A pathological fracture associated with a humeral chondroblastoma

Jaime Cardenal Urdampilleta1, Fernando Díez Renovales1, Laura Zaldumbide Dueñas2, Javier Castillo de Juan1, Eider Alcalde Odriozola1

1Department of Radiology, Hospital Universitario Basurto, Hospital Universitario de Basurto Avenida Montevideo 18 48013 Bilbao Vizcaya, Spain
2Department of Anatomic Pathology, Hospital Universitario Cruces, Hospital Universitario Cruces Plaza de Cruces 12 48903 Barakaldo Vizcaya, Spain

Correspondence: Jaime Cardenal Urdampilleta
E-mail: JAIME.CARDENALURDAMPILLETA@osakidetza.net
Received: July 27, 2015
Published online: September 02, 2015

Keywords: Chondroblastoma; pathological fracture; bone lytic lesion; curettage

To cite this article: Jaime Cardenal Urdampilleta, et al. A pathological fracture associated with a humeral chondroblastoma. Med Imaging Interv Radiol 2015; 1: e935. doi: 10.14800/miir.935.

Introduction

A chondroblastoma is a rare, usually benign, tumor of bone that accounts for approximately 1% of all bone tumors. In 1931, Codman classified it as a chondromatous variant of giant cell tumors, when he described these lesions in the proximal humerus [1]. A decade later, Jaffe and Lichtenstein renamed the Codman tumor a benign chondroblastoma to emphasize the chondroblastic genesis of the lesion and to distinguish it from the classic giant cell tumor of bone [2].

Case Report

A 16-year old female presented to the emergency room with a 3 weeks history of right shoulder pain that had worsened during a recent gymnastic exercise. On examination the shoulder appeared swollen and painful on abduction. Pain worsened on weight-bearing. A presumptive clinical diagnosis of a rotator cuff tendinosis was elicited and symptomatic treatment was prescribed. However the patient returned one week later complaining of increasing shoulder pain. Physical examination revealed marked tenderness without local erythema. The patient was afebrile and laboratory analysis showed no remarkable findings. A shoulder radiography was indicated.

Radiology

Radiography of the shoulder demonstrated a humeral metaepiphyseal lytic lesion with a pathological fracture involving the base of both tuberosities (Fig.1). CT confirmed both findings (Figs. 2a-c).

MRI (Figs. 3a-d) was performed showing a well circumscribed endomedullar hyperintense lesion in the metaepiphyseal region. The lesion had a peripheral rim of low signal intensity on both T1 and T2 weighted images indicating sclerotic margins. Extensive high signal intensity was present within the adjacent bone marrow and surrounding soft tissues. Both the lesion and the peripheral edema enhanced with gadolinium. Rotator cuff tendons demonstrated no abnormalities.

Curettage of the lesion was then performed filling the defect with calcium sulphate. Osteosynthesis was required to obtain a stabilize the fracture (Fig.4)
Histology

Microscopic evaluation revealed a uniform population of chondroblasts (Figs 5a-b). These are round to polygonal cells, with well-defined cellular limits, pale eosinophilic cytoplasm and ovoid nucleus with frequent longitudinal grooves. They were organized in sheets within a lobulated pattern with randomly distributed osteoclast-type giant cells. Variable sized nodules of light-staining amorphous chondroid material among chondroblasts were found and a fine network of pericellular calcification in the so called “chicken wire” pattern was also demonstrated. Mitosis was observed but no atypical forms were present. Ultrastructural studies revealed features typical of fetal chondroblasts.

Discussion

Although differential diagnosis of a lytic lesion in a young patient is very extensive, only a few tend to arise in the epiphysis.
Chondroblastoma is a rare cartilaginous neoplasm that characteristically arises in the epiphysis of long bones, principally in young patients, and represent less than 1% of all primary bone tumors [3, 11, 12].

These tumors affect principally people between 10 and 30 years of age, however, Chondroblastoma has been reported to arise in individuals in the age range between 3 and 73 years (90% occur between 5 and 25 years of age)[3].

The most commonly involved area is the lower extremity (72% of cases), and 50% of tumors occur around the knee. Origin in distal femur, proximal tibia and proximal humerus show similar frequencies (20% each)[4]. The rest originates from flat bones and small tubular bones of hands and feet.

The clinical picture is quite non-specific and includes local pain, often accompanied in the case of para-articular lesions by impaired function of an adjacent joint [5, 12].

On radiographs, chondroblastoma appears as a well-defined, osteolytic lesion with a thin sclerotic rim located in the epiphysis or apophysis of a long bone [5, 14]. CT demonstrates similar findings, although endosteal remodeling is more conspicuous. Periosteal reaction may also be seen on radiography or CT in about half of the cases.

MRI is ideal for the evaluation of transphyseal or transcortical extension, and for demonstrating associated surrounding bone marrow edema, which is seen in a large proportion of cases [6]. These lesions have typical features of cartilage: low to intermediate signal on T1 images and intermediate to high signal on T2. In our case the lesion was mainly hyperintense due to the lack of chondroid calcifications.

Most chondroblastomas are associated with significant alterations in signal of bone marrow and adjacent soft tissues which besides being edematous, present an intense and homogeneous paramagnetic contrast-enhancement [7]. Such peripheral enhancement is typically more intense than the enhancement of the tumor itself and some authors have observed that this finding also occurs in other benign tumors with aggressive features like osteoid osteoma and Largerhans Cell Histiocytosis.

Additionally in this case a pathological fracture was present which increased the surrounding edema and enhancement.

Pathologically, chondroblastoma is composed of medium-sized, round or multinucleated cells with a distinct border, and the giant cells generally have several to more than ten small nuclei [8]. In some cases, chondroid matrix is observed. In the present case, histopathological examination of an intraoperative specimen showed typical findings suggestive of chondroblastoma, such as “chicken wire” calcification [4].

Chondroblastoma does not undergo spontaneous resolution if left untreated; therefore, intervention is necessary to stop progression and alleviate pain. Curettage and packing of the area with bone graft or polymethylmethacrylate is currently the standard treatment. However, chondroblastomas may be difficult to eradicate surgically because they are usually located in the epiphysis and may be near an open growth plate and/or articular cartilage. Functional impairment and growth disturbances may occur, although most patients are near the end of their growth spurts, and therefore this is not usually a major concern. Local recurrence is a substantial concern in surgically treated patients [9]; previous studies report recurrence rates of 8%-20%.

Radiofrequency may be an effective alternative to intervention in some cases [13]. In a study by Rybak et al of 17 patients who were treated with radiofrequency ablation for chondroblastomas, the authors concluded that percutaneous radiofrequency ablation is an alternative to surgery for selected chondroblastomas but that larger lesions under weight-bearing surfaces need to be approached with caution because of an increased risk of articular collapse and recurrence [9, 10, 15].

The diagnosis of Giant Cell tumor and Largerhans Cell Histiocytosis was also initially suggested in our case, but the sclerotic margins and the fact that it did not about the articular surface suggested chondroblastoma.

Conflict of interests

The authors declare that they have no conflict of interest.

References


