

**Abstract number: 11195**

Does A Constrained Shoulder Endoprosthesis Replacement After Tumour Resection Offer Any Advantage Over A Simple Humeral Prosthesis?

Shintaro Iwata, Krishna Reddy, Simon R. Carter, Roger M. Tillman, Adesegun T. Abudu, Lee M. Jeys, Robert J. Grimer

Oncology Unit, Royal Orthopaedic Hospital, Birmingham, United Kingdom

*Background* Reconstruction after tumour resection of the proximal humerus can be a formidable challenge for the musculoskeletal oncology surgeon. Proximal migration is one problem for patients who have undergone an allograft-prosthesis composite or endoprosthesis reconstruction and this may arise due to massive resection or detachment of the shoulder girdle musculature. It can lead to unsatisfying function and severe pain. Constrained shoulder endoprosthesis replacement is a good solution for that, although no study has demonstrated factors associated with the implant survival and functional outcome of those patients.

*Questions/purposes* We therefore evaluated (1) the implant survival and functional outcome of the patients treated with constrained shoulder endoprosthesis both as a primary and revision procedure and (2) which clinical factors were associated with these outcomes.

*Methods* 22 patients underwent surgery using the Bayley-Walker endoprosthesis (BWE), which includes a humeral component with a socket and a glenoid component with a ball, between 2000 and 2013. It is designed to obtain stabilization of the glenohumeral joint by a constrained joint mechanism.. Indication for BWE reconstruction consisted of salvage surgery for migrated endoprosthesis in 12 patients and primary surgery for patients likely to have an instability due to massive shoulder girdle musculature resection in 10 patients. The first-generation BWE was used from 2000 to 2006 and second-generation BWE from 2006 to 2013 that was revised because of unsatisfactory dislocation rate of first-generation BWE. We assessed the implant survival of those patients with Kaplan-Meier method. The endpoint of the survival was an implant failure which was a removal or dislocation of the prosthesis that was never restored. Functional outcome was evaluated using the MSTS Score. Differences in survival among the factors were assessed by the log-rank test and associations with MSTS score among the factors were examined using Wilcoxon rank-sum test.

*Results* Follow up periods ranged from 12 to 156 months and median was 53 months. During this period, five implant failures were seen at six to 17 months after the surgery, and the five-year implant survival was 77% (95% confidence interval, 55 - 90%). Actual implant dislocation was observed in six cases. Four out of six cases implanted with first-generation prostheses suffered dislocations including two glenohumeral joint dislocations and two glenoid component cut-outs. In addition, two out of 16 cases with second-generation prostheses suffered glenohumeral joint dislocations. Implant survival of second-generation prosthesis was significantly better than that of first-generation (five-year implant survival; 87% vs 50%,  $p=.050$ ). Salvage cases tended to be associated with worse implant survival compared with primary cases, although not statistically significant (66%

vs 90%,  $p=.16$ ). MSTS score ranged from 40 to 96%, and median score was 76%. Patients who had a history of dislocations had worse functional outcomes (median MSTS, 60%) compared to those with no dislocation (median MSTS, 84%)( $p=.032$ ). A reasonable MSTS score was observed even in the patients who underwent salvage surgery (primary 74% vs salvage 78%,  $p=.84$ ).

*Conclusion* Second-generation BWE provides acceptable implant survival and function for both primary and revision surgery of the proximal humerus.