Skeletal Radiology (2019) 48:1829–1830
https://doi.org/10.1007/s00256-019-03274-1

TEST YOURSELF: ANSWER

Test yourself answer: painful knee swelling

Akarshan Monga[1] · Andrew Rosenberg[2] · Frank O'Dea[3] · John Durham[4] · Ty K. Subhawong[5]

Published online: 16 July 2019
© ISS 2019

Diagnosis

Chondroblastoma of the distal femur.

Discussion

This 19-year-old woman presented with right knee pain for 7 years and increased knee swelling for 6 months. On physical examination she had a joint effusion (Fig. 1) and tenderness to palpation. She had a full range of motion and no neurological deficits. Radiographs demonstrated a densely mineralized subarticular lesion in the femoral trochlea, with a narrow zone of transition and associated soft-tissue edema and effusion (Fig. 2). There was central radiolucency within the lesion, better depicted on CT (Fig. 3), in addition to a subcentimeter focus of cortical breakthrough anterior of the heavily mineralized component. Densely mineralized periosteal reaction was present along the medial femoral condyle. Based on these clinical and radiological features, a differential diagnosis of low-grade osteosarcoma, osteoblastoma, and chondroblastoma was entertained.

The case presentation can be found at https://doi.org/10.1007/s00256-019-03273-2

✉ Ty K. Subhawong
tsubhawong@miami.edu

[1] Nova Southeastern University- College of Osteopathic Medicine, Davie, FL, USA

[2] Department of Pathology, University of Miami Miller School of Medicine, 1400 NW 12th Avenue, Miami, FL 33136, USA

[3] Health Sciences Centre, Memorial University of Newfoundland, 300 Prince Philip Drive, St. John's, NL A1B 3V6, Canada

[4] Northern Arizona Orthopaedics, 1485 N. Turquoise Drive, Flagstaff, AZ 86001, USA

[5] Department of Radiology, University of Miami Miller School of Medicine/Jackson Memorial Hospital, 1611 NW 12th Ave, JMH WW 279, Miami, FL 33136, USA

Open biopsy was performed, with histology showing round to polygonal chondroblasts with clear to eosinophilic cytoplasm, which was clearly demarcated. Several areas of hyaline cartilage were present (Fig. 4), in keeping with chondroblastoma [1]. The histology also demonstrated abundant oval and pericellular areas of calcified matrix, surrounding individual cells.

Chondroblastoma is a rare benign cartilaginous bone tumor. Xu et al. performed a multicenter retrospective analysis of 199 patients with extremity chondroblastoma, reporting a mean age of 18 years, male:female ratio of 2.7:1, and pain as the most common presenting symptom. The most commonly involved locations were the epiphyses of the tibia, the femoral head and condyles, and the humeral head [2]. In their series, the physis was open in approximately 26% of patients, closing in 22%, and closed in 52%. However, because patients may experience pain for years before coming to medical attention (7 years in our case), many tumors discovered in young adults likely originated while the physis was open.

Characteristic radiographic features of long-bone chondroblastoma include epiphyseal lytic lesion, with the majority of cases extending into the metaphysis; thin, sclerotic, and geographic margin; lobular contour; stippled, or punctate, calcifications within the lesion; and thick, solid periosteal reaction [3, 4]. CT helps to identify extraosseous extension [3]. This case was unusual in that the abundant mineralization predominated over the radiolucent non-mineralized chondroid matrix. MRI in most cases demonstrates intermediate T1-weighted signal intensity; heterogeneous intra-tumoral T2 hyperintensity with associated (and often exuberant) perilesional bone marrow edema pattern; and periostitis, soft-tissue edema, reactive joint effusion, and synovitis are also common features [3].

The degree of sclerosis in this lesion rendered it nearly impervious to bur, osteotome, and curette. Two distinct regions of the lesion were encountered: one comprised mostly soft tissue, and the remaining tumor was gritty-like toughness. OSTEOSET T bone graft substitute was used to pack the bone cavity (Fig. 5). The surgery was performed in a resource-

limited environment without access to high-speed or diamond-tipped bur, or allograft. In addition to curettage and grafting, other treatment options include radiofrequency ablation, or en bloc resection for lesions that failed or were otherwise unamenable to intralesional treatment [2]. Rates of recurrence of chondroblastoma reported in case series range from approximately 5% [2] to 30% in pediatric case series [5].

Compliance with ethical standards

Conflicts of interest The authors declare that they have no conflicts of interest.

References

1. Garcia RA, Inwards CY, Unni KK. Benign bone tumors—recent developments. Semin Diagn Pathol. 2011;28(1):73–85.
2. Xu H, Nugent D, Monforte HL, Binitie OT, Ding Y, Letson GD, et al. Chondroblastoma of bone in the extremities: a multicenter retrospective study. J Bone Joint Surg Am. 2015;97(11):925–31.
3. Douis H, Saifuddin A. The imaging of cartilaginous bone tumours. I. Benign lesions. Skeletal Radiol. 2012;41(10):1195–212.
4. Aboulafia AJ, Kennon RE, Jelinek JS. Benign bone tumors of childhood. J Am Acad Orthop Surg. 1999;7(6):377–88.
5. Sailhan F, Chotel F, Parot R, SOFOP. Chondroblastoma of bone in a pediatric population. J Bone Joint Surg Am. 2009;91(9):2159–68.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.