Postoperative Opioid Use and 90-Day Healthcare Costs Following Upper and Lower Extremity Arthroscopy: A Commercial Claims Analysis

Wali Ul-Hassan Pirzada, Vinay Rao Bijoor, Terence Thomas, Anthony Michael Castro, Sina Ramtin, Asif M Ilyas

INTRODUCTION: Arthroscopic surgery is one of the most frequently performed procedures in orthopaedic practice and is often followed by postoperative opioid prescribing. As attention to opioid stewardship grows, it remains unclear how varying levels of opioid exposure affect downstream healthcare costs. While previous studies have examined opioid-related complications and prolonged use, few have focused on the economic impact of opioid prescribing in the arthroscopy setting. This study aimed to evaluate whether patients receiving multiple opioid prescriptions after arthroscopy incur higher short-term healthcare costs, using national commercial claims data.

METHODS:

We conducted a retrospective, CPT-level analysis using a 5% national sample of U.S. commercial insurance claims from January 2019 to January 2020. The dataset included upper and lower extremity arthroscopy procedures, with each row aggregating patients by CPT code and reporting patient counts, opioid fill levels, and cost distributions. Opioid exposure was categorized as (1) “0–1 fills” vs. “2+ fills” and (2) “0 fills,” “1 fill,” and “2+ fills.” For each group, we calculated descriptive statistics for 90-day post-discharge costs and estimated bootstrap-derived 95% confidence intervals using triangular distributions. Cost differences across opioid groups were assessed using Kruskal–Wallis and Wilcoxon rank-sum tests. Violin plots were used to visualize cost distribution overlap. As a secondary analysis, we performed weighted least squares regression and Spearman’s correlation to explore cost trends by opioid exposure level.

RESULTS:

Across 121 CPT rows representing approximately 27,223 patients, the overall mean 90-day post-discharge cost was $28,286 (SD $31,547). Patients with “2+ fills” had higher mean costs ($33,359) than those with “0–1 fills” ($25,282). Non-parametric tests indicated a statistically significant difference in median costs between these groups (Kruskal–Wallis $p = 0.037$; Wilcoxon $p = 0.037$). In the three-group analysis, mean costs rose with increasing opioid exposure ($26,629 for 0 fills; $27,851 for 1 fill; $31,187 for 2+ fills), though the overall trend was not statistically significant (Kruskal–Wallis $p = 0.113$). Violin-boxplots showed substantial cost distribution overlap. WLS regression identified a significant positive cost trend across opioid groups ($\beta = \$3,279$ per fill-category increase, $p = 0.002$), supported by a modest Spearman correlation ($\rho = 0.166$, $p = 0.068$).

DISCUSSION AND CONCLUSION:

Our findings suggest that increased postoperative opioid fills are associated with modestly higher healthcare costs following arthroscopy, particularly when comparing patients with two or more fills to those with fewer. However, high variability and overlapping cost distributions indicate that opioid use is only one of many contributing factors. These results highlight that procedure type may influence the economic footprint of opioid prescribing. Limitations include the use of aggregated data and lack of patient-level covariates.

In this national claims analysis of arthroscopy patients, higher opioid use was modestly associated with greater 90-day healthcare costs. These findings support the continued refinement of opioid prescribing protocols specific to procedure type and underscore the need for future studies using patient-level data to clarify causal relationships.