

Very Long Term Outcomes Following Endoprosthetic Replacements

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Introduction: Limb salvage surgery had replaced amputation as the preferred treatment modality in more than 90% of the patients with extremity sarcomas. Endoprosthetic reconstruction has the advantage of providing immediate stability, thus allowing early mobilization, rehabilitation, and weight bearing. However, the long term results of these megaprotheses are still lacking.

Aim: To establish what happens to patients in the long term (>25 yrs) following endoprosthetic replacement. All patients in this series had first generation prosthesis (e.g. at the knee a cemented, fixed hinge).

Methods: A prospective database contains details of all patients treated at our unit with musculoskeletal tumours. All patients who underwent an endoprosthetic replacement more than 25 years ago (prior to 31/5/1990) and who survived for at least 20 years were identified and their outcomes investigated with particular reference to the development of complications and the need for further surgery. 229 patients who had complete follow up and were alive at 31/5/2015 were identified. The mean age at diagnosis was 20.8 years (range, 5-62 years). The most common diagnoses were osteosarcoma (132) followed by Ewing's sarcoma (31) and chondrosarcoma (23). There were 101 distal femoral, 59 proximal tibial, 26 proximal femoral, 20 proximal humeral, 8 intercalary, 5 total femoral, 5 total humeral, 4 hemipelvic, and 1 distal humeral endoprosthetic replacements.

Results: All patients were followed up for a mean period of 28.8 years (range, 25 to 43 years). The 229 patients had a total of 653 further operations (excluding lengthening of expandable prostheses and rebushing). This averaged 2.9 further operations per patient over a minimum of 25 yrs. Those without infection had a mean of 2.1 further operations whilst those with infection had 4.6 further operations. 38 patients (17%) still had the original prosthesis in situ after more than 25 years. 34 patients required an amputation, one for vascular problems, 22 due to infection and 10 due to local recurrence. Only one patient had an above knee amputation for fixed flexion deformity of the knee while none of the amputations were done purely for mechanical failure.

The risk of infection persisted throughout the life of the prosthesis and averaged about 1% per year. Of the 65 patients who developed an infection, 11 developed it within 6 months of a previous surgery – suggesting that the risk of infection following any further surgery was around 2%. The biggest risk sites for infection were the proximal tibia (49%), proximal femur (26.9%) and the distal femur (24.7%) and for amputation were the proximal tibia (26.7%) and the proximal femur (15.4%). 26 of the 65 patients with an infection (40%) eventually had an amputation.

Functional scores were generally well maintained in patients despite further surgery but were decreased in those with infection.

Conclusions: This study represents the longest and most detailed follow up of patients with 'first generation' endoprostheses. It shows that further surgery is almost inevitable as patients live longer but in the majority limb salvage is maintained. Late complications continue to arise however with infection being the most devastating.