Concurrent Soft Tissue Chondroma and Periosteal Chondroma of Thumb

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ABSTRACT

Chondromas are classified according to their locations as enchondroma, periosteal chondroma, and the extraskeletal soft tissue chondroma. Multiple chondromas are well known as part of some disease entities like enchondromatoses and synovial chondromatosis. Many authors reported multiple chondromas previously; however, we have not encountered any instance of coexistence of soft tissue and periosteal chondromas in the English literature. We present a case with concurrent soft tissue and periosteal chondromas appeared five years after hand trauma with clinical, radiological and histological features.

Key words: *Periosteal chondroma; soft tissue chondroma; MRI.*

INTRODUCTION

Periosteal and soft tissue chondromas are rare benign cartilage neoplasms that have the same basic pathology as the enchondroma except their location (1). Periosteal chondroma presents on the periosteal surface of long or short tubular bones. Soft tissue chondroma usually arise from tenosynovial sheaths or the soft tissue adjacent to tendons in the hands and feet, usually without any connection to the underlying bone.

Although multiple chondromas are well known, no instance of coexistence of soft tissue and periosteal chondromas has been reported in the English literature.

We present a case of concurrent soft tissue chondroma and periosteal chondroma in the distal phalanx of the right thumb appearing five years after hand trauma.

CASE

A 34-year-old man presented with a hard mass on the radial aspect of left thumb. The mass had appeared about five years ago, after a penetrating injury to his left hand with fiber glass. It had enlarged slowly and had pain in cold weather. No other complaint was existent about the mass. On physical examination, a hard, immobile, and lobulated mass at the end of the distal phalanx of the left thumb was present. Ulceration was seen on the covering skin (Figure 1). Laboratory investigations disclosed no abnormality. The patient suffered from pectus excavatum, though he had not any clinical manifestation. Radiograph of the thumb showed a cortical erosion and concavity (scalloping) at the radial aspect of distal phalanx along with an adjacent soft tissue density (Figure 2). In magnetic resonance imaging (MRI), two closely neighboring soft tissue masses with identical signal characteristics were seen. There was a hypointense line separating the lesions. One of the mass had a broad base on the radial aspect of distal phalanx. The other one had no relation with the bone. Both tumors had low intensity in the T1-weighed image and intermediate intensity in the T2- weighed image. They showed heterogenous contrast enhancement after the administration of intravenous gadolinium chelate. No obvious finding of bone marrow invasion was suspected (Figure 3). In the differential diagnosis, chondroma and malignant tumor of the soft tissue were included. The patient had an open biopsy and excision of the tumor under local anesthesia. During the operation, the masses were found to be localized

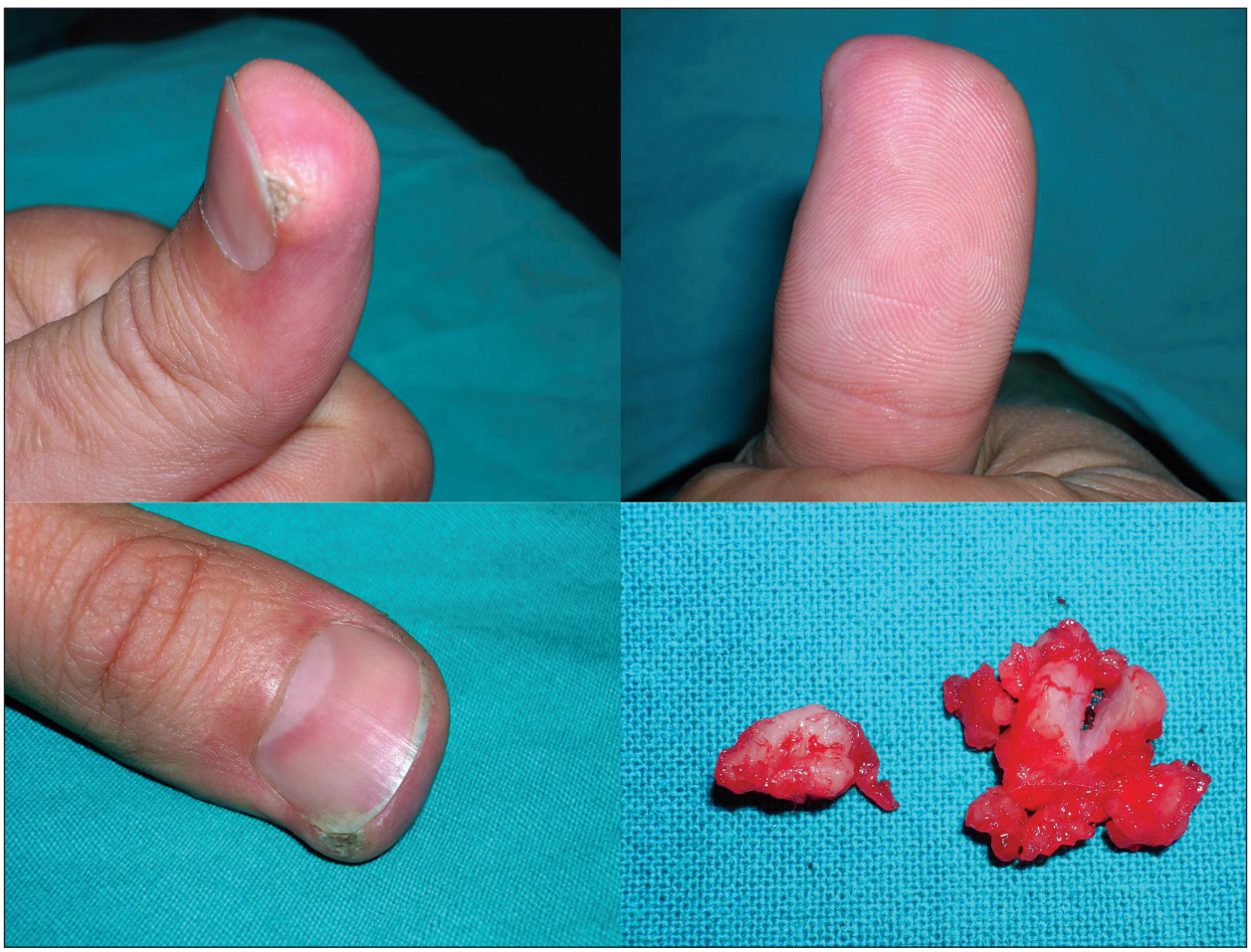

Figure 1. A lobulated lumpy mass with ulceration of the covering skin is seen in the radial and volar aspect of the left thumb (lower left and upper). Two encapsulated whitish masses with approximately 1 and 0.5 cm in diameter, are seen in macroscopic section; both appear similar except their sizes and multilobulated nature of the bigger one (lower right).

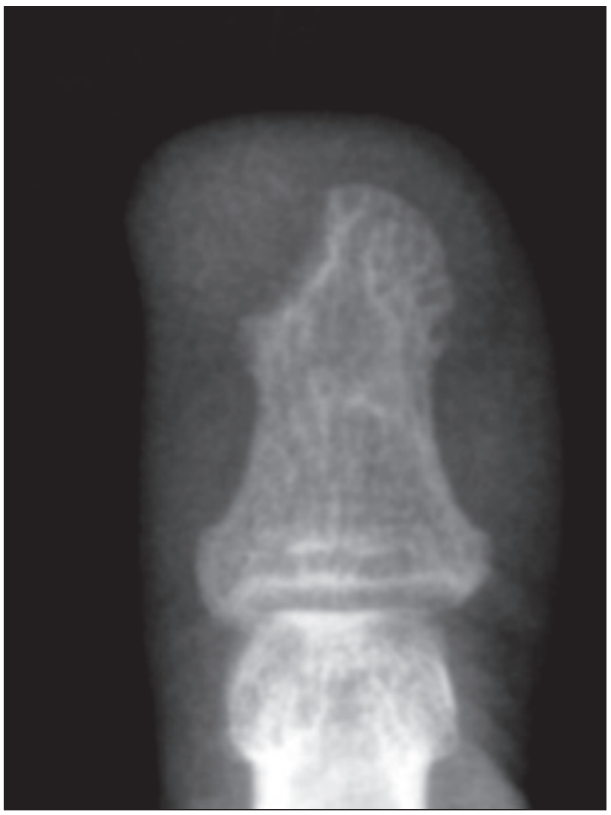

Figure 2. X-ray of the thumb showing scalloping at the radial aspect of distal phalanx with an adjacent soft tissue mass.

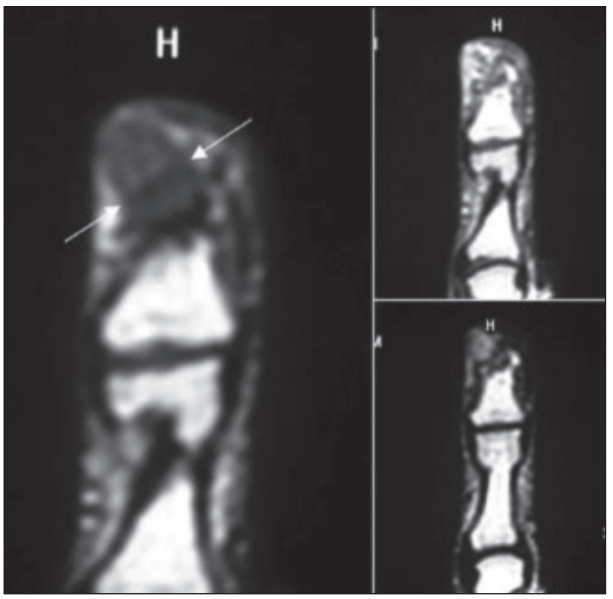

Figure 3. MRI of the lesion in coronal plane. Two adjacent soft tissue masses having the same signal characteristics were seen; the lesions are separated with a hypointense line (between the arrows). Both tumors had low intensity in the T1-weighed image (left) and intermediate intensity in the T2- weighed image (lower right). After the administration of intravenous contrast material, heterogeneous enhancement is seen (upper right).

in the subcutaneous tissue; they were totally surrounded by a white capsule on the surface. Tumors were completely removed. Eroded cortex of the adjacent bone was cleared. Postoperative course of the patient was uneventful and there were no signs of recurrence eight months later.

Macroscopically two hard, approximately 1 and 0.5 cm in diameter, encapsulated, and whitish masses adjacent to each other were seen. Both masses were quite similar except their sizes and multilobulated nature of the bigger one (Figure 1). In the histopathological examination of specimens, epidermis was discerned in some small irregular areas; the whole remaining tissue was composed of nodular and well-demarcated tumoral lesions that getting through to the tissues deeper than the subcutaneous fatty layer. The tumoral tissue was comprised of lacunes of chondrocytes located in abundant hyaline matrix. Cellularity of the lesion was relatively prominent in the periphery while the central part seemed hypocellular. There were no signs of invasion of the bone marrow and the histopathological diagnosis was chondroma (Figure 4).

DISCUSSION

Chondromas are common tumors, and they are classified as enchondroma, periosteal chondroma, and the rare extraskeletal soft tissue chondroma. No distinctive cytogenetic or molecular findings discriminate among these various types of chondroma (1).

Periosteal chondromas are rare, constituting 2.2% of benign tumors and 0.5% of all tumors in the Mayo Clinic series (2). Unlike osteochondromas, which also develop on the surfaces of bones, periosteal chondromas are not related to the physeal plates and most likely develop through subperiosteal cartilage formation. This tumor is predominately seen in patients younger than 30 years, with the highest frequency in the second decade. The lesions usually stop growing before they reach the upper limit of 3-4 cm in diameter. If growth continues beyond this, one must strongly consider the possibility of a peripheral

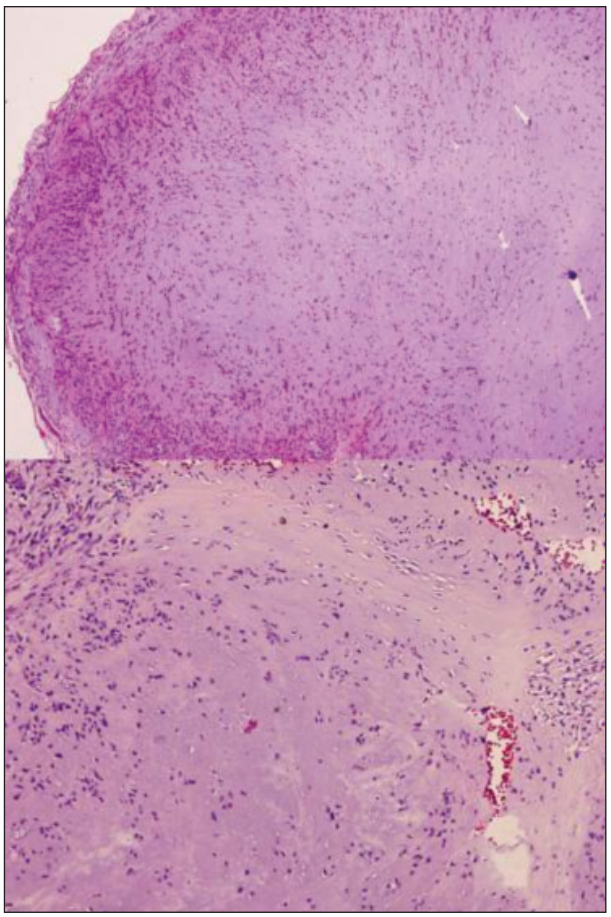

Figure 4. Well demarcated nodular chondroma (H&E, x20) (upper); lacunas of chondrocytes located in abundant hyaline matrix in greater magnification (H&E, x200) (lower).

surface-type chondrosarcoma that would continue to grow after bone maturity. Robinson et al (3) suggested that the main distinctive feature of periosteal chondromas and chondrosarcomas is their size: periosteal chondrosarcomas are larger. As far as we know, there is only one report of multiple periosteal chondroma in a patient in the English literature in which Pazzaglia and Ceciliani (4) reported a patient with multiple periosteal chondroma of the humerus leading to growth arrest. In our patient the slow progression of the lesion and the relatively young age are characteristics for a typical periosteal chondroma. There were two chondromas in our case and their localization and concurrency seem unique. The one was with a periosteal base and the other was localized in the soft tissue without any connection to bone.

Soft tissue chondroma is also known as extraskeletal chondroma arises mostly in the soft tissues of the hand and feet, usually without any relation to the underlying bone. Over 80% of them are found in the fingers. Less common sites are the hands, toes, feet, and trunk. Soft tissue chondroma usually presents as a slowly enlarging nodule or mass that infrequently causes pain or tenderness. It mainly affects adults between 30 and 60 years of age; it is often associated with tendon, tendon sheath, or the joint capsule, and, unlike periosteal chondroma, is located outside the periosteum. Almost all of these tumors are solitary, but Dellon et al (5) reported bilateral chondromas in the right index and left ring fingers in a patient with renal failure. Multiple extraosseous chondromas are more likely examples of synovial chondromatosis.

Although age and localization properties of periosteal and soft tissue chondromas seem different, the relative rareness of these tumors encourages us to think that the age propensity of the chondromas may not be so different. Furthermore, the concurrence of both types in our case may support this opinion.

Some authors have suggested that trauma, including surgery, may induce chondroma formation and this association could have been an important contributing factor in the induction of the tumor in a patient (6). Some previous reports showed trauma in the etiology of periosteal chondroma, however, we could not find any posttraumatic instance of either soft tissue chondroma or concurrent periosteal and soft tissue chondromas.

Clinically, periosteal chondromas present as palpable masses which are often swollen and painful (7-9), although painless masses have also been described (10). Our patient described pain only in cold weathers. This may be due to increased tension of skin in wintry weather accompanied with tumoral tension.

The radiologic work-up of our case revealed the distinction between the two histologically identical lesions. This assortment of the tumors was confirmed both macro and microscopically. Radiologically, periosteal chondromas present as sharply marginated radiolucent bone surface tumors often with calcification and mineralization of the chondroid matrix (7-9). Classically, there is erosion into the cortex of the bone with saucerization of the underlying bone, with

overlapping cortical bone at the edges, often showing sclerosis. Our case showed all above radiologic features except prominent calcification.

Macroscopic features of periosteal chondromas include well-demarcation without penetration into the underlying cancellous bone. The underlying cortex appears thickened and shows indentation. The tumor size is usually less than 6 cm in greatest dimension (7-9).

Histologically, periosteal chondromas show a lobulated configuration of hyaline cartilage covered by periosteum (10). They are usually hypocellular, although occasionally may focally show increased cellularity with nuclear pleomorphism, binucleation, and multinucleation (7-9). The hypercellularity and features of nuclear atypia can sometimes be misdiagnosed as chondrosarcoma. Occasionally, focal areas of mixoid degeneration may result in a mistaken diagnosis of chondrosarcoma. There was no sign of sarcomatous differentiation in our case and macroscopic and microscopic characteristics were characteristic for chondroma.

Suggested treatment for the periosteal chondroma contains intralesional, marginal, and en bloc excisions. All these techniques are sufficient and come with low recurrence rates (7-9). To avoid postexcisional reccurrences, marginal excision of the tumors and curettage of the underlying cortical bone has been suggested (10).

The differential diagnosis of soft tissue chondroma includes extraskeletal mesenchymal chondrosarcoma, giant cell tumor of the tendon sheath with foci of cartilaginous metaplasia, calcifying aponeurotic fibroma, synovial chondromatosis, and nodular chondrometaplasia. After excision, benign extraskeletal chondroma can recur in 15% to 20% of the cases (11). The principal clinical differential diagnosis for periosteal chondroma is juxtacortical chondrosarcoma and periosteal osteosarcoma.

In conclusion, the present case of chondroma is similar to those previously described cases in its clinical presentation, location, and X-ray findings which are highly suggestive of such kind of tumor. However, the concurrency of periosteal and extraskeletal chondromas, as proved with MRI and pathologic evaluation, seems first in the English literature.

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