Cost Comparison Between Open Reduction and Internal Fixation and Functional Bracing for Humeral Diaphyseal Fracture Management

Prism Schneider, MD; Ahmed M. Negm, MD; Stephanie Yee, BS; Mary Amedeo, CCRP; Rudolf Reindl, FRCSC; Gregory Berry, MD; ***Herman Johal, MD;***
Canadian Orthopaedic Trauma Society
University of Calgary, Calgary, Alberta, CANADA

Purpose: Prior studies have found increased direct surgical costs for intramedullary nail fixation when compared with open reduction and internal fixation (ORIF) for humeral diaphyseal fractures. Coaptation splinting is reported to have lower direct costs compared to functional bracing for nonoperative management. This study aimed to complete a cost analysis comparing the differences in direct and indirect costs between ORIF and functional bracing relative to the improvement in SMFA (Short Musculoskeletal Function Assessment) functional outcome scores for isolated humeral diaphyseal fractures.

Methods: This is a prespecified secondary analysis from a large randomized controlled trial (RCT) comparing ORIF (plate and screws) with nonoperative treatment (functional bracing) for humeral diaphyseal fractures. A cost analysis was completed using data on costs and outcomes from the trial, including both direct costs of care (implant costs, hospital stay, readmissions, complications) as well as indirect costs (time off of work). Change in SMFA functional outcome scores were used to quantify effectiveness, with a minimal clinically important difference (MCID) of 7.3 used as a threshold for clinically significant improvement. Costs and outcomes were captured over a 1-year period. A Monte Carlo model was utilized to generate incremental cost-effectiveness ratios, using a probabilistic sampling strategy.

Results: A total of 168 patients were enrolled (n = 84 per treatment group), with an 85% 1-year follow-up rate. Overall average direct and indirect costs for the ORIF group were $19,039.22, while overall average costs for the conservative group was $24,273.49. Overall change in SMFA score for the ORIF group was 4.82, while the overall change for the conservative group was 5.89 points. When combined, this resulted in an incremental cost-effectiveness ratio of $3101 per point improvement in SMFA, or $22,637.30 to obtain a clinically important improvement in SMFA functional outcome score.

Conclusion: Providing value-based care has become increasingly important, and using traditional thresholds, ORIF of humeral shaft fractures would be considered a cost-effective treatment option.