

Trends in the Adoption of Outpatient Joint Arthroplasties and Patient Risk during 2019-2021

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INTRODUCTION:

Over the last decade, the United States has seen a substantial increase in patients undergoing total joint arthroplasties (TJA) of the shoulder, hip, and knee. More recently, there is evidence that the COVID-19 pandemic has substantially altered the way these patients are receiving care with an increase in same-day discharge surgeries since the start of the pandemic. Concerns exist regarding the appropriateness of the outpatient setting for high-risk patients. The objectives of this study were to describe the trends in patients' risks in outpatient shoulder, hip, and knee arthroplasty based on the Hierarchical Condition Category risk score (HCC) and the Charlson Comorbidity Index (CCI), and to explore potentially appropriate related risk inflection points for outpatient surgery in this same subset using the HCC and CCI.

METHODS:

Complete Medicare inpatient and outpatient fee-for-service claims were screened for patients that underwent total hip, knee, or shoulder arthroplasty procedures between 2019 and 2021. DRG codes 469, 470, 521, and 522 were used to identify knee and hip procedures, and DRG code 483 for shoulder procedures using inpatient claims. CPT codes 27447, 27130, and 23472 were used to identify knee, hip, and shoulder procedures from the outpatient claims, respectively. The ICD-10 Procedure codes were used to exclude non-hip/knee/shoulder extremity procedures. A surgery was considered outpatient if the patient was discharged on the same day.

The HCC and CCI scores were used to assess patient risk. Patient outcomes were measured as all-cause hospital readmission, postoperative complication, and mortality, within 90 days post-discharge. The postoperative complications were extracted based on CMS's complication measures.

Trends in the total surgical volume of joint arthroplasties and the percentage of outpatient arthroplasties were delineated by calendar quarter over time. The relationship between outcomes and risk scores was visually depicted using Lowess curves. The second derivatives were taken at each risk score data point for each Lowess curve to identify potential risk score cutoff points, at which adverse clinical events increase rapidly. These are the risk levels with a large rate of increase in all-cause hospital readmission rate, postoperative complication rate, or mortality rate.

RESULTS:

A total of 616,234, 745,522, and 189,528 total hip, knee, and shoulder arthroplasties were identified, respectively. Even though knee and hip arthroplasties were removed from the inpatient-only list by CMS in January 2018 and January 2020, respectively, the percentage of outpatient cases remained at 5% or less prior to 2020Q2, when the COVID-19 pandemic started [Figure 1]. However, outpatient volume started to take off in 2020Q2, and by 2021Q4, 15%, 21%, and 33% of hip, knee, and shoulder arthroplasties were discharged on the same day of surgery, respectively.

When measured using the percentage of an HCC score of two or above, the outpatient risk level increased over time [Figure 2], although only in hip patients were the trends statistically significant at the 5% level. When measured using the CCI score, the trends were more salient, and they were all statistically significant for three types of arthroplasties.

Across all three types of joint arthroplasties and both risk scores, there was an overall positive association between risk scores and outcomes [Figure 3]. Some outpatients had a considerably high level of risk. For example, in outpatients with an HCC score of two or higher, the all-cause hospital readmission rate, complication rate, and mortality rate was $\geq 12\%$, 6%, and 1%, respectively for hip, knee, and shoulder arthroplasty. Seven HCC and CCI risk cutoff points were identified, where all-cause hospital readmission rates increased at the fastest pace [Figure 4].

DISCUSSION AND CONCLUSION:

TJA procedures are shifting toward the outpatient setting over time, largely driven by the COVID-19 pandemic. TJA outpatients' risk increased over time and they may experience suboptimal outcomes. Identifying risk cutoff points using validated tools is necessary for optimal care and determining the most appropriate surgical setting.

