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Survival and complications of skeletal reconstruction after surgical treatment of bony metastatic renal cell carcinoma

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Introduction: Skeletal metastasis is common in advanced renal cell carcinoma (RCC). Improvements in survival have resulted in an increase in the burden of disease due to skeletal metastases. Radiotherapy plays a major palliative role in treatment of bone metastases in general, but in skeletal metastases from RCC, radiotherapy is less effective. Surgical intervention remains a valid treatment to improve function and relieve pain. The aim of this study was to assess the factors affecting reconstruction survival, especially prosthesis survival in endoprosthetic replacement (EPR), when applied to the management of skeletal metastases from RCC.

Methods: A retrospective analysis of all patients treated for non-spinal skeletal metastases for metastatic RCC in three international specialist orthopaedic oncology institutions (ROH, Birmingham, UK, Tampere, Finland, Karolinska, Stockholm, Sweden) between 2000 and 2014 was performed. Reconstruction survivorship was calculated using the Kaplan-Meier method whilst factors affecting reconstruction survival were assessed using Cox-regression multivariate analysis.

Results: A total of 268 procedures were performed in 253 patients. EPR was performed in 76.9% of cases, intralesional curettage and cementation with or without fixation in 13.8%, plating or intramedullary nailing in 4.1%, bone resection without reconstruction in 4.5%, and amputation in 1.1%. The overall rate of complications was 17%, which were classified as Henderson type 1 (soft tissue failure) 1.1%, type 2 (aseptic loosening) was not seen, type 3 (structural failure) 7.1%, type 4 (infection) 4.9% and type 5 (tumour progression) 3.7%. Endoprosthetic replacement when performed as the primary procedure demonstrate the best survivorship whilst factors associated with poor reconstruction survival included previous surgical intervention, pre operative radiotherapy, and intralesional resection margins.

Conclusion: We have identified three key predictors of failure following resection and reconstruction, previous radiotherapy when combined with pre-reconstruction radiotherapy, intralesional excision, and most notably, previous surgical intervention. We conclude that endoprosthetic replacement be considered as the index surgical intervention for skeletal metastases from renal cell carcinoma as this carries the lowest incidence of complications. Revision of previous skeletal stabilisation, especially when combined with radiotherapy carries a high risk of complication, including infection, which often necessitates amputation.