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Nonossifying Fibroma of the Distal Femur

Patrick Graham

Introduction

Nonossifying fibroma (NOF), sometimes referred to as a fibrous cortical defect, is a common benign bone lesion found in approximately 30% of the population. Its occurrence is ordinarily in the metaphysis of long bones, most commonly in the lower extremities, and as NOFs are typically asymptomatic, they are incidentally noted. They are thought to be associated with the growth plate, with most form in the first two decades of life and may elongate with bone growth. In approximately 80% of tumors, there is cell mutation, causing activation of the RAS-MAPK pathway. Nonossifying fibroma will go on to spontaneous resolution when the patient reaches skeletal maturity, with a residual sclerotic region of bone left in adulthood (Bovée & Hogendoorn, 2019; Bowers et al., 2013; Ceroni et al., 2011; Grohs et al., 2002; Herget et al., 2016; Peabody & Attar, 2014).

Case Presentation

A 19-year-old man presented to the orthopaedic clinic with a primary complaint of left knee pain. He was an active cross-country runner who had recently started a new running regimen with the college team. He had been experiencing vague leg and hamstring pains over previous months, which he attributed to hamstring tightness, noting improvement with rest, stretching, and use of ibuprofen. These symptoms had notably increased since rejoining his team and, given the persistent nature despite their interventions and modalities, his athletic trainer was concerned about a possible stress fracture. He had not run for about a week but still noted knee and hamstring pain.

Upon presentation was an alert, oriented, affect-appropriate male in no apparent distress. He walked with a slightly antalgic gait, without use of an assistive device. There was no significant swelling, discoloration, or deformity on inspection of the leg. There was notable tenderness about the distal, posterior, and lateral thigh that was difficult for him to pinpoint. Passive hip and knee range of motion was grossly equal, smooth, and painless. The knee was stable with ligamentous testing, although with noted discomfort with manipulation. His strength was grossly equal, with mild discomfort noted on resisted knee flexion and straight leg hip extension. He was found to be distally neurovascularly intact.

Radiographs taken at the time of evaluation included bilateral standing anteroposterior, unilateral anteroposterior, and lateral views of the affected extremity. These images were evident for an eccentric, radiolucent bone lesion with a thin sclerotic rim and a narrow zone of transition of the left distal femur (see Figure 1).

Management

To further characterize this newly found bone lesion and assess for an associated stress or occult fracture, the patient was referred for magnetic resonance imaging (MRI). Given his symptoms and finding of a large bone lesion in a weight-bearing bone, he was also instructed to be protected weight-bearing with the use of crutches. He was also instructed on conservative measures for pain management including continued use of nonsteroidal anti-inflammatory medications and icing regularly. The MRI scan revealed a well-circumscribed, eccentric lesion with predominantly low signal intensity of both T1- and T2-weighted images. There was a focal soft-tissue edema pattern and a subtle internal bright signal consistent with an associated stress fracture through the lesion (see Figure 2; Bowers et al., 2013; Ceroni et al., 2011; Grohs et al., 2002; Herget et al., 2016; Peabody & Attar, 2014).

With these findings, the patient was referred to an orthopaedic oncologist for further evaluation and management. He subsequently underwent a curettage and graft of this lesion and was able to return to running during the next cross-country season (Ceroni et al., 2011; Grohs et al., 2002; Peabody & Attar, 2014).

Discussion

Nonossifying fibroma is a benign bone lesion with characteristic imaging findings. Smaller lesions, those in non-weight-bearing bones, which are asymptomatic and not at significant risk for pathological fracture, may be monitored with serial imaging. Larger lesions, especially those in weight-bearing bones, which present a higher risk for pathological fracture, are likely to require surgical intervention. In either case, the best course of action is to refer these patients to an orthopaedic oncologist for definitive management (Bowers et al.,

Patrick Graham, MSN, RN, APRN/ANP-BC, Banner University Medical Center Tuscon, Tuscon, AZ.

The author has disclosed no conflicts of interest.

Correspondence: Patrick Graham, MSN, RN, APRN/ANP-BC, Banner University Medical Center Tuscon, 265 West Ina Rd, Tucson, AZ 85704 (graham.pw@gmail.com).

DOI: 10.1097/NOR.0000000000000714

Figure 1. Radiographs—bilateral anteroposterior, unilateral anteroposterior, and lateral views of the left knee. Note an eccentric bone lesion of the left distal femur with a sclerotic rim and a narrow zone of transition.

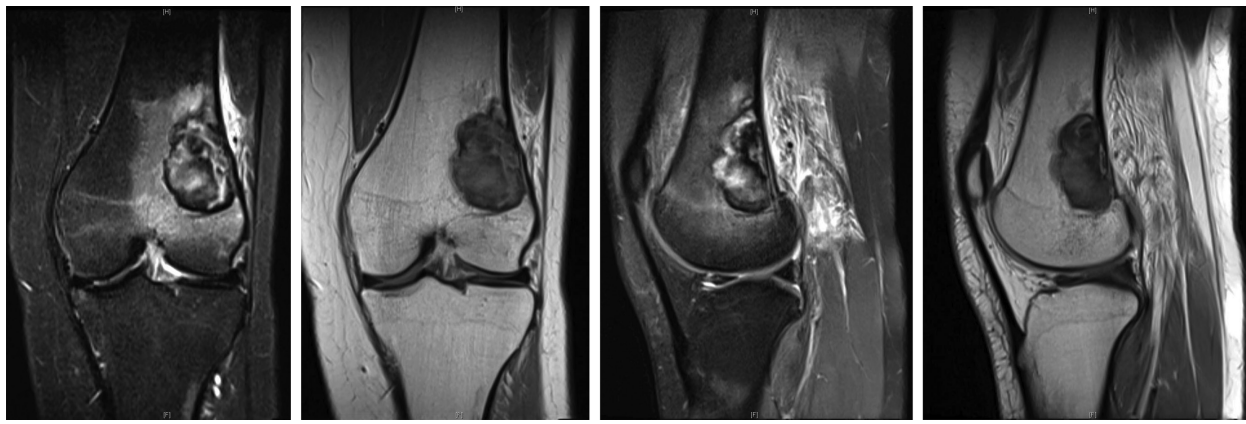

Figure 2. Magnetic resonance imaging—coronal T2 + fatsat, coronal T1, sagittal T2 + fatsat, sagittal T1. Again note an eccentric lesion of the distal femur with a narrow zone of transition. There is no associated periosteal reaction. The characteristic low signal on both T1- and T2-weighted images is consistent with nonossifying fibroma. Some interspersed high signal with associated soft-tissue edema is consistent with a stress fracture and muscular strain associated with the patient's history of distance running.

2013; Ceroni et al., 2011; Grohs et al., 2002; Herget et al., 2016; Peabody & Attar, 2014).

References

Bovée, J. V., & Hogendoorn, P. C. (2019). Non-ossifying fibroma: A RAS-MAPK driven benign bone neoplasm. *The Journal of Pathology*, *248*(2), 127–130. https://doi.org/10.1002/path.5259

Bowers, L. M., Cohen, D. M., Bhattacharyya, I., Pettigrew, J. C., Jr., & Stavropoulos, M. F. (2013). The non-ossifying fibroma: A case report and review of the literature. *Head and Neck Pathology*, *7*(2), 203–210. https://doi.org/10.1007/s12105-012-0399-7

Ceroni, D., Dayer, R., De Coulon, G., & Kaelin, A. (2011). Benign fibrous histiocytoma of bone in a paediatric population: A report of 6 cases. *Musculoskeletal Surgery*, *95*(2), 107–114. https://doi.org/10.1007/s12306-011-0115-x

Grohs, J. G., Nicolakis, M., Kainberger, F., Lang, S., & Kotz, R. (2002). Benign fibrous histiocytoma of bone: A report of ten cases and review of literature. *Wiener Klinische Wochenschrift*, *114*(1–2), 56–63.

Herget, G. W., Mauer, D., Krauß, T., El Tayeh, A., Uhl, M., Südkamp, N. P., & Hauschild, O. (2016). Non-ossifying fibroma: Natural history with an emphasis on a stage-related growth, fracture risk and the need for follow-up. *BMC Musculoskeletal Disorders*, *17*, 147. https://doi.org/10.1186/s12891-016-1004-0

Peabody, T., & Attar, S. (Eds.). (2014). *Orthopaedic oncology: Primary and metastatic tumors of the skeletal system*. Springer.