Submission Number: 11034

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Background: The mainstay treatments for pathological fractures of the proximal humerus due to metastatic disease include fixation with plate osteosynthesis or intramedullary nailing (IMN) supplemented with polymethyl methacrylate (i.e. bone cement)(PMMA).

Question/Purpose: The goal of our study was to examine the functional outcomes and complications associated with fixation of impending and actual pathological fractures of the proximal humerus due to metastatic bone disease.

Patients and Methods: A retrospective analysis was performed on 13 patients (6 males, 7 females) who presented with impending or actual pathological fractures of the proximal humerus. These patients were treated with plate osteosynthesis (n=4) and IMN (n=9) by a single surgeon from 2010 to 2014. The most common diagnosis was metastatic carcinoma (n=8), followed by myeloma (n=5). The choice of fixation was dependent upon the amount of bone stock available for proximal fixation with screws and necessity of screw augmentation with significant amounts of polymethyl methacrylate. Patients were assessed using the Musculoskeletal Tumor Society Scoring system (MSTS) according to pain, function, emotional coping, hand positioning, manual dexterity, and lifting ability, as well as range of motion (ROM) and performance status using the Eastern Cooperative Oncology Group (ECOG) and Karnofsky (KPS) scales.

Results: Average length of follow-up was 11.31 months (range: 2-47 months). Average MSTS score was 23.8 (range: 13-30). ECOG/KPS scores ranged from 1-5 / 0-100 (average: 1.57/76.4). Three patients died within 1 year of surgery due to progression of metastatic disease. Thirty eight percent of patients experienced excellent ROM, 46% had good, 16% had poor. Nine patients achieved a four or higher on the MSTS pain scale, while two patients scored a 2. The two patients who did not achieve a satisfactory pain score had myeloma and progression of systemic disease resulting in chronic bone pain elsewhere. Despite two low pain scores, all other patients were adequately palliated, pain well-controlled, and could use their extremities for activities of daily living. The only major complication was one non-union of a pathological fracture due to postoperative radiation that resulted in hardware failure (plate=1). The patient elected to not undergo revision of the plate because her pain was well controlled and she had good elbow and hand function. There were no infections or amputation.

Conclusions: Patients with impending or actual pathological fractures of the proximal humerus from metastatic cancers can be safely treated and adequately palliated with either IMN or plate fixation. Most patients are primarily pain free and have good to excellent functional outcomes within a short time frame from surgery. There is a low rate of complications. Method of fixation may be chosen based on availability of bone stock for proximal fixation with screws and ability to augment fixation with PMMA.