Case Resolution

Rodrigo Re
Diagnostic Imaging Service, Osteoarticular/Musculoskeletal Area – Interventionism, Sanatorio Allende, Córdoba, Argentina

Case Presentation on page 444.

DIAGNOSIS: Gonalgia. Primary bone lymphoma.

DISCUSSION

The radiograph showed a permeative pattern, with marked involvement of the outer condyle and, to a lesser extent, of the inner condyle (Figure 3).

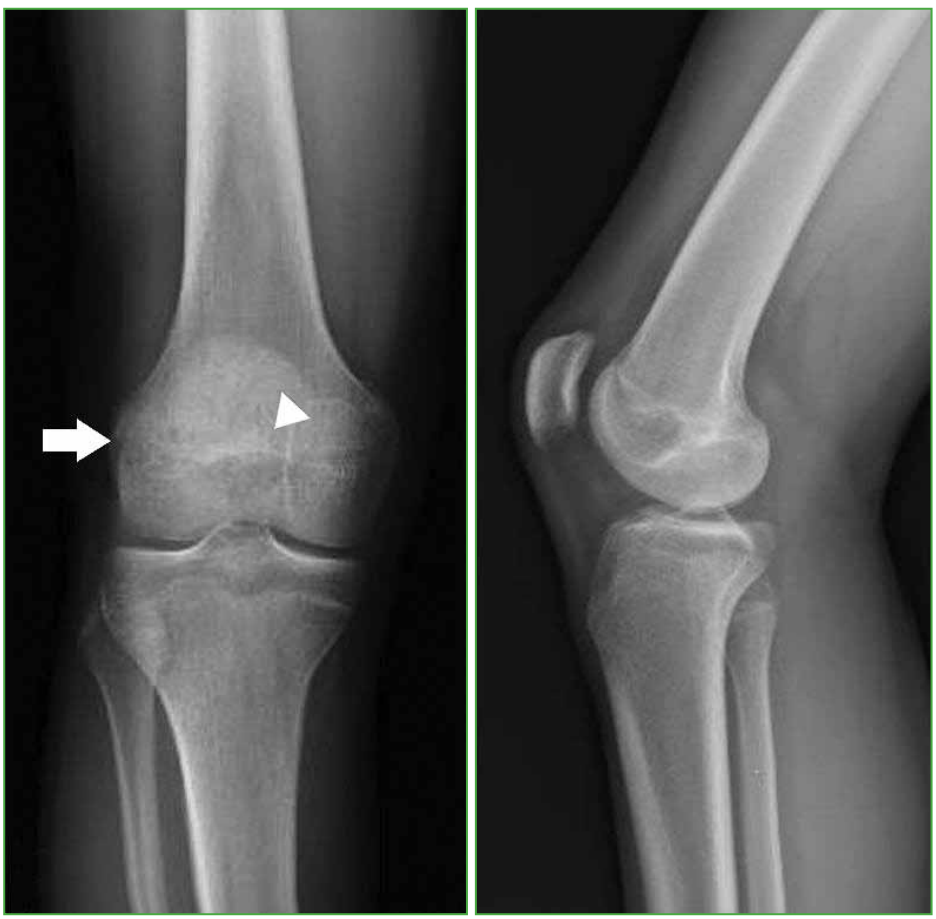

Figure 3. Anteroposterior and lateral right knee radiographs. Permeative lesion involving the outer condyle (arrow), without cortical injury or periosteal reaction, with passage to the inner condyle (arrowhead).

Dr. RODRIGO RE • rodrigo_re@hotmail.com https://orcid.org/0000-0001-7382-9459

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The magnetic resonance showed greater bone edema, accompanied by a polylobed tumor surrounding the growth cartilage, thinning the posterior cortex without breaking it (Figure 4A). Hypointensity persisted in the T1-weighted sequences (Figure 4B) and there was a marked enhancement after the injection of the contrast medium (Figure 4C). The diffusion sequences were hyperintense, with a low signal in the apparent diffusion coefficient (average value 0.6 $x10^{-3}$ mm^2/s) raising the possibility of a lesion with high cellularity (Figure 4D).

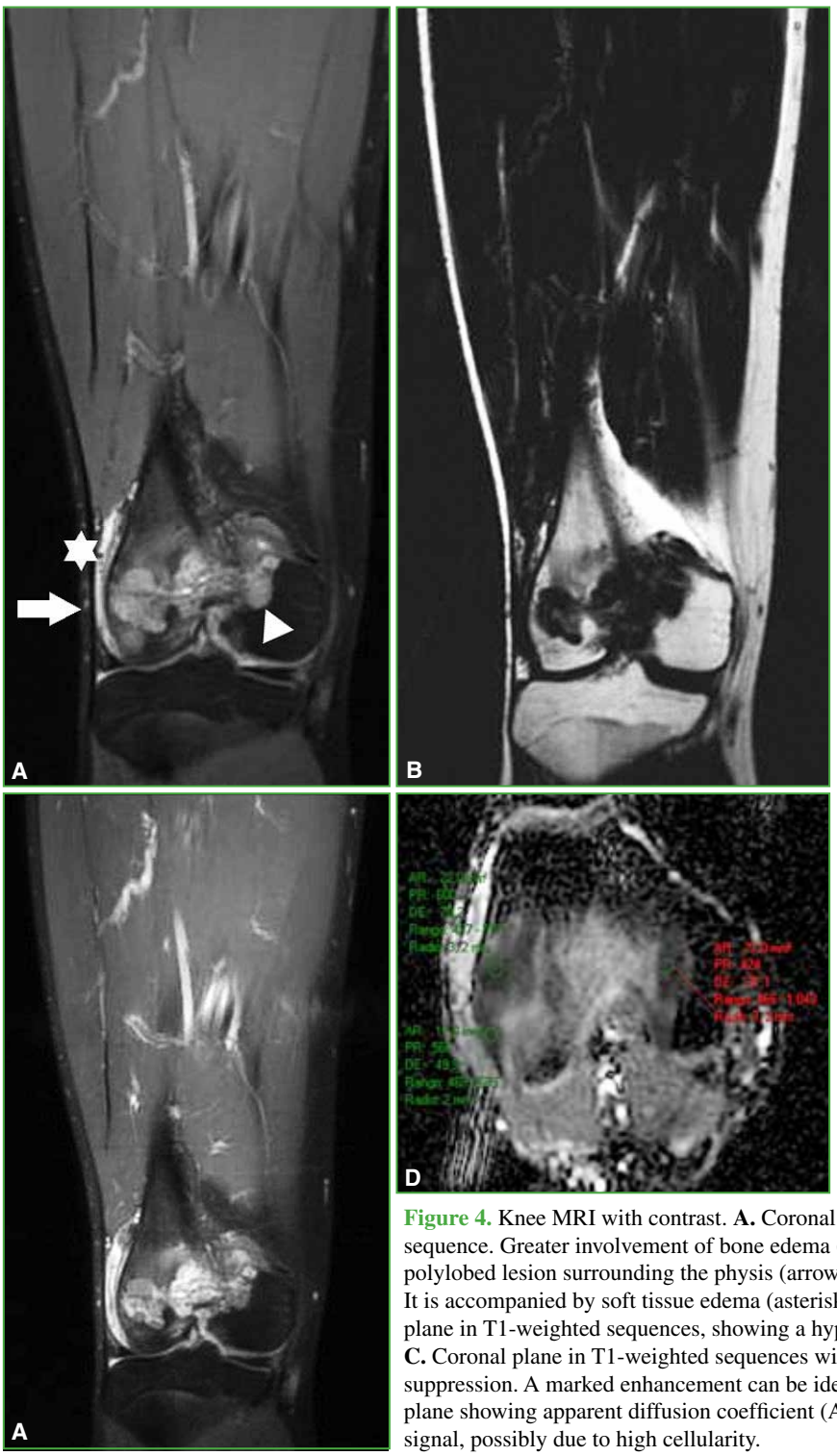

Figure 4. Knee MRI with contrast. **A.** Coronal plane in STIR sequence. Greater involvement of bone edema (arrow) with a polylobed lesion surrounding the physis (arrowhead) is identified. It is accompanied by soft tissue edema (asterisk). **B.** Coronal plane in T1-weighted sequences, showing a hypointense lesion. **C.** Coronal plane in T1-weighted sequences with contrast and fat suppression. A marked enhancement can be identified. **D.** Axial plane showing apparent diffusion coefficient (ADC) with low signal, possibly due to high cellularity.

Given these findings, a consultation at the Hematology-Oncology Service was requested. There, the pain of a year of evolution was verified, without weight loss and with slight atrophy of the muscle mass of the right thigh.

The patient underwent nuclear medicine studies to evaluate and stage the lesion. Single-photon emission computed tomography (SPECT) showed marked uptake in the early and late phases (Figure 5A) whereas positron emission tomography (PET) showed a hypermetabolic lesion with SUVmax of 8.1 (Figure 5B).

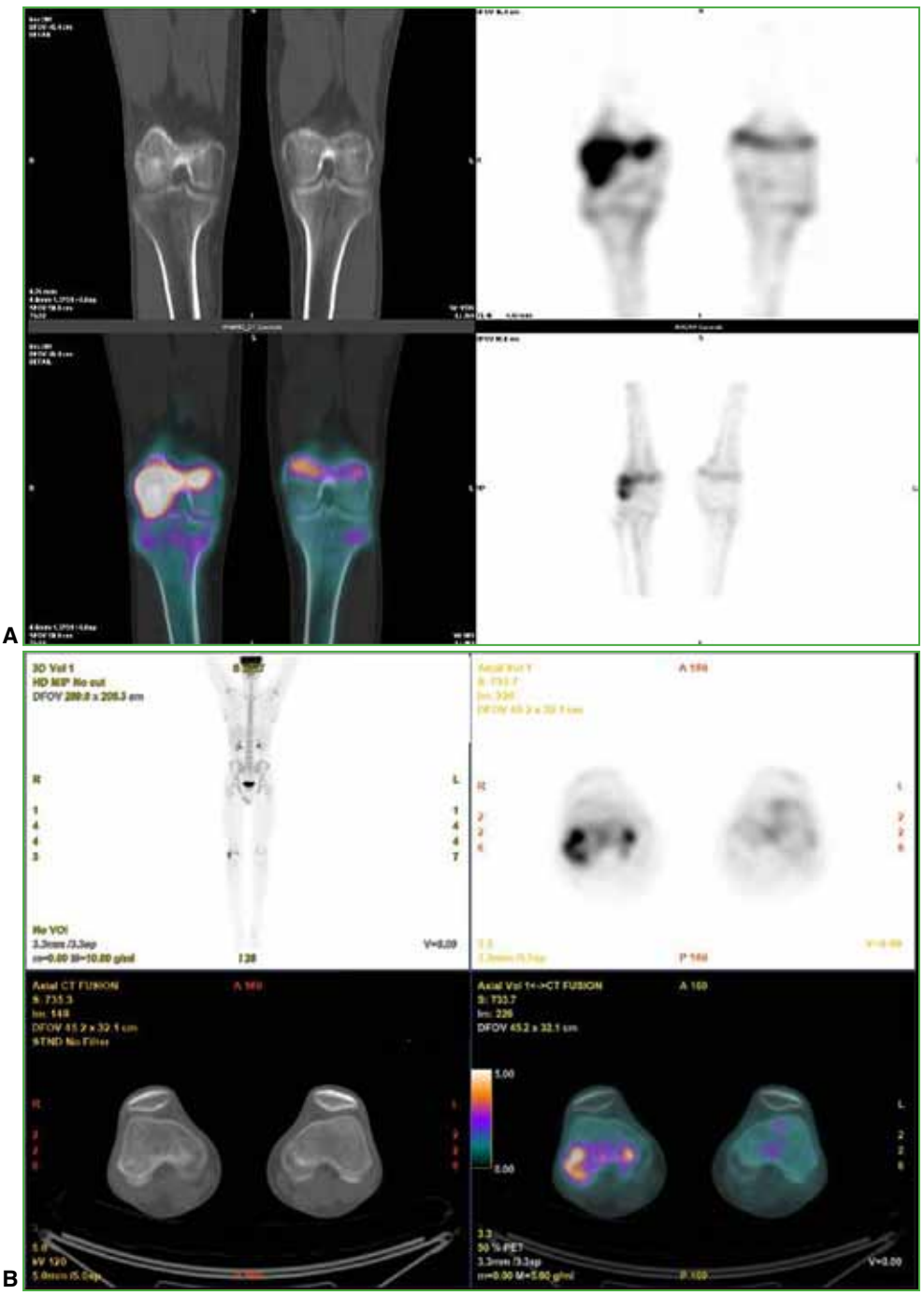

Figure 5. Nuclear medicine. **A.** Whole-body SPECT scan. Hypercaptation of the right knee is visualized in the metaphyseal and epiphyseal areas. The left knee has a faint uptake in the growth cartilage. **B.** Positron emission tomography. A hypermetabolic area is observed at the distal end of the right femur.

Later, knowing that it was a single lesion, the Tumor Committee decided to perform a CT-guided biopsy (Figure 6). The pathological anatomy study reported lymphoid infiltration at the intertrabecular level and marked phenomena of cell attrition, with positive immunohistochemistry for CD20, CD10, and Bcl6, and a high rate of proliferation (ki67).

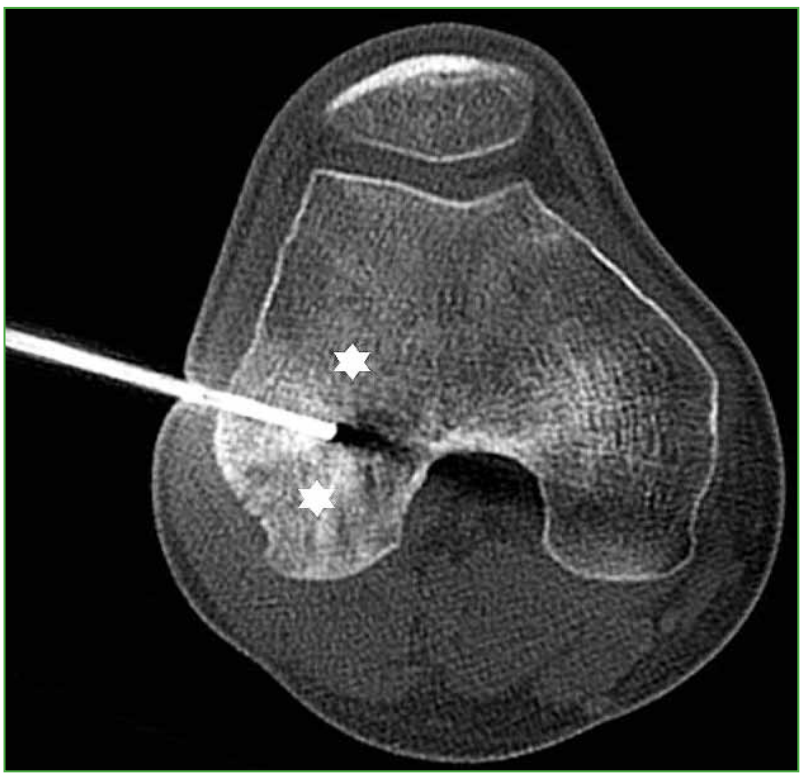

Figure 6. CT-guided bone biopsy of the outer condyle with an 11 4G thick needle. A permeative pattern is identified, confounding normal bone with pathological bone (asterisk).

DIAGNOSIS

With all these findings, primary bone lymphoma was diagnosed.

Primary lymphoma is a type of non-Hodgkin lymphoma. This is a rare lesion (5% of all extraganglionic lymphomas). It is localized in regions of persistent red bone marrow, mostly in adults. It has a predilection for long bones (71%) and, to a lesser extent, flat bones (25%).

It usually extensively compromises the bone with permeative destruction (70%). It may manifest as a lytic lesion with cortical thickening due to endosteal involvement. When the lesion begins to externalize it does so with a multilayered periosteal reaction.

Its clinical presentation includes bone pain, sometimes with a palpable mass. When the spine is compromised, there may be neurological symptoms. The first manifestation may be pathological fractures. Rarely, patients present B symptoms (fever, night sweats, weight loss).

The age range is wide (1 to 86 years), but it is uncommon in children <10 years. It is slightly more common in males (1.5:1).

Primary bone lymphoma accounts for 3-7% of all malignant bone tumors and the survival rate at 5 years is 83-90%.

Treatment involves the combination of radiation therapy and chemotherapy.

Nuclear medicine studies are used to evaluate the number of lesions and characterize them before and after treatment.

The most frequent differential diagnoses are Ewing's sarcoma and osteomyelitis (Figures 7 and 8).

Figure 7. A 13-year-old girl with right knee pain of 3 months of evolution, histologically proven as Ewing's sarcoma. Anteroposterior (**A**) and lateral (**B**) radiographs of the right knee show an ill-defined irregular region of metaphyseal demineralization (arrows) with minimal anterior cortical scalloping (**B**, arrowhead). **C.** MRI, coronal plane, T1-weighted sequences without contrast. The intramedullary demarcation line of the tumor (long arrow) and ill-defined intramedullary edema (short arrow) are observed. **D.** STIR sequence, postcontrast coronal and sagittal planes in T1-weighted sequence. The image with fat suppression (**E**) reveals the extent of edema with intramedullary enhancement (short arrows). F. T1-weighted sequence, post-contrast Fat-Sat axial plane. The finding is confirmed. Taken from Kaste SC. Imaging pediatric bone sarcomas. *Radiol Clin North Am* 2011;49(4):749-65. https://doi.org/10.1016/j.rcl.2011.05.006.

Figure 8. A 4-year-old girl with right knee pain of 3 months of evolution, without a history of trauma. Diagnosis: osteomyelitis. **A and B.** Anteroposterior and lateral radiographs. A permeative pattern (asterisk) with a multilayered periosteal reaction is observed. **C and D**. MRI, coronal planes, T1-weighted and STIR sequences. A hypointense lesion is visualized in T1-weighted sequences and a hyperintense lesion with an associated pathological fracture (arrowhead) is visualized in fluid-sensitive sequences. **E and F.** MRI, sagittal planes, STIR and T1-weighted sequences. A subperiosteal abscess is observed in the posterior distal third of the femur (arrow). **G.** MRI, axial plane. Better characterization of the subperiosteal abscess (arrow).