ACTA
ORTHOPAEDICA
et
TRAUMATOLOGICA
TURCICA

CASE REPORT

Acta Orthop Traumatol Turc 2011;45(2):130-134
doi:10.3944/AOTT.2011.2419

Extraskeletal juxtaarticular chondroma of the knee

Ajay Pal SINGH[1], Ish Kumar DHAMMI[1], Anil Kumar JAIN[1], Shuchi BHATT[2]

Departments of [1]Orthopedics, and [2]Radiology,
UCMS and GTB Hospital, Delhi, India

Extraskeletal chondromas are atypical lesions and their recognition is important to avoid invasive treatment methods like marginal excision. The diagnosis must be confirmed with correlating clinical, radiological and histopathological examination. We report a 40-year-old woman with an extraskeletal chondroma around the knee joint. The radiological and histopathological aspects of the patient are presented along with a review of the literature.

Key words: Knee; extraskeletal; chondroma.

Extraskeletal chondromas are rare and benign cartilaginous tumors occurring mostly around hands and toes. These tumors may occur in atypical juxtaarticular localizations with no bone or joint involvement.[1-4]

The radiographic features of this entity may be confusing and further imaging studies may be necessary for the definitive diagnosis.[4-6] Computerized tomography (CT) or magnetic resonance imaging (MRI) studies will give information on the localization of the lesion, which will be important for a wide and safe surgical resection. Histopathological features may also be confusing and differentiation from low grade malignancies of a chondroid origin may not be possible.[2,7,8] The information on clinical, radiological and histological features of these tumors will facilitate the definitive diagnosis and treatment choice.

We report a 40-year-old woman with an extraskeletal chondroma around the knee joint. The radiological and histopathological aspects of the patient are presented along with a review of the literature.

Case report

A 40-year-old woman presented to the out-patient department with a two year history of progressively increasing swelling of the left knee. She had a vague, intermittent discomfort for six months in her left knee. There was no history of clicking, locking and limitation of motion of the knee. The patient reported no history of trauma or swelling elsewhere in the body.

On examination, a 6x4x3 cm painless, mobile, bony-hard mass on the infrapatellar area was palpable. It was separate from the patella and patellar tendon. The local temperature was normal with no knee joint effusion and instability. The overlying skin was supple, with no dilated veins (Fig. 1a). The knee had a full range of motion with no distal neurovascular deficit. The patient had no other medical condition and was not on any medication.

Her laboratory tests, including hemogram, ESR and CRP, were within normal limits.

The anteroposterior radiograph of the left knee revealed an eccentric lytic defect in the epi-metaphy-

Correspondence: Ajay Pal Singh, MD. Residential Complex, D-13.UCMS & GTB Hospital, Dilshad Garden, New Delhi, India.
Tel: +91 9891394779 e-mail: docajaypal@gmail.com

Submitted: January 14, 2010 **Accepted:** April 16, 2010

seal region of the upper end of the tibia (Fig. 1b). The lesion was sharply outlined with a narrow, sclerotic rim and contained an area of spotted calcification. The lateral view showed the anterior location of the lesion with the calcified matrix, extending to the outside of the anterior limit of the bone (Fig. 1c). There was no evidence of expansion of the bone or periosteal reaction. The anterior cortical margin was not identifiable at the site of the lesion. Mild degenerative changes in the knee joint were also seen.

An MRI examination of the left knee revealed a well-defined extrosseous, lobulated mass along the anteromedial aspect of the proximal tibia. The lesion was in contact with the underlying bone with no cortical breach or bony continuity, but causing scalloping of the outer cortex. The lesion was in the subcutaneous plane, extending between the fibers of the medial retinaculum and the capsule. It had no extension or involvement of the patellar tendon or the infrapatellar fat pad. No evidence of joint effusion was present. The adjacent tendons and ligaments were normal with preserved fat planes. The lesion was isointense to the muscle on T1-weighted images and hyperintense on T2-weighted ones. The images with areas of hypointesity, on both T1 and T2 images, corresponded to areas of calcification, seen on the plain radiographs. The MRI confirmed the extraosseous, extrasynovial location of the lesion and the associated bone destruction. The tumor had a chondroid matrix with spotted calcification foci (Figs. 2a-d).

In the differential diagnosis extrasynovial/extraskeletal chondroma, extraskeletal osteochondroma, soft tissue chondrosarcoma, periosteal chondroma, periosteal chondromyxoid fibroma, chondroblastoma with extraosseous component and synovial cell sarcoma were accounted.

A fine-needle biopsy was performed. However, on histopathological examination, the scarce acellular material was not diagnostic.

An excisional biopsy of the lesion was done. The mass was entirely extraskeletal, extraarticular and extrasynovial with a well-defined capsule. It was located in the subcutaneous plane with no attachment to the tendon, bone or joint. A marginal en bloc excision of the lesion was done. Macroscopically, it was a 5x4x2 cm lesion with smooth margins and the cross-section was white and shiny, with a cystic central cavity (Figs. 3a-c). Histologically, hyaline cartilage-like cells and extracellular matrix were observed. There was no mitosis, and dystrophic calcification was seen in the periphery. These findings suggested the histological diagnosis of chondroma (Figs. 3d and e). The post-operative period was uneventful. On her last control, the patient had full range of motion of the knee. She was followed up for 2 years, with no evidence of recurrence (Figs. 3f and 3g).

Discussion

Extraskeletal chondromas are rare, benign cartilaginous tumors, known to occur due to metaplasia of the mesenchymal cells in the capsule or adjacent connective tissue of a joint.[1,4,6] Cartilage prolifera-

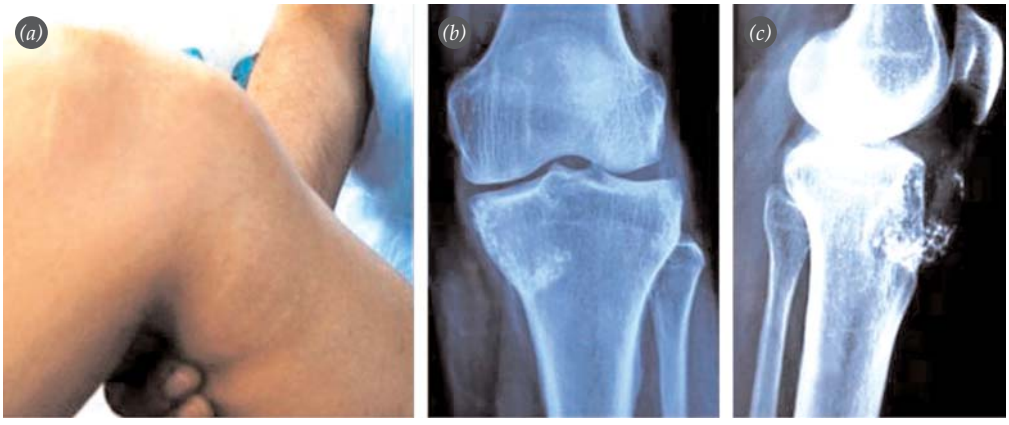

Fig. 1. **(a)** Clinical photograph of the knee showing infrapatellar swelling. **(b)** Anteroposterior and lateral radiographs of the knee showing scalloping of tibia with spotted calcification. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

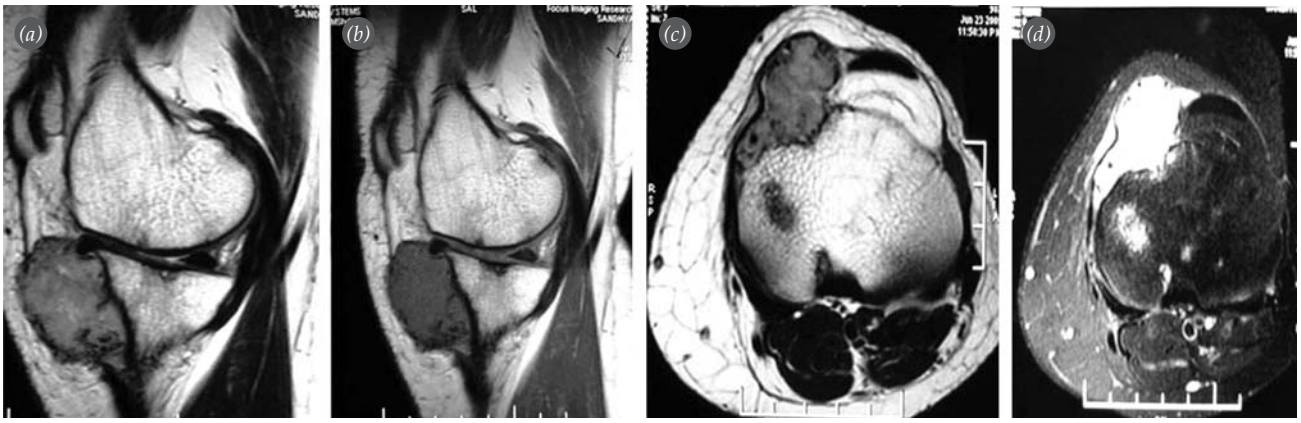

Fig. 2. **(a-d)** MRI of the right knee. T1 and T2-weighted sagittal and coronal sections showing exraosseous lobulated mass extending to medial patellar retinaculum. The lesion is isointense to muscle on T1 and hyperintense on T2 images with interspersed spotted signal void.

tion and subsequent vascular penetration leads to enchondral ossification. This results in extraskeletal chondromatous or osteochondromatous lesions around the joint. Such lesions usually occur in hands and toes, and lesions around the knee are rarely reported.[1-3] Most of the known cases around the knee joint are intracapsular, involving the infrapatellar fat pad, and only isolated cases of extracapsular location exist in the literature.[4] A variety of nomenclature has been assigned to osseous or cartilaginous

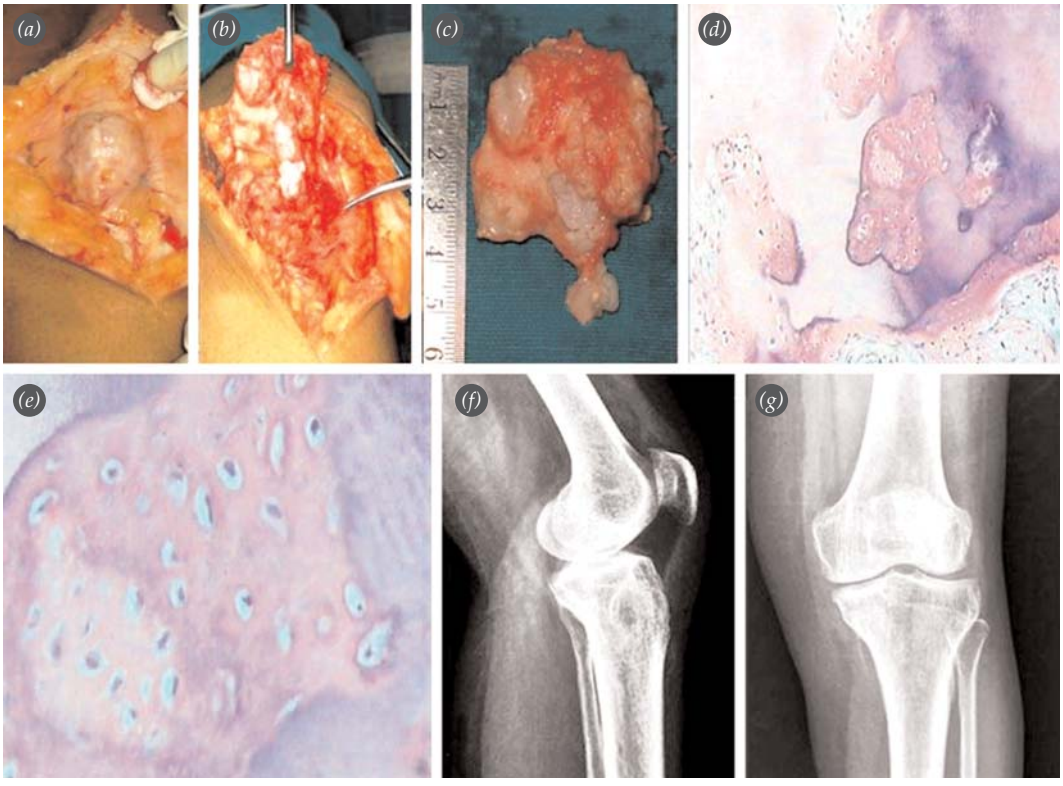

Fig. 3. **(a, b)** Preoperative picture showing subcutaneous and extraskeletal lesion. **(c)** Photograph of excised mass showing gross appearance and size <5 cm. **(d, e)** Low and high power histological picture (H-E 7 and 100 um) showing hyaline cartilage-like cells with no mitotic activity and extracellular matrix. **(f, g)** Anteroposterior and lateral radiographs of the knee at the 2-year follow up. There is no evidence of recurrence. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

masses, occupying the infrapatellar space. Jaffe coined the term "extraskeletal paraarticular osteochondromas" and used the synonymous terms "paraarticular chondromas" and "intracapsular chondromas" as well.[9] Milgram and Dunn differentiated these lesions from synovial chondromatosis.[10] Sakai et al. reported three cases with paraarticular infrapatellar fat pad location and discussed the differential diagnosis of chondroma and osteochondroma.[11] Our case is unique, due to its extraskeletal, extracapsular location and destruction of the underlying tibia, undermining the diagnosis.

The differential diagnosis of soft tissue tumors with calcification includes several entities like, hemangioma, tumoral calcinosis, myositis ossificans, extraskeletal chondroma/osteochondroma or soft tissue chondrosarcoma, extraskeletal myxoid chondrosarcoma and synovial sarcoma. Typical chondroid calcification limits the differential diagnosis to cartilaginous tumors, and involvement of the adjacent bone also makes periosteal, juxtacortical or cortical tumors likely. In our case, a periosteal reaction was conspicuously absent, making periosteal chondroma or chondrosarcoma unlikely. The absence of intraosseous lesion, as shown by the MRI, eliminated the possibility of chondromyxoid fibroma or chondroblastoma. Synovial cell sarcoma and soft tissue chondrosarcoma show evidence of spotted or dense calcification, and appear to be heterogeneous on T2-weighted images, a finding which was absent in our case. Absence of osseous architecture in the lesion made diagnosis of osteochondroma and myositis improbable. MRI taken in our case established the extraossoeus extrasynovial nature of the lesion. Its lobulated nature and the signal intensities, corresponding to the hyaline cartilage with evidence of calcification, typical of chondroid tumors, could make the diagnosis of extraskeletal chondroma easy. However, presence of a lesion in the subcutaneous plane and its extension, posterior to the medial retinaculum, could not completely exclude its intracapsular extension. Our case did not have any restriction of movement of the knee joint, as other reported cases, in the extracapsular compartment. Intracapsular lesions are present with some restriction of movements.[12] Destruction of the underlying bone or invasion into the adjacent structures suggests malignancy.

Even with histological examination, low-grade soft tissue chondrosarcoma may be difficult to diagnose.[8] Reith et al. concluded that cytological atypia may be seen in benign soft tissue chondroma and should not be considered as aggressive.[13] Chondromas are primarily cartilaginous lesions, showing lobular pattern on histology, however, osteochondromas are mostly bony, with a peripheral cartilaginous cap.[11] Pathologically, extraskeletal chondromas consist of hyaline cartilage-like cells and a fibrous capsule. They contain focal or diffuse calcification and may also show some ossification, fibrous or myxoid changes.[8] The histological appearance often consists of well-encapsulated lobules of mature hyaline cartilage with varying cellularity.[2,8] Calcifications tend to be more pronounced in the center than at the periphery of the tumor lobules. Vascular fibrous capsules, hyaline cartilage-like lesions with fibrous pseudocapsule, chondroblastic variants, with immature cells, hyperchromatic nuclei, binucleated cells, and mitotic figures can also occur. The variable histological appearance, particularly in the presence of myxoid changes, may lead to the misdiagnosis of chondrosarcomas.[2,7,8]

Marginal surgical excision of the tumor is adequate and no recurrence of the tumor is known to date.[12-14]

Only a few cases of extraskelatal chondroma are reported in literature and only one report details the MR findings.[4,9-12] Extraskeletal chondromas are unusual lesions, and their recognition is important to avoid unnecessary, aggressive management, as marginal excision is adequate. The possible MR features of such a lesion are well described in this report. The diagnosis should be confirmed after correlating clinical, radiological and histopathological examination.

Conflicts of Interest: No conflicts declared.

References

1. Dahlin DC, Salvador AH. Cartilaginous tumors of the soft tissues of the hands and feet. Mayo Clin Proc 1974;49: 721-6.
2. Enzinger FM, Weiss SW. Cartilaginous soft tissue tumors. In: Enzinger FM, Weiss SW, eds. Soft tissue tumors. 3rd ed. Mosby: St Louis; 1995. p. 991-1009.
3. Kransdorf MJ, Meis JM. From the archives of the AFIP: extraskeletal osseous and cartilaginous tumors of the extremities. Radiographics 1993;13:853-84.

4. Kudawara I, Ueda T, Araki N. Extraskeletal chondroma around the knee. Clin Radiol 2001;56:779-82.
5. Bansal M, Goldman AB, DiCarlo EF, McCormack R. Soft tissue chondromas: diagnosis and differential diagnosis. Skel Radiol 1993;22:309-15.
6. O'Malley MJ, Faller GT, Craig CC. Extraskeletal chondroma of the foot. Orthopaedics 1996;19:256-8.
7. Weiss SW, Goldblum JR. Cartilagineous soft tissue tumors. In: Weiss LM, Goldblum JR, editors. Enzinger and Weiss's soft tissue tumours. 4th ed. St Louis: Mosby; 2001. p. 1361-88.
8. Papagelopoulos PJ, Savvidou OD, Mavrogenis AF, Chloros GD, Papaparaskeva KT, Soucacos PN. Extraskeletal chondroma of the foot. Joint Bone Spine 2007;74:285-8.
9. Jaffe HL. Tumor and tumorous conditions of the bones and joints. Philadelphia: Lea and Febiger; 1958.
10. Milgram JW, Dunn EJ. Para-articular chondromas and osteochondromas. A report of three cases. Clin Orthop Relat Res 1980;(148):147-51.
11. Sakai H, Tamai K, Iwamoto A, Saotome K. Para-articular chondroma and osteochondroma of the infrapatellar fat pad: a report of three cases. Int Orthop 1999;23:114-7.
12. Mosher JF, Kettelkamp DB, Campbell CJ. Intracapsular or para-articular chondroma. A report of three cases. J Bone Joint Surg Am 1966;48:1561-9.
13. Reith JD, Bauer TW, Joyce MJ. Paraarticular osteochondroma of the knee: report of 2 cases and review of the literature. Clin Orthop Relat Res 1997;(334):225-32.
14. Steiner GC, Meushar N, Norman A, Present D. Intracapsular and paraarticular chondromas. Clin Orthop Relat Res 1994;(303):231-6.