Rare Case of Dual Lesion: Nonossifying Fibroma and Osteochondroma

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Abstract

In this paper, we offer radiographic and pathologic evidence of a unique coexisting dual lesion. A 14-year-old boy presented for evaluation of a painful right knee after sustaining a twisting injury. The patient was found to have a torn anterior cruciate ligament, in addition to incidental finding of distal femoral dual lesion composed of tissue consistent with a nonossifying fibroma and an osteochondroma. To our knowledge, this is the first report in the medical literature of a dual lesion containing both an osteochondroma and nonossifying fibroma.

Osteochondromas are considered to be the most common skeletal neoplasm,[1] accounting for 35% of benign bone tumors[2] and 10% to 15% of all tumors.[3] Nonossifying fibromas are the most common bone lesion, reported in 30% to 40% of children.[4] To our knowledge, however, there is no report in the literature of a dual lesion composed of tissue consistent with both an osteochondroma and a nonossifying fibroma. In this report, we offer radiographic and pathologic evidence of a unique coexisting dual lesion. The patient's guardian provided written informed consent for print and electronic publication of this case report.

Case Report

A 14-year-old boy presented to his primary care physician for evaluation of right knee pain after sustaining a twisting injury while running with his friends; radiographs were taken at this visit (**Figures 1A, 1B**). The patient was diagnosed with a knee sprain and was informed that he had a right knee benign cystic lesion that required observation only. He was told to follow up with an orthopedist for further evaluation. Two months later, the patient started playing competitive football and began having increased pain in the right knee and sensations of instability. When he was seen by an orthopedist, physical examination showed a tear of the anterior cruciate ligament (ACL). However, the patient was referred to an orthopedic oncologist because of the indeterminate nature of the lesion in the distal femur.

Examination of the right knee by the orthopedic oncologist confirmed a likely ACL tear and a fixed palpable prominence over the medial femoral metaphyseal flare with no tenderness or Tinel's sign. Radiographic review showed a right medial distal femoral metaphyseal cortically based radiolucent geographic lesion. The lesion had a scalloped rim with concavity and prominence consistent with its palpability on physical examination. No soft-tissue component and no periosteal reaction were observed. To further define the lesion and evaluate the knee ligaments, magnetic resonance imaging (MRI) of the right knee was performed with and without contrast. The MRI confirmed the diagnosis of an ACL tear (**Figure 2**). Im-

Figure 1. (A) Anteroposterior radiograph of the right knee shows a medial distal femoral metaphyseal cortically based radiolucent geographic lesion. The bony outgrowth has the classic shape of an osteochondroma but is lytic compared with medullary bone and has a sclerotic rim with a narrow zone of transition. No soft-tissue mass, periosteal reaction, or mineralization is seen in the lesion. (B) Lateral radiograph of the right knee.

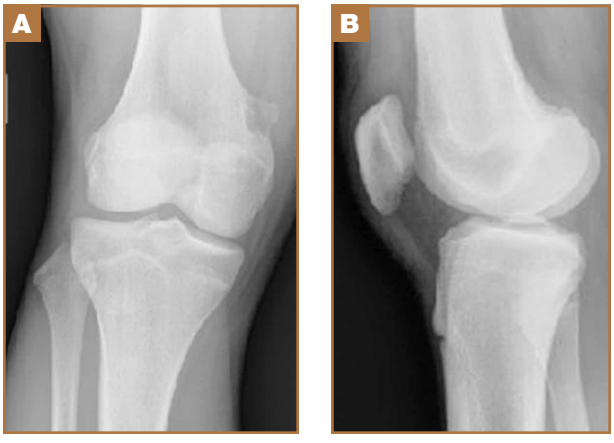
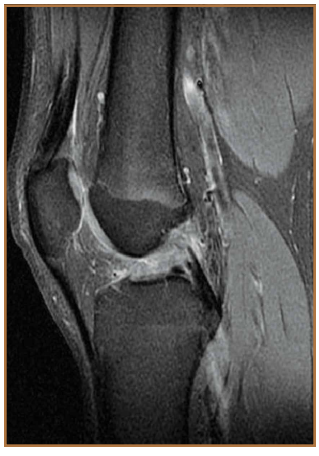


Figure 2. Sagittal T2-weighted image through the middle of the right knee confirms a tear of the ACL.



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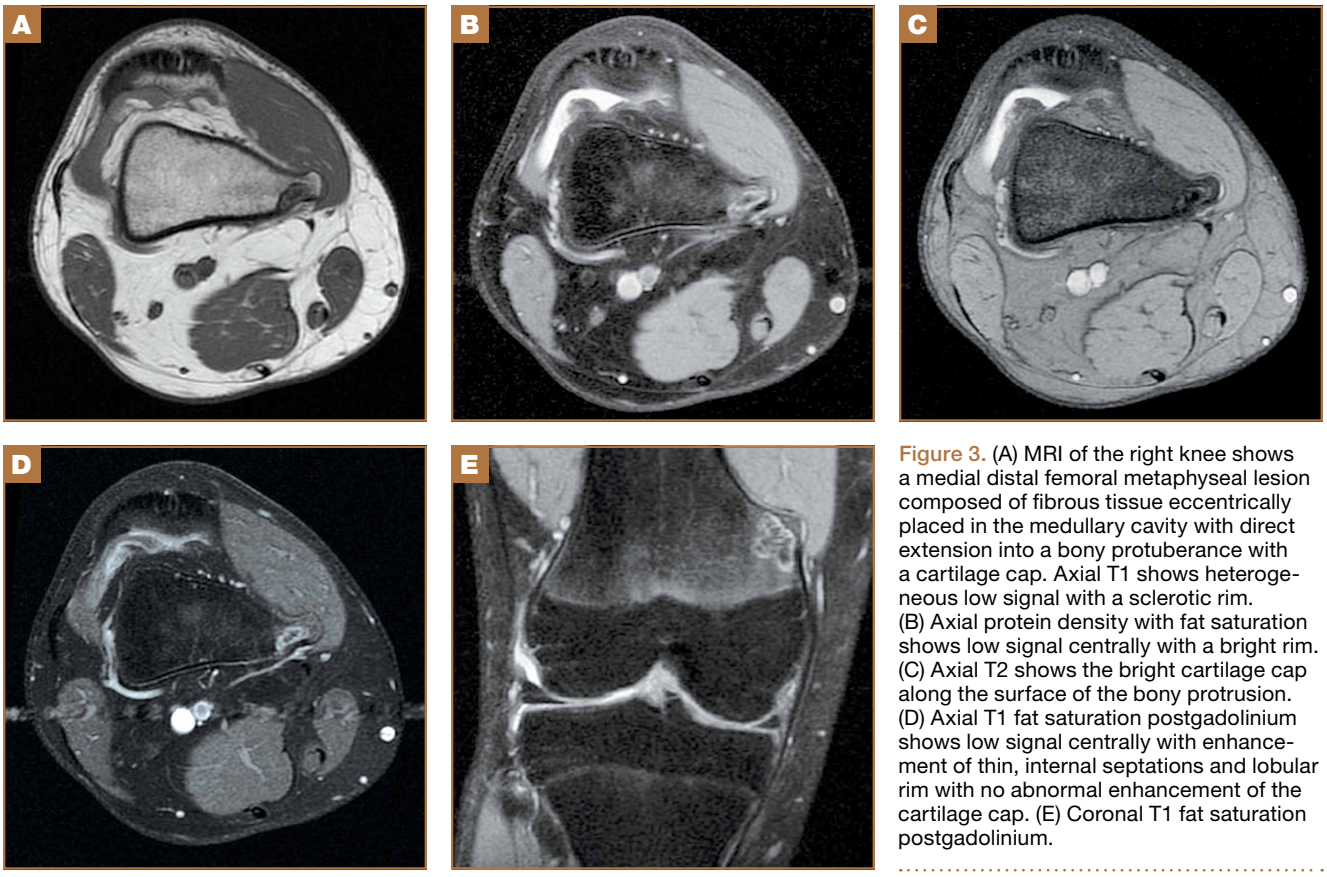

Figure 3. (A) MRI of the right knee shows a medial distal femoral metaphyseal lesion composed of fibrous tissue eccentrically placed in the medullary cavity with direct extension into a bony protuberance with a cartilage cap. Axial T1 shows heterogeneous low signal with a sclerotic rim. (B) Axial protein density with fat saturation shows low signal centrally with a bright rim. (C) Axial T2 shows the bright cartilage cap along the surface of the bony protrusion. (D) Axial T1 fat saturation postgadolinium shows low signal centrally with enhancement of thin, internal septations and lobular rim with no abnormal enhancement of the cartilage cap. (E) Coronal T1 fat saturation postgadolinium.

aging of the lesion in the distal femoral metaphysis revealed a cortically based lesion composed of fibrous tissue with a cartilage cap but no overtly aggressive features (**Figures 3A-3E**). Although the lesion had benign features and could be followed clinically and radiographically, the patient and family chose ACL reconstruction. The lesion had unusual features on imaging studies, and definitive diagnosis could not be made radiographically. Therefore, a confirmatory biopsy was offered before the patient underwent a potentially contaminating surgical procedure. After the patient and his family learned that this unusual lesion required observation or biopsy, the family chose an excisional biopsy of the distal femoral lesion (**Figures 4A, 4B**).

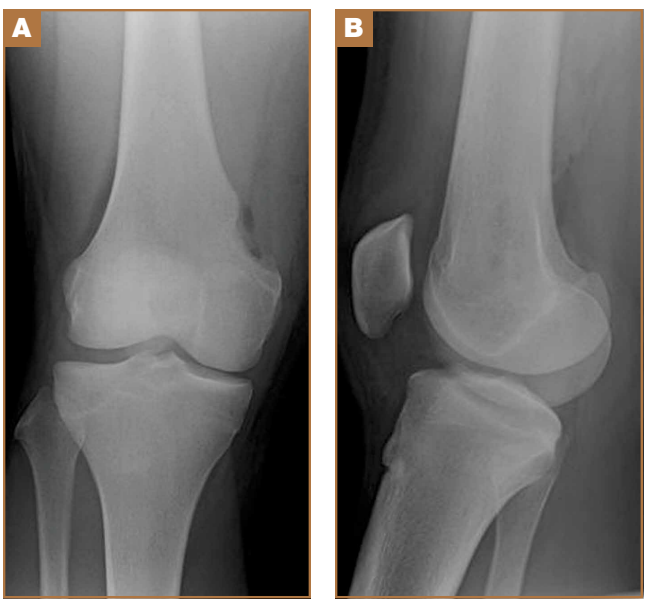

Figure 4. (A) Postoperative anteroposterior radiograph of the right knee shows complete excision of the lesion. (B) Postoperative lateral radiograph.

Grossly, the excised specimen consisted of a 3 × 2 × 2-cm irregularly shaped portion of bone, including a 2 × 1.5 × 1-cm bony protuberance partially covered by a thin white cartilage cap. Following decalcification, the specimen was sectioned for microscopic examination (**Figures 5A-5C**), which showed a well-circumscribed lesion of plump spindle cells producing collagen admixed with scattered osteoclasts, rare hemosiderin deposits, and rare foamy macrophages. Peripherally, the lesion was less cellular with more extracellular matrix (collagen), reflective of maturation. Adjacent to the spindle cell lesion was a region of relatively normal lamellar bone trabeculae and marrow-containing medullary space, covered by a thin layer of hyaline cartilage overlaid by dense fibrous connective tissue (**Figures 5D, 5E**). Given the clinical scenario, imaging findings, and gross and microscopic morphology, a diagnosis of nonos-

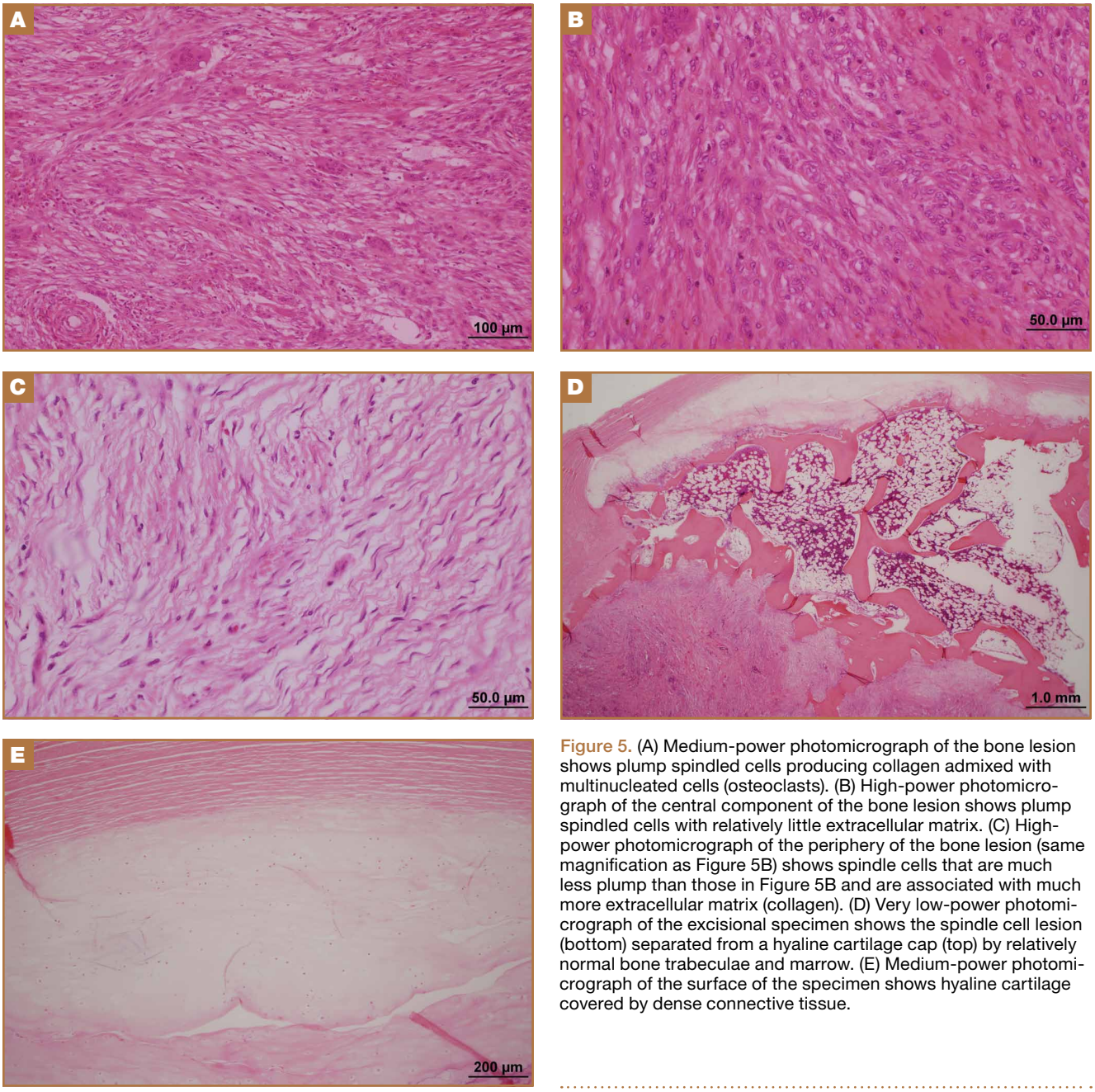

Figure 5. (A) Medium-power photomicrograph of the bone lesion shows plump spindled cells producing collagen admixed with multinucleated cells (osteoclasts). (B) High-power photomicrograph of the central component of the bone lesion shows plump spindled cells with relatively little extracellular matrix. (C) High-power photomicrograph of the periphery of the bone lesion (same magnification as Figure 5B) shows spindle cells that are much less plump than those in Figure 5B and are associated with much more extracellular matrix (collagen). (D) Very low-power photomicrograph of the excisional specimen shows the spindle cell lesion (bottom) separated from a hyaline cartilage cap (top) by relatively normal bone trabeculae and marrow. (E) Medium-power photomicrograph of the surface of the specimen shows hyaline cartilage covered by dense connective tissue.

sifying fibroma (metaphyseal fibrous defect) and a diagnosis of osteochondroma (exostosis) were rendered.

Discussion

An osteochondroma will typically present as a solitary palpable, fixed, nontender mass in the metaphysis of long bones around the knee and proximal humerus. As these lesions tend to occur near the insertion of tendons, they can cause mechanical pain with activity and can develop a symptomatic bursa overlying the cartilage cap. The pathogenesis of osteochondroma formation can result from traumatic or congenital separation of a piece of physeal cartilage from the epiphyseal growth plate and its displacement or herniation through the perichondrial ring of LaCroix that surrounds the growth plate, producing the tumor's characteristic medullary continuity.[1-3] A nonossifying fibroma, however, will typically present as an incidental finding on plain radiographs or as a pathologic fracture, if it becomes large enough. Although the pathogenesis of nonossifying fibromas is unknown, they can grow, in a way similar to osteochondromas, as a result of abnormal bony development from a disturbance in the epiphyseal plate.[4]

To our knowledge, this is the first report in the medical literature of a dual lesion containing both an osteochondroma and a nonossifying fibroma. It is possible that the 2 components of the lesion developed as a result of a similar insult to the epiphyseal plate, but it is beyond the scope of this report

to draw conclusions based on a single patient.

Although our patient was not symptomatic as a result of the lesion, he underwent excisional biopsy, confirming the benign nature of the lesion and allowing him to proceed with ACL reconstruction without oncologic concern. Overall, the lesion had benign features and could have been safely observed. However, because this was a rare coexistent dual lesion, the imaging features were unusual and not characteristic of any single benign bony lesion. In addition to presenting a previously undescribed lesion, this case reinforces the importance of following safe oncologic principles before undergoing a potentially contaminating surgery.

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References

1. Florez B, Monckeberg J, Castillo G, Beguiristain J. Solitary osteochondroma long-term follow-up. *J Pediatr Orthop B*. 2008;17(2):91-94.
2. Passanise AM, Mehlman CT, Wall EJ, Dieterle JP. Radiographic evidence of regression of a solitary osteochondroma: a report of 4 cases and a literature review. *J Pediatr Orthop.* 2011;31(3):312–316.
3. Mavrogenis AF, Papagelopoulos PJ, Soucacos, PN. Skeletal osteochondromas revisited. *Orthopedics*. 2008;31(10):1018-1028.
4. Betsy M, Kupersmith LM, Springfield, DS. Metaphyseal fibrous defects. *J Am Acad Orthop Surg*. 2004;12(2):89-95.