

## PAPER 35

**Title:** A cost effectiveness analysis of elective versus emergent surgery for patients with metastatic bone disease.

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**Background:** Metastatic bone disease (MBD) is a substantial burden to both patients and the healthcare system. Currently, patients with MBD enter surgical care through either emergent or electively scheduled care pathways. There is limited data on the economic implications of MBD surgery in Canada.

**Purpose:** The purpose of this study was to determine the survival benefits and health care costs associated with elective versus emergent surgical care pathways for patients with MBD of the femur in a Canadian health care system.

**Methods:** We have conducted a retrospective, multicenter cohort study of all patients presenting for surgery for MBD of the femur in southern Alberta between 2006 and 2021. Emergent surgeries were defined by patients admitted to hospital via urgent care mechanisms and managed on the on-call trauma list. Elective surgeries were defined by patients seen by an orthopaedic surgeon at least once prior to surgery, and booked for a scheduled urgent, yet elective procedure. Patient demographics, treatment characteristics and post-operative outcomes were extracted from a chart review. A decision tree model of surgical care pathways was developed with clinical experts for the cost-effectiveness analysis. Probabilistic sensitivity analysis was used, with the effectiveness of elective versus emergent surgery for the femur determined by the overall survival post-operatively between the two groups. Direct health care costs associated with surgery and post-operative care were estimated using micro-costing data from Alberta Health Services and converted to 2021 Canadian Dollars.

**Results:** A total of 379 patients underwent orthopaedic surgery for MBD of the femur between 2006 and 2021. There were 283 patients (74.7%) treated through emergent pathways and 96 patients (25.3%) treated through urgent, electively scheduled pathways. Lung, prostate, and breast cancer were the most common primary malignancies and there was no significant difference in primary malignancies between groups ( $p=0.08$ ). The probabilistic sensitivity analysis demonstrated superior expected overall survival of the elective surgery group at 15.6 months with a corresponding lower overall surgical cost of \$20,731 per patient. However, the emergent surgery group had an overall survival of 6.3 months and an overall surgical cost of \$42,036 per patient. The results were consistent across two-way sensitivity analysis. Incremental cost effectiveness ratios were not calculated due to the superiority of elective care pathways.

**Conclusion:** Our preliminary model demonstrated longer post-operative survival and lower direct health care costs for patients with a metastatic femur lesion managed through elective care pathways. These findings demonstrate clinical and economic value in providing elective orthopaedic care, when possible, for patients with MBD. In the face of rising healthcare costs, interventions capable of reducing the economic burden of MBD surgery will have positive impacts on patient care and provide opportunity for health economic efficiencies. Further refinements to the economic model are ongoing and will be available for presentation.