

Number and Title: 10806 - Large Segment Allografts in Limb Salvage

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Introduction: The current treatment of musculoskeletal tumors with limb sparing techniques has evolved. Advances in endoprosthetics have changed the way we use allografts. Advanced imaging and neoadjuvant treatment permits joint-sparing procedures. Partial joint resections have continued the use and need for osteoarticular replacements.

Questions/Purposes: What are the complications associated with limb sparing techniques? What are the final outcomes of these complications?

Methods: A retrospective review of musculoskeletal oncology patients at our institution from 1991-2013 was performed. Patients were identified who were treated with an intercalary or osteoarticular allograft, or an allograft prosthetic composite (APC) for a musculoskeletal tumor. Data was evaluated with respect to the outcome of surgery, including complications. Methods of salvage and rates of limb retention were analyzed.

Results: Eighty-three patients (34 male, 49 female) were identified with seventy-four primary tumors (61 primary sarcomas, 12 benign aggressive tumors, nine metastatic lesions, and 1 post-traumatic lesion). The 83 surgical sites were: 28 tibia, 21 femur, 17 humerus, 8 pelvis, 7 radius/ulna, 1 scapula, and 1 knee. The mean age was 34 years (range 4-70). With a mean follow-up of 7 years, thirty-seven patients (45%) had complications that required a second surgery at an average of 35 months (range 0.5-146) after the index procedure. These included 15 non-unions, 7 infections, 5 fractures, 5 recurrences, 3 cases of osteolysis, and 2 painful hardware. Of the twenty non-unions and fractures, 11 were successfully grafted, 8 were salvaged with endoprostheses, and 1 required amputation. Three patients with allograft resorption had second procedures. Two had an endoprosthesis revision while the third had removal of plate and screws. All seven infections were treated with debridement and antibiotics: 4 grafts were retained, 2 patients underwent a two-stage reimplantation with spacer prosthetic and endoprosthesis, and 1 patient required an amputation. There were five oncologic complications (local recurrences) that were treated with repeat wide resection and conversion to endoprosthetics in three, a repeat allograft in one, and one required amputation.

The second procedure in thirty of 37 patients (81%) was successful and required no additional surgery. The remaining seven patients required additional procedures. Overall, there were 1.6 procedures per patient. The allograft retention rate was 77% and the limb retention rate was 96%. Allograft healing problems (non-union, fracture, resorption) occurred in 28% of patients and comprised 72% of all non-oncologic complications. Intercalary grafts had the highest rate of non-unions (33%) and APCs had the highest rate of infection (17%).

Conclusions: The use of allografts has allowed patients to retain portions of their joints and long bones that would normally be resected to accommodate an endoprosthesis. Allografts allow preservation of bone stock which affects subsequent surgery. Despite the post-operative complication rate of 50%, a successful secondary surgery rate of 81% with a 96% limb retention rate suggests allografts still have a role in limb salvage.