

PERIOSTEAL CHONDROMA OF THE PROXIMAL TIBIA MIMICKING OSGOOD-SCHLATTER'S DISEASE

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We report a case of a periosteal chondroma of the proximal tibia in an 11-year-old girl, which was initially misdiagnosed as Osgood-Schlatter's disease. The absence of pain and meticulous analysis of the imaging findings on initial and follow-up plain radiographs, ultrasound and MRI allowed to suggest the diagnosis of a periosteal chondroma, which was confirmed after biopsy. Besides the difficulty in the imaging diagnosis of the lesion, determination of the optimal treatment strategy may be challenging as well. Given the localization of this lesion close to the growth plate, decision has to be made whether the lesion will be treated surgically or a watchful waiting policy will be implemented in order to prevent interference with the normal growth of the bone.

Periosteal or juxtacortical chondroma is an uncommon benign cartilaginous neoplasm, affecting children and adolescents. When the lesion is located at the proximal tibia adjacent to the unfused apophysis of tibial tuberosity (TT), the diagnosis can be particularly challenging, because of its radiological resemblance to Osgood-Schlatter's disease. The purpose of this paper is to report the distinctive clinical and imaging features allowing a correct diagnosis of this unusual lesion in order to initiate appropriate treatment.

Case report

An 11-year-old healthy girl presented with a painless firm swelling at the anterior aspect of the left proximal tibia. There was no history of trauma and there were no signs of inflammation. Standard radiographs of the left knee showed a subtle soft-tissue swelling with intralesional calcifications adjacent to the left tibial tuberosity (Fig. 1). The lesion was initially interpreted as Osgood-Schlatter's disease and relative rest was recommended. Nine months later, she was readmitted with a slightly grown swelling. Repeated lateral radiograph revealed a marked cortical remodelling distal to the TT, with cortical scalloping, endosteal sclerosis, and abundant superficial cartilaginous calcifications. The lesion also demonstrated thickening of the cortex at its proximal and distal margins, in keeping with a "cortical buttress sign" (Fig. 2). On



Fig. 1. — Initial lateral radiograph of the left knee. Note the presence of a soft-tissue swelling with intralesional calcifications distal to the tibial tuberosity (arrow), mimicking Osgood-Schlatter's disease. The lesion is – however – located distal to the apophysis. Moreover, cortical thickening of the adjacent anterior tibia is unusual for Osgood-Schlatter's disease.

ultrasound, there was – however – no thickening of the distal patellar tendon (Fig. 3). These findings argue against the diagnosis of Osgood-Schlatter and rather suggest a

tumoral lesion of the bone. Magnetic resonance imaging (MRI) was performed for further lesion characterization, which revealed a juxtacortical cartilaginous mass, adjacent to the growth plate of the TT (Fig. 4). After multidisciplinary discussion, the decision was made to remove the lesion surgically. A local resection with curettage of the adjacent cortex was performed. Histologically, the diagnosis of periosteal chondroma was made. Postoperative recovery was uneventful and there has been no recurrence for 3 years.

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Fig. 2. — Follow-up lateral radiograph of the left knee shows abundant superficial cartilaginous calcifications (curved arrow) and thickening of the cortex at its proximal and distal margins (arrowheads), in keeping with a “cortical buttress sign”.

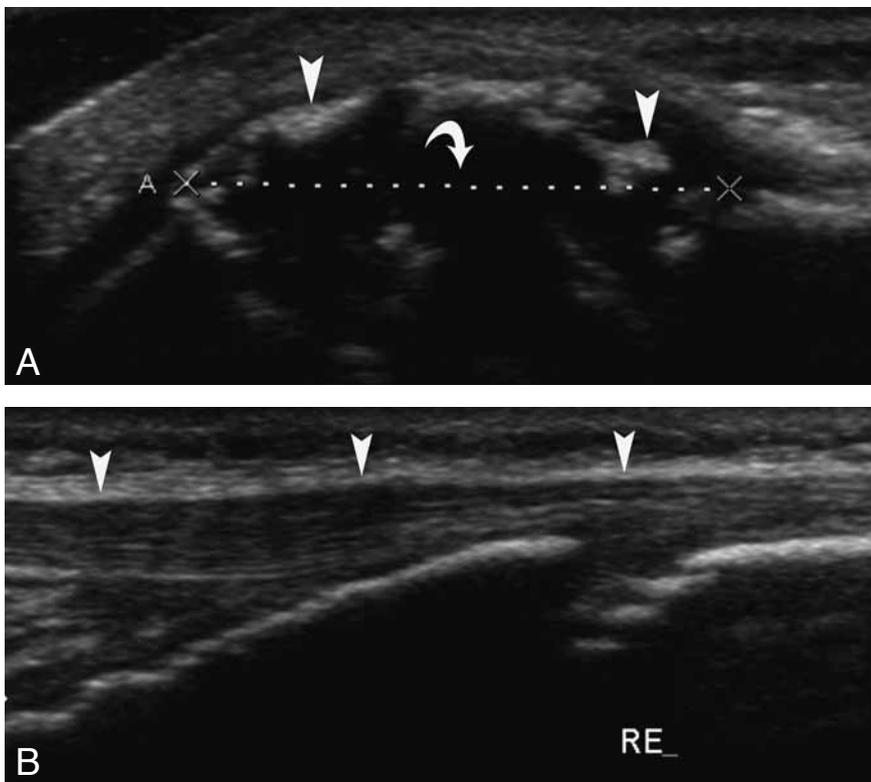


Fig. 3. — Ultrasound of the left knee. Axial (A) image showing a hypo-echogenic lesion to the tibial tuberosity (curved arrow), with multiple intralesional reflections causing a retro-acoustic shadowing (arrowheads) in keeping with calcifications. Longitudinal (B) image showing a normal reflectivity and thickness of the patellar tendon (arrowheads).

Discussion

Periosteal (juxtacortical) chondroma is a slowly growing, benign tumoral lesion of cartilaginous origin, originally described by Lichtenstein and Hall in 1952 (1). It must be distinguished from an osteocartilaginous exostosis and from a solitary enchondroma, as it arises between the cortical bone and the periosteum of tubular bones, leaving the medullary cavity unaffected. Although it can occur at any age, this tumor predominantly occurs in children or young adults, with a male predilection. Periosteal chondroma usually arises at the osseous insertions of tendons and ligaments or at the metaphyseal region of the long tubular bones, such as the femur and humerus. The bones of the hand and feet are also frequently affected (2). Clinically, it most often presents as a painless swelling with progressive onset. Frequently, it is an incidental radiographic finding.

Plain radiographic features include a cortically based, radiolucent soft tissue mass, scalloping or remodelling of the adjacent underlying bony cortex with an endosteal border of sclerosis, matrix calcifications (occurring in approximately 50% of patients) and a “cortical buttress sign” (3). Irregularity of the osseous surface may be misinterpreted as a malignant tumor (3). On CT, cortical scalloping and intralesional matrix calcifications may be appreciated more in detail. On MR imaging the typical features of a water-rich cartilaginous tumour are found, consisting of a matrix of hyperintense signal relative to fat on T2-weighted images (WI), and of hypo- to isointense signal relative to muscle on T1-WI. Intralesional calcifications can be seen as areas of low signal intensity on both pulse sequences. The lesion is typically well delineated and often bordered by a hypointense rim on T2-WI. No bone marrow edema nor soft tissue edema is seen. Contrast enhancement is observed predominantly at the periphery of the cartilage nodules (ring-and-arc enhancement). Radiographically, differentiation has to be made with other benign and malignant tumor and tumor-like conditions, such as an osteocartilaginous exostosis (osteochondroma), in which there is continuity of both the cortical and the medullary bone. Differentiation has also to be made with an enchondroma, which is located in the medullary cavity, and



Fig. 4. — MR imaging of the left knee. Axial (A) and sagittal (B) fat-suppressed T2-WI, sagittal spin-echo (SE) T1-WI (C) and axial fat-suppressed T1-WI after intravenous administration of gadolinium contrast (D). Note a well-delineated juxtacortical lesion (arrow) measuring 2.5 cm, adjacent to the growth plate of the tibial tuberosity. Heterogeneity with foci of hypo-intense signal on both non-enhanced T1- and T2-WI, and peripheral ring-and-arc enhancement pattern (arrowheads) after intravenous administration of gadolinium contrast.

with a Ewing's sarcoma. The latter is a fast growing osteolytic lesion causing an unsharp margination of the cortical bone. A huge soft tissue extension is the rule. Of particular interest is the differential diagnosis with a periosteal chondrosarcoma. As a periosteal chondrosarcoma represents a relatively slow-growing malignancy, reactive sclerosis and scalloping may be seen, very similar to the radiological appearance of a

periosteal chondroma. However, a periosteal chondrosarcoma is generally larger, occurs in an older population, and tends to permeate the underlying bone with formation of bony spicules extending out from the cortex (4).

A periosteal chondroma occurring at the TT in skeletally immature patients, such as in our case, may mimic a chronic avulsive lesion at the insertion of the patellar tendon

into the TT (Osgood-Schlatter's disease). Clinically, Osgood-Schlatter is characterized by focal pain at the TT. On plain radiographs, fragmentation involves the TT itself, instead of the cortical bone underneath the TT. Moreover, on ultrasound, the distal patellar tendon is widened, hypo-echoic and there may be hypervascularity around the fragmented TT on power Doppler imaging. MR imaging may demonstrate an

associated infrapatellar bursitis, marrow edema within the proximal tibia, and thickened cartilage anterior to the tibial tubercle (5).

Histologically, periosteal chondroma is characterized by lobulated immature cartilaginous tissue, covered by a fibrous periosteal capsule. Pathologic differentiation with a low-grade chondrosarcoma may be difficult.

Medullary invasion is the most valuable differentiating finding on histopathology, as this never occurs in a periosteal chondroma.

The preferred treatment for asymptomatic lesions consist of waitful watching (6), especially when excision can affect subsequent growth in children. For painful lesions, local excision, with curettage of the adjacent saucerized cortical bone is curative (7). However, when clinical and radiographic findings are inconclusive, a pre-operative excisional biopsy is mandatory. Although the recurrence rate is low, some advo-

cate adjuvant cryotherapy in order to avoid local recurrence.

Conclusion

When located at the tibial tuberosity, a periosteal chondroma may mimic Osgood-Schlatter's disease. Awareness of this uncommon lesion, correct interpretation of clinical (absence of pain, progressive growth), imaging features and demonstration of the cartilaginous matrix on MRI may help to avoid misdiagnosis.

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