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Survival of Modern Tumor Endoprostheses: complications, functional results, and a comparative statistical analysis

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Background: Lower limb is a frequent site for bone tumors. Due to their availability, modularity, uncomplicated usage, immediate fixation, and relatively low complication rates compared to alternatives, metallic endoprostheses have become the reconstruction option used most commonly. Complications and failures of these devices remain high compared to other arthroplasty procedures. Objective of this study was to retrospectively analyze results of a modular reconstructive tumor prosthesis for the lower limb (GMRS-Stryker) in primary and secondary implants.

Materials and Methods: Twohundred-nintyfive GMRS prostheses were implanted: 197 primary implants, 98 revisions in 84 failed primary reconstructions after tumor resection and 14 failed implants for non oncologic reasons. Sites of reconstruction included: 199 distal femur, 60 proximal tibia, 32 proximal femur, 4 total femur. Histologic diagnoses: 166 osteosarcomas, 22 Ewing sarcomas, 22 chondrosarcomas, 18 spindle cell sarcoma, 12 other sarcomas, 6 metastases, 35 giant cell tumors. Causes of endoprosthesis failure were classified as: soft tissues failures about the implant (Type 1), aseptic loosening of the implant (Type 2), structural fracture (Type 3), infection (Type 4), and tumor recurrence (Type 5). Functional results (MSTS system) were analyzed and Kaplan-Meier curves of implant survival defined comparing primaries and revisions.

Results: At a mean oncologic follow up of 4.2 years (range, 2 to 8 years), 195 patients are continuously NED, 43 NED after treatment of relapse, 10 AWD, 33 DWD. The overall failure rate in our series was 28.8% and failure occurred at a median of 1.7 years (range, 1 month to 7 years). There was a significant difference in implant survival of all modes of failure between primary and revision implants ($p = 0.0313$). There was also significant difference in implant survival of failure of primary and revision proximal tibial implants ($p = 0.0410$). Breakage of prosthetic components did never occur. Functional scores were obtained in 229 of 295 patients. The average overall score was 81.6% (24.5 range, 5-30).

Conclusion: Middle term results with GMRS are promising, with excellent functional results and low incidence of complications. A significant difference in implant survival was found in this series between primary and revision implants. Functional results are satisfactory.

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