Case Resolution

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DIAGNOSIS: Intraosseous lipoma.

DISCUSSION

In the magnetic resonance of the left shoulder (Figure 3), a tumor was visualized in the centromedullary, proximal metaphyseal-diaphyseal region. It was predominantly made up of a hyperintense lesion on T1 sequences and hypointense on suppression sequences, surrounding a hypointense central sclerotic area on all sequences.

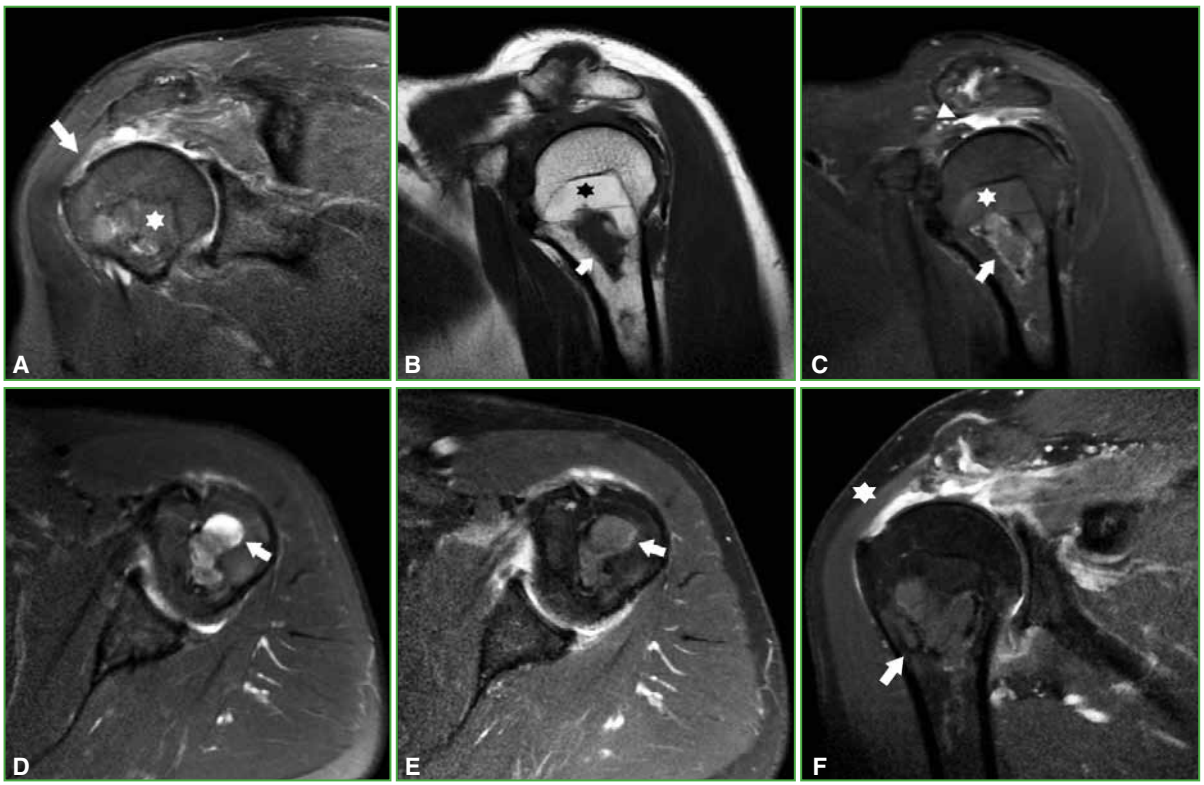

Figure 3. Left shoulder MRI. **A.** Coronal section in proton density sequence with fat suppression. Supraspinatus tear (arrow) and hypointense intraosseous lesion (asterisk). **B.** Sagittal section in T1 sequence. A predominantly hyperintense tumor (asterisk) with central hypointense lesion (arrow). **C.** Sagittal section in proton density sequences with fat suppression. The lesion becomes hypointense (asterisk) with its central component slightly hyperintense (asterisk). Supraspinatus injury. **D.** Axial section in proton density sequence with fat suppression. Heterogeneous central lesion, with a small cystic transformation (arrow). **E.** Axial section in T1 sequence with fat suppression and injection of contrast medium. Heterogeneous central lesion, with small cystic transformation (arrow) without enhancement after injection. **F.** Coronal section in T1 sequence with fat suppression and injection of contrast medium. Heterogeneous central lesion (arrow) without enhancement after injection. Supraspinatus injury (asterisk).

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It had a defined proximal margin and a poorly defined distal margin. After the injection of the contrast medium, no enhancement of any of the components of the lesion was observed.

The acromioclavicular joint presented degenerative changes with a decrease in the acromiohumeral space. Full-thickness rupture of the supraspinatus muscle tendon was visualized, with myotendinous retraction. It was suggested to complete the study with computed tomography (Figure 4).

Given the findings by magnetic resonance imaging and tomography, the treatment comprised expectant management of the bone injury and physiotherapy for the rotator cuff pathology.

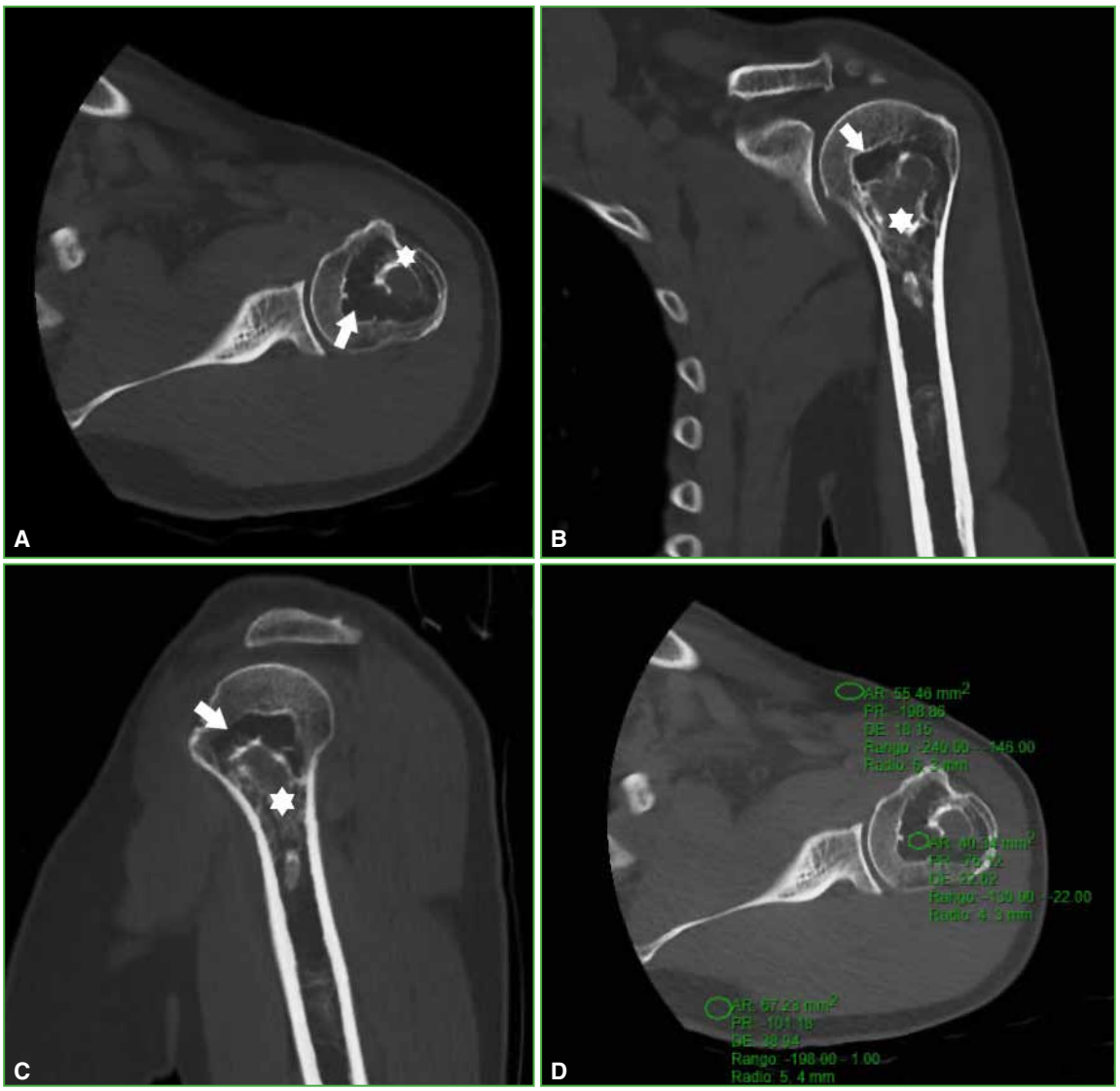

Figure 4. Computed tomography of the left shoulder. **A.** Axial section in bone window. Heterogeneous lesion that alternates hypodense (arrows) and hyperdense (asterisk) areas. **B and C.** Coronal and sagittal sections, respectively, in the bone window. A hypodense lesion (arrow) with its hyperdense central component (asterisk) without endosteal cortical invasion. **D.** Axial section in bone window where measurements of the Hounsfield Units (HU) of the lesion are made, which yield a value of -75 HU (compared with the TCS, with an average value of -150 HU).

DIAGNOSIS

Given all these findings, intraosseous lipoma was diagnosed.

Intraosseous lipomas are extremely rare and overdiagnosed, especially on MRI.

They present as fat-dense lesions in all imaging studies. They can be detected at any age and are usually asymptomatic. The most frequent type involves the calcaneus, in Ward's triangle. Treatment is indicated only when they cause symptoms, and consists of curettage and bone grafting.

A pathological classification has been described for the biopsies of these lesions (Milgram) that divides them into three groups: type I, with a predominance of viable fat cells, type II, with a predominance of transitional cells, formed, in part, by viable cells plus necrosis and calcifications, and type III, necrotic fat, calcifications, fluid levels, and reactive bone.

In imaging studies, it appears as a lytic-like lesion, with defined margins, low aggressiveness, thinning and slight cortical widening. They often have central calcifications.

Radiograph: Radiolucent intramedullary lesion, with sclerotic borders. It may have central (Milgram type II) or extensive (Milgram type III) calcifications.

Computed tomography: Intraosseous lesion with fat attenuation.

Magnetic resonance: *Type I*. T1 and T2 sequences with a hyperintense fat signal. Loss of signal with suppression. *Types II and III*. Fat necrosis with low signal on T1 sequence, high signal on T2 sequence and peripheral enhancement after contrast medium injection.

The most frequent differential diagnoses are foci of fatty bone marrow hyperplasia, fibrous dysplasia (Figure 5), simple or aneurysmal bone cyst (Figure 6), chondral lesions (enchondroma, chondrosarcoma) (Figure 7), bone infarct, avascular necrosis (Figure 8) and chondromyxoid fibroma (Figure 9).

ACTIVITY

Given this diagnosis, what treatment would you propose in your Institution?

Figure 5. Fibrous dysplasia. **A.** Radiograph of the right shoulder in internal rotation. A lesion is visualized that alternates radiolucent and radiodense areas, with a wide transition zone, and cortical thinning without rupture (arrow). **B.** Computed tomography, axial section of the proximal third of the humerus. A centromedullary "ground glass" lesion (asterisk), with marked cortical thinning (arrow). **C and D.** Magnetic resonance imaging in T1 sequences, coronal and axial planes (dotted line plane), respectively. A predominantly hypointense lesion, surrounded by hyperintense areas (spared marrow). **E and F.** Magnetic resonance in STIR sequences, coronal and axial planes (dotted line plane), respectively. A predominantly hyperintense lesion at the diaphyseal level without involvement of the epiphysis.

Figure 6. Simple bone cyst. Radiograph of the left shoulder in internal rotation. A hypodense lesion, with multiple partitions inside and cortical thinning (arrow), without epiphyseal involvement (asterisk).

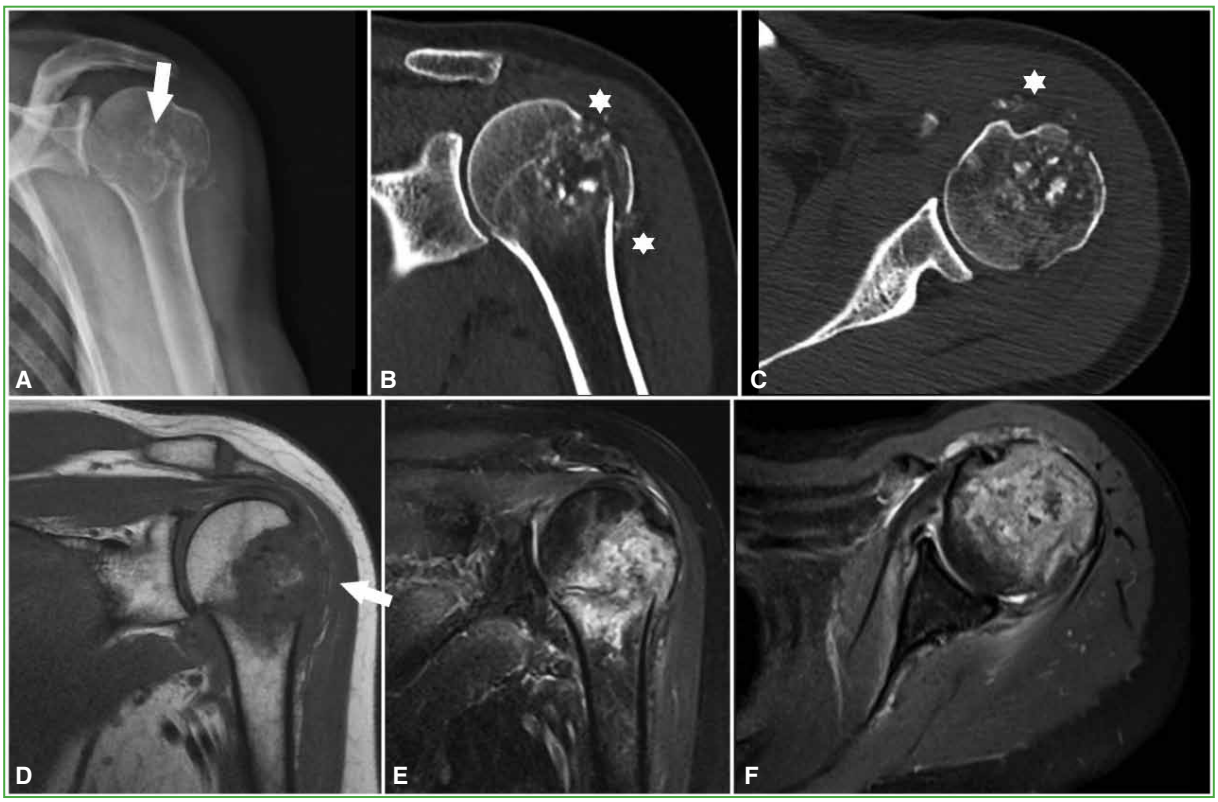

Figure 7. Chondrosarcoma. **A.** Radiograph of the left shoulder in internal rotation. Lesion that alternates radiolucent and radiodense areas (popcorn) (arrow), associated with cortical rupture due to pathological fracture. **B and C.** Computed tomography, coronal (**B**) and axial (**C**) sections of the humerus. A pathological fracture on pre-existing heterogeneous lesion. Dense images are observed in soft tissue topography (asterisks). **D.** Magnetic resonance imaging in T1 sequences, coronal plane. A predominantly hypointense lesion, with pathological fracture and soft tissue involvement (arrow). **E and F.** Magnetic resonance in STIR sequences, coronal and axial planes, respectively. A predominantly hyperintense lesion with significant bone edema.

Figure 8. Bone necrosis. Radiograph of the right shoulder in internal rotation with a predominantly epiphyseal hypodense lesion (arrow) with fragmentation of the epiphysis (asterisk).

Figure 9. Chondromyxoid fibroma. Radiograph of the right shoulder in internal rotation. A metaphyseal-diaphyseal lesion, with lobulations and internal calcification (arrowhead), and cortical thinning and insufflation (arrow), without epiphyseal involvement (asterisk).