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Surgical Treatment of Infected Tumor Megaprotheses with Staged Reconstruction

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Introduction: Limb salvage in musculoskeletal tumor surgery may be complicated by infection. Due to the fact that previous surgery is extensive and usually involves large endoprostheses and allografts, attempts at further limb salvage may be considered futile. Amputation is commonly considered. With the advent of modern techniques and medical management limb sparing surgeries can be considered as an alternative to ablation.

Purpose: Does prior treatment with segmental endoprostheses prohibit further successful limb salvage?

Methods: Between 1992 and 2014, 17 patients were treated for infected megaprotheses after being surgically treated for musculoskeletal tumors. There were nine females and eight males. The mean time from the index procedure until infection was 30 months. Following radical debridement, the resultant skeletal defect averaged 30 cm. Patients were treated with local antibiotics in polymethyl methacrylate (PMMA) spacers and endoprostheses as well as IV antibiotics for a minimum of six weeks followed by oral antibiotics for an additional six weeks. The initial tumor procedure involved the femur in eleven patients, the tibia in two, the acetabulum in one, the humerus in two, and the ulna in one. Patients had repeat cultures before two-stage reimplantation when their WBC, ESR, and CRP returned to normal. Patients were reimplanted when final cultures were negative.

Results: Thirteen patients were treated using a two-stage protocol with customized intraoperative antibiotic impregnated PMMA spacers including intramedullary nails for a mean of 10 months and the other four patients had a one-stage procedure. These four patients included two patients with a total femur replacement and two patients with an allograft-prosthetic composite of the proximal humerus and ulna. The organisms cultured were gram positive in 14 cases, mixed gram positive and negative in one case, and two patients had no growth on cultures but histologic evidence of acute infection. Reimplantation was successful in 13 patients after the initial procedure (76%). Four patients had recurrent infections. One of these patients was successfully reimplanted after an additional one-stage procedure, two had a second two-stage procedure and have retained their spacers, and one patient had an arthrodesis procedure which became reinfected and required an amputation. Successful limb salvage in regards to infection control occurred in 14/17 patients (82%). One additional patient required an amputation for an oncologic complication (local recurrence), so the overall limb salvage rate was 13/17 (76%).

Conclusion: Patients with megaprothetic infections following limb salvage treatment for musculoskeletal tumors do not have to be uniformly subject to amputation. Radical debridement and appropriate antibiotics in conjunction with custom spacers followed by selective one- and two-stage reimplantation results in successful limb salvage in 82% of patients. This result is similar to other reports despite the large size average defects.