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Case Report

Giant-Cell Tumor of the Patella

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Abstract

The patella is an uncommon anatomical site for primary bone tumors; however, giant-cell tumor is the most common one in this bone. This tumor appears in 20 to 40-year-old adults and it is rare in children under 13 years old. It is twice as common in women and it has a locally-aggressive biological behavior. We present you the case of a 48-year-old man who came to a physician's visit due to volume augmentation and pain in the right patella with knee flexion limitation. Simple X-rays showed a lytic, expanding, benign lesion in the right patella, for which the biopsy confirmed the diagnosis of giant-cell tumor. Extension studies determined the tumor was in stage III; therefore, total patellectomy with extensor mechanism reconstruction was performed.

Keywords: Giant Cell Tumor; Patella; Patellectomy

Introduction

Giant-cell tumor is a histologically-benign neoplastic lesion which is formed by osteoclast-type multinucleated giant cells that mix with mononucleated spindle cells and histiocytes [1]. Its common site is epiphyseal in the distal femur, followed by the proximal tibia, the distal radius, and the proximal humerus [2]. It has a higher incidence in 20 to 40-year-old adults and it is rare in children under 13 years old; only 10 % of the cases reported occurred in subjects under 65 years old. It affects women more often and it grows more rapidly during gestation [3]. Its regular biological behavior is that of progressive osteolysis, cortical destruction, periosteal distention, and expansive centrifugal growth. The patella is a rare site (less than 1%) for all giant-cell tumors, which is the main reason for submitting this report [3].

Clinical Case

A 46-year-old, male patient who has suffered pain in the anterior side of the knee for 5 years, augmentation of patellar volume associated to flexion limitation 0-100 degrees, no skin erythema or collateral circulation (Figure 1).

Figure 1: Clinical Image of Giant-Cell Tumor of the Patella in AP View.

Simple knee X-ray: right patella, lytic 9-cm big expanding tumoral mass, of great diameter, with diagnostic impression of giant-cell lesion and with associated aneurismal bone cyst. Additional CT scan of the chest was negative for metastasis, the bone scan confirmed the lesion was monostotic, and (Figure 2-3) serum calcium and phosphorus were normal.

Figure 2: Lytic, Expanding, Patellar Lesion Compatible with Giant-Cell Tumor.

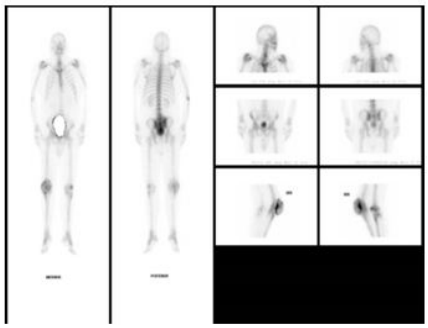

Figure 3: Bone Scan Image with Increased Uptake in the Right Patella.

Right patella open biopsy reported abundant osteoclast-type multinucleated giant cells distributed uniformly and surrounded by dense accumulations of mononucleated cells, compatible with giant-cell tumor. (Figure 4) [4,5]. Given the histological diagnosis and the clinical and radiological signs, the tumor was determined to be in stage III, and the following surgical treatment was planned: total patellectomy and extensor mechanism reconstruction. [6].

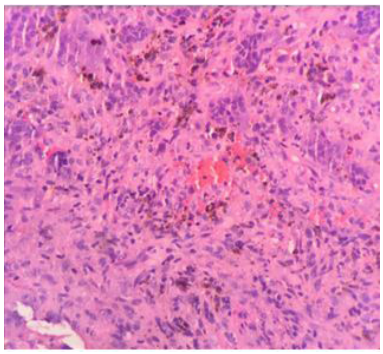

Figure 4: Histopathological Image H-E Showing Abundant Multinucleated Giant Cells that are Predominantly Osteoclasts.

Marginal patellar resection was performed using medium anterior approach (Figure 5), closing of internal and external skin flaps (Figure 6), and patellar and quadriceps tendon section. (Figure 7) [4,6].

Figure 5: Anterior Knee Approach for Patellar Tumor Excision.

Figure 6: Mass Exposure with Lifting of Knee Skin Flaps.

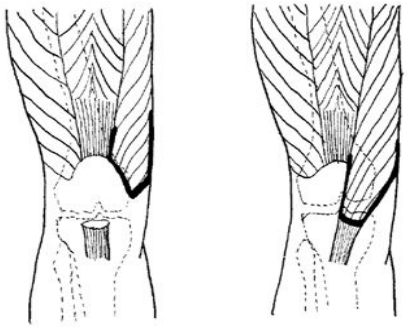

Figure 8: Reconstruction Technique of the Knee Extensor Mechanism with the Vastus Medialis Muscle.

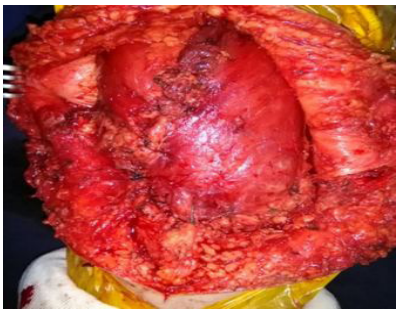

Figure 9: Post-Patellectomy Reconstruction of the Extensor Mechanism with Vastus Medialis Muscle.

Discussion

This case report aims to highlight the rare occurrence of giant-cell tumor in the patella-with chondroblastoma as the most common primary tumor [3], the aggressive local and osteolytic behavior of this tumor, and the need to perform a marginal tumor resection with total patellectomy in order to achieve local control. It describes the reconstruction of the extensor mechanism with regional anatomical structures [1,6]. The standard biopsy technique for this case is made with tru-cut needle and local anesthesia [9]. This patient had an open biopsy performed outside the institution.

The recommendation is to perform said biopsy at the same referral site where the patient is treated. The delayed clinical presentation in stage III made it necessary to perform a more extensive surgery. The earlier the diagnose, the higher the probability to perform intralesional tumor therapy and to preserve the anatomy of the affected site [8,9]. Having the support of diagnostic specialties, such as Radiology and Pathology, make the orthopedic oncology practice safer, especially in clinical cases with rare occurrence [9].

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