Giant Cell Tumor of the Patella in a Skeletally Immature Patient

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Introduction
We present the case of a 10 year old female with giant cell tumor of the patella. Unique case in both site of tumor and its presentation in a skeletally immature individual. The case and clinical course is presented, and current literature reviewed.

Case History
In January 2010, a 10 year old girl first noted right knee pain. By March 2010, she presented to her primary physician, and the symptoms were thought to represent runner’s knee. The pain persisted, and in July 2010 she had a fall. X-ray in the emergency department revealed patellar erosion and disruption, and soft tissue swelling. MRI August 2010 demonstrated an expansile patellar mass which completely replaces the patella and extends into Hoffa’s fat pad. Needle biopsy came back as chondroblastoma. In bone tumor interdisciplinary conference, the tumor was felt to be behaving more aggressively than a chondroblastoma. Additional imaging and pathology review was undertaken. PET CT September 2010 demonstrated a hypermetabolic right patellar soft tissue mass and subcutaneous nodule. In addition, numerous pulmonary nodules, some hypermetabolic, were discovered. Wedge biopsy of 3 lungs nodules, open biopsy of the patellar tumor, and review of pathology returned a diagnosis of giant cell tumor for all sites.

Imaging

Pathology

Microscopic image of patient’s giant cell tumor, showing multinucleated giant cells amid stromal cells.

Literature Review

Giant cell tumor was first described by Sir Astley Cooper in 1818, and accounts for up to 9.5% of primary bone tumors (1), with the overwhelming majority in skeletally mature patients. It is for the most part a benign, locally aggressive tumor with a tendency for local recurrence. Classically it is a metaepiphyseal or epiphyseal lesion which abuts the articular surface, with the majority of cases about the knee. Giant cell tumor is a rare entity in the pediatric patient. Prevalence in the literature ranges from 1.8% to 10.6% (2 – 4). Giant cell tumors in the skeletally immature are usually found in the metaphysis, versus the typical metaepiphyseal location in mature bones (2,3). Giant cell tumors in this age group are also largely seen in females (4 – 6).

Clinical Course
The patient was started on denosumab in October 2010, a monoclonal antibody which ultimately inhibits osteoclastic activity. It is licensed as a treatment for osteoporosis (7). She had a marked improvement in her symptoms as soon as after the first dose. Follow-up PET CT 2 weeks later demonstrated decrease in metabolic activity of the primary tumor. The most recent imaging in May 2011 showed stable to decreased size of the primary tumor, decreased FDG uptake on PET, and slight decrease in size of the pulmonary metastases.

Discussion
Though giant cell tumor is part of the differential when presented with a juxta-epiphyseal or epiphyseal lesion, leaving it out of the differential for a skeletally immature patient is overall an accurate generalization. It should be considered, but cases such as ours are unusual. It was the only such case seen at our institution in the past 8 years. And our incidence is in line with the reported frequency in the literature. Our case also fits the tendency for giant cell tumors in the immature skeleton to occur in females.

References