Key Drivers of 90-day Costs in Primary Total Elbow Arthroplasty

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Background: Progress towards value-based care in orthopaedics requires knowledge on surgical care costs as well as drivers of costs. Therefore, the purpose of this study was to assess 90-day health system costs in primary total elbow arthroplasty (TEA), the proportion of contribution from each cost group to total hospital cost, and to determine key drivers of 90-day costs in primary TEA.

Methods: Consecutive patients that underwent primary TEA between 2014 to 2021 at a tertiary care academic medical center were included. An institutional accounting database was queried to determine direct costs to the health system attributed to TEA. All costs within 90 days of the surgical encounter were included for analysis to reflect the global postoperative period. Descriptive statistics were used to summarize the patient and surgical characteristics, as well as the cost data. Proportions of costs related to various subcategories of cost were determined to assess the key cost groups that contribute to total hospital costs for the entire cohort, and sub analysis was performed to evaluate only readmitted patients. Furthermore, a linear regression analysis was used to determine key drivers of 90-day costs in the setting of primary TEA.

Results: Thirty-five patients who underwent primary total elbow arthroplasty were identified from 2014 to 2021, 28 patients with 90-day cost data were included in this study. The mean surgical encounter cost was $18,075 (+/- $9,772) and mean 90-day costs were $19,875 (+/- $9,885). The largest proportion of health system costs in primary TEA was surgical implants (48%), followed by operating room fees (18%), surgical supplies (9%), and anesthesia (7%). For readmitted patients, the largest proportion of health system costs remained surgical implants (30%) followed by operating room fees (22%), yet hospital fees (19%) increased substantially. In assessing the key drivers of 90-day health system costs, length of stay (B=1,304.30, 95% CI 674.54 to 1,934.05; p<0.001), readmission (B = 16,148.55, 95% CI 7,055.01 to 25,240.08; p=0.001*), and Charlson comorbidity index (B = 2,247.43, 95% CI 68.64 to 4,426.22; p=0.044) were statistically significant predictors of increased 90-day costs.

Conclusion: Implant costs comprise nearly half of total 90-day costs in primary TEA, with operating room costs making the second largest contribution. Additionally, length of stay, readmission, and patient comorbidity burden were significantly associated with increased 90-day costs.