

Figure 1. **(A)** Anteroposterior and **(B)** lateral plain radiographs showed a few ossified bodies adjacent to the CM joint of the thumb, with erosion of the base of the first metacarpal bone and trapezium.

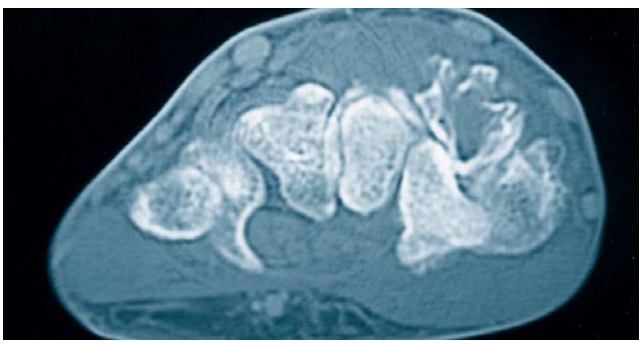

Figure 2. Computed tomography showed that peripheral ossification of the nodule on the dorsal aspect of the CM joint had developed and that the trapezium had shifted palmarly.

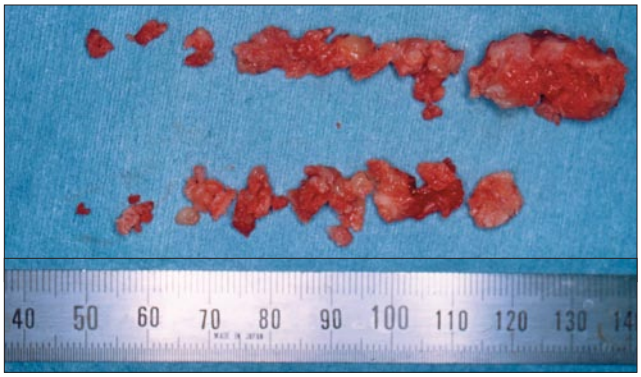

Figure 3. Resected specimen showing a number of osteochondral bodies.

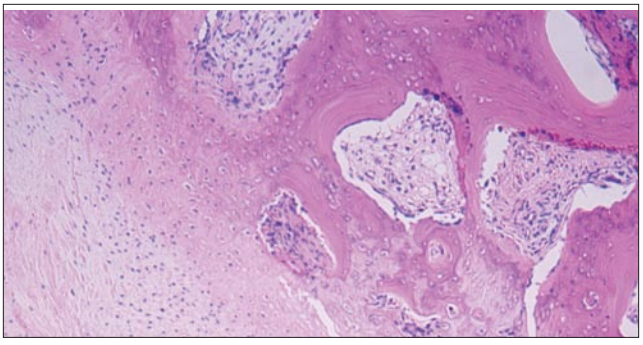

Figure 4. A photomicrograph showed cartilaginous tissue and bone formation within the synovial tissue (hematoxylin and eosin stain, original magnification ×200).

In primary synovial osteochondromatosis, plain radiographs classically show periarticular diffuse soft-tissue swelling and multiple calcified nodules. In our patient, despite the smallness of the joint, the nodule was large, and there was peripheral calcification. When the cartilaginous nodule exists within the synovial membrane for a long time, the synovial blood supply within the cartilaginous body increases, and therefore the intrasynovial nodule becomes more mature and peripheral lamellar ossification stronger.[9]

This condition should be differentiated from soft-tissue chondroma, synovial chondrosarcoma, and the secondary synovial osteochondromatosis caused by osteoarthritis. See the Box[16,17] at top right.

Milgram classified synovial osteochondromatosis in 3 stages:[18]

Stage 1 is the period of progressive intrasynovial body formation without loose bodies.

Stage 2 is the period when osteocartilaginous bodies are present in the synovial membrane and loose in the joint cavity.

Stage 3 is the period with multiple loose bodies floating within the joint cavity and no visible intrasynovial bodies, indicating that activation of the synovium has subsided.

Consequently, treatment for synovial osteochondromatosis in stages 1 and 2 consists of removal of the loose bodies and as complete a synovectomy as possible, but in stage 3, it is sufficient to remove only the osteocartilaginous bodies, and synovectomy is no longer essential.

We concluded from plain films obtained 7 months after onset that ossification of the cartilaginous body was finished and the activity had subsided. As a result, only the tumor was removed and the capsule was preserved, which is helpful in preventing the CM joint's subluxing.

Some Important Distinctions in the Differential Diagnosis

Distinguishing primary from secondary synovial osteochondromatosis is easy. In the latter condition, there are radiographic findings of osteoarthritis such as narrowing of the joint space, formation of osteophytes, and subchondral sclerosis.

Soft-tissue chondroma is a rare benign lesion characterized by lobulated cartilaginous nodules with calcification in the soft tissue that are separated from the cortex or periosteum of the bone, joint capsules, or tendon sheath. Most occur between the 4th and 6th decades of life and affect the distal extremities, presenting as a slowly growing mass.[16] The long history of the soft-tissue chondroma and extra-articular occurrence serve to distinguish this from synovial osteochondromatosis.

In the present case, it was important to distinguish the patient's condition from chondrosarcoma; the absence on radiogic films of the soft-tissue invasion and bone destruction suggestive of malignancy[17] made it possible to rule out chondrosarcoma.

Authors' Disclosure Statement and Acknowledgements

The authors report no actual or potential conflict of interest in relation to this article.

References

1. Lynn MD, Lee J. Periarticular tenosynovial chondrometaplasia. *J Bone Joint Surg Am* 1972;54:650-652.
2. Murphy AF, Wilson TN. Tenosynovial osteochondroma in the hand. *J Bone Joint Surg Am.* 1958;40:1236-1240.
3. Linden O. Case of osteochondromatosis of the metacarpophalangeal joint. *Acta Chir Scand.* 1934;75:181-184.
4. Dahlin DC, Salvador AH. Cartilaginous tumors of the soft tissues of the hands and feet. *Mayo Clin Proc.* 1974;49:721-725.
5. Szepesi J. Synovial chondromatosis of the metacarpophalangeal joint. *Acta Orthop Scand.* 1975;46:926-930.
6. Lucas GL, Sponcellar PD. Synovial chondrometaplasia of the hand: case report and review of the literature. *J Hand Surg Am.* 1984;9:269-272.
7. Mylle J, van Delm I, Sciot R, van damme B, De smet L, Fabry G. Chondromatosis of the fifth metacarpophalangeal joint: case report and review of the literature. *Acta Orthop Belg.* 1992;58;346-348.
8. Reed SC, Wright CS. Synovial chondromatosis of the metacarpophalangeal joint: case report and review of the literature. *Can J Surg.* 1996;39:407-409.
9. Roulot E, Le Viet D. Primary Synovial osteochondromatosis of the hand and wrist: report of a series of 21 cases and literature review. *Rev Rhum, Engl. Ed.* 1999;66: 256-266.
10. Cremone JC, Wolff TW, Wolfort FG. Synovial chondromatosis of the hand. *Plast Reconstruct Surg.* 1982;69:871-874.
11. Takami H, Takahashi S, Ando M. Synovial chondromatosis of the proximal interphalangeal joint of a finger. *J Hand Surg Am.* 1994;19:794-796.
12. Kettelkamp DB, Dolan J. Synovial chondromatosis of an interphalangeal joint of the finger. *J Bone Joint Surg Am.* 1966;48:329-332.
13. Harvey FJ, Negrine J. Synovial chondromatosis in the distal interphalangeal joint. *J Hand Surg Am.* 1990;15:102-105.
14. Lewis M, Marshall JL, Mirra JM. Synovial chondromatosis of the thumb. *J Bone Joint Surg Am.* 1974;56:180-183.
15. Malhotra R, Gaur S, Dave PK, Dinda AK. Synovial chondromatosis of the interphalngeal joint of the thumb: a case report. *J Hand Surg Am.* 1994;19:460-461.
16. Bansal M, Goldman AB, DiCarlo EF, McCormack R. Soft tissue chondromas: diagnosis and differential diagnosis. *Skel Radiol.* 1993;22:309-315.
17. Cawte TG, Steiner GC, Beltran J, Dorfman HD. Chondrosarcoma of the short tubular bones of the hands and feet. *Skel Radiol.* 1998;27:625-632.
18. Milgram JW. Synovial osteochondromatosis: a histopathological study of thirty cases. *J Bone Joint Surg Am.* 1977;l59:792-801.