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Long-term follow-up of custom cross-pin fixation of 56 tumour endoprosthesis stems: a single-institution experience

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Abstract

Aims: Aseptic loosening is a major cause of failure in cemented endoprosthetic reconstructions. This paper presents the long-term outcomes of a custom-designed cross-pin fixation construct designed to minimize rotational stress and subsequent aseptic loosening in selected patients. The paper will also examine the long-term survivorship and modes of failure when using this technique.

Patients and methods: A review of 658 consecutive, prospectively collected cemented endoprosthetic reconstructions for oncological diagnoses at a single centre between 1980 and 2017 was performed. A total of 51 patients were identified with 56 endoprosthetic implants with cross-pin fixation, 21 of which were implanted following primary resection of tumour. Locations included distal femoral (n = 36), proximal femoral (n = 7), intercalary (n = 6), proximal humeral (n = 3), proximal tibial (n = 3), and distal humeral (n = 1).

Results: The median follow-up was 132 months (interquartile range (IQR) 44 to 189). In all, 20 stems required revision: eight for infection, five for structural failure, five for aseptic loosening, and two for tumour progression. Mechanical survivorship at five, ten, and 15 years was 84%, 78%, and 78%, respectively. Mechanical failure rate varied by location, with no mechanical failures of proximal femoral constructs and distal femoral survivorship of 82%, 77%, and 77% at five, ten, and 15 years. The survivorship of primary constructs at five years was 74%, with no failure after 40 months, while the survivorship for revision constructs was 89%, 80%, and 80% at five, ten, and 15 years.

Conclusion: The rate of mechanical survivorship in our series is similar to those reported for other methods of reconstruction for short diaphyseal segments, such as compressive osseointegration. The mechanical failure rate differed by location, while there was no substantial difference in long-term survival between primary and revision reconstructions. Overall, custom cross-pin fixation is a viable option for endoprosthetic reconstruction of short metaphyseal segments with an acceptable rate of mechanical failure. Cite this article: *Bone Joint J* 2019;101-B:724-731.

Keywords: Complex revision; Endoprosthesis; Short intramedullary segment.