

## **ABSTRACT #11407**

Authors: Jordan S. Gross, MD<sup>1</sup>, Benjamin D. Levine, MD<sup>1</sup>, Michelle McNee, MD<sup>1</sup>, Benjamin Plotkin, MD<sup>1</sup>, Leanne Seeger, MD<sup>1</sup>, Kambiz Motamedi, MD<sup>1</sup> and Nicholas Bernthal, MD<sup>2</sup>

<sup>1</sup>Department of Radiology, David Geffen School of Medicine at UCLA, Los Angeles, CA.

<sup>2</sup>Department of Orthopedic Surgery, David Geffen School of Medicine at UCLA, Los Angeles, CA.

Background: Musculoskeletal pseudotumors or “tumor mimics” (benign, non-neoplastic disease), are commonly encountered in orthopedics, and pose a clinical challenge for orthopedic oncologists and musculoskeletal radiologists. Musculoskeletal pseudotumors are becoming more frequently encountered due in part to the increasing availability of higher field strength MRI and clinical referrals. Distinguishing between neoplastic and non-neoplastic disease is critical for both initial and long term patient management.

Questions/Purposes:

1. What are the most common musculoskeletal pseudotumors?
2. To characterize the imaging features (CT, Ultrasound or MRI), of some of the most common musculoskeletal pseudotumors.
3. Is there an age predilection for benign lesions when compared to more aggressive lesions?

Patients and Methods: We performed a retrospective review of all cases presented at our weekly sarcoma tumor board over a period of 9 months in 2010 (March 2010-November 2010). The year 2010 was chosen because it allowed for an adequate amount of time to establish a diagnosis and for sufficient follow-up. All cases had pathologic confirmation of the diagnosis. Inclusion criteria included any bone and soft tissue lesion that was discussed during the aforementioned time frame at our weekly tumor conference. Metastatic disease to the skin, subcutaneous tissue, muscle or bone was included. Recurrent lesions were also included. Scar resections were considered if there were imaging findings that suggested the possibility of recurrent disease. Intra-thoracic, intra-abdominal and intrapelvic lesions were excluded (this includes any metastatic lesion in the chest, abdomen and pelvis, even if the primary site of malignancy was a bone or soft tissue tumor). Other exclusion criteria included cases focusing on hardware removal, cases in which no definitive pathologic diagnosis was made and cases in which no final pathology result was available in our electronic medical record. We separated the remaining cases into benign and aggressive-appearing lesions. The benign lesions were further subdivided into neoplastic and non-neoplastic disease. We then stratified these lesions by demographics and location of the tumor.

Results: There were a total of 315 lesions that were investigated: 174 were aggressive appearing lesions and 141 were benign lesions. Of the aggressive lesions, 95 patients were male and 79 were female. Of the benign lesions, 71 were male and 70 were female (52 male and 48 female of benign neoplastic disease; 19 male and 22 female of benign non-neoplastic disease). The average age for patients with aggressive neoplastic disease was 50.3 years. The average age for patients with benign neoplastic disease was 36.8 years; the average age for patients with benign non-neoplastic disease was 42.9 years. Of the benign lesions, 100 were neoplastic and 41 were non-neoplastic disease. The non-neoplastic lesions included: 11 cases of bone fragments, cartilage and/or fibroadipose tissue, 5 cases of chronic osteomyelitis, 5 cases of nodular synovitis, 4 ganglion cysts, 3 cases of scar tissue, 3 cases of granulomatous inflammation, 2 hematomas, 2 cases of nodular fasciitis, 2 cases of heterotopic ossification, 1 case of ischemic fasciitis and 3 “miscellaneous” cases (Paget’s disease, Rosai-Dorfmann disease, and fluid collection with debris).

Conclusion: The most common musculoskeletal pseudotumors or tumor mimics in this study were bone fragments (fractures or non-specific sclerotic lesions), chronic osteomyelitis and nodular synovitis. Tumor mimickers comprised 13% of all lesions investigated. A similar analysis was performed by Crundwell et al. (*Clinical Radiology* **2007**) with similar results and percentages (13% vs. 17%). However, one of the major differences is that the review by Crundwell et al. focused on soft tissue tumors, and did not include bone tumors. Another noteworthy observation in our study is that benign lesions presented at an overall younger age than aggressive lesions. One limitation for our study is that our study sample only includes lesions that were biopsied or excised. Therefore, this is not necessarily a representation of the most common presenting tumor mimickers, but the ones that most commonly require tissue sampling for definitive diagnosis. Another limitation is that many of these lesions were initially worked up at outside institutions, and the quality of imaging and biopsy samples from outside studies could not be controlled. However, all of the cases were reviewed by the radiologists and pathologists at our institution. In conclusion, this study emphasizes that musculoskeletal tumor mimickers are relatively common and present at a younger age as compared to aggressive lesions. Such lesions can present a clinical challenge to both orthopedic oncologists and musculoskeletal radiologists.