Understanding and Accurately Tracking the Reasons for 90-Day Readmission Following Total Joint Arthroplasty

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Introduction: Readmission after Total Joint Arthroplasty (TJA) places a great burden on the health care system. As reimbursement systems place increased emphasis on quality measures such as readmission rates, understanding and accurately tracking the causes for readmission becomes increasingly important.

Methods: We queried an electronic database for all patients who underwent Total Hip Arthroplasty (THA) or Total Knee Arthroplasty (TKA) at our institution from 2006 through 2010. We identified those who had been readmitted within 90 days of the original procedure and reviewed their demographic and clinical data as well as their readmission diagnoses by ICD-9 code. We set readmission as our outcome variable and analyzed data such as age, index procedure, length of stay (LOS), readmission diagnosis, co-morbidities and payer group as our variables of interest. We used chi-square tests to characterize and summarize the patient data and logistic regression analyses to predict the relative likelihood of patient readmission based on our control variables. In addition, two senior-level orthopaedic residents performed a blinded analysis of de-identified medical records of 87 random patients and assigned a diagnosis and ICD-9 code for that readmission encounter. The resident-derived diagnoses were then compared with the coder-derived diagnoses and analyzed for agreement using binomial proportion with 95% exact confidence limits.

Results: 6436 patients underwent THA or TKA during the study period. This cohort of patients represented a diverse payer mix, including Medicare 43.4%, PPO 36.5%, HMO 10.2%, and Self-Pay/Other 9.9%. Readmission rates were as follows: unilateral THA, 190 of 2546 (7.46%); bilateral THA, 0 of 13 (0%); unilateral TKA, 288 of 3553 (8.11%); bilateral TKA, 32 of 337 (9.50%) for a combined rate of 7.92%. There was no significant difference in the rate of readmission among unilateral THA, unilateral TKA, and bilateral TKA (p=0.36). While there was a wide variety of readmission diagnoses, the top three were cellulitis (ICD-9 Group 682, 4.97%), procedure-related complications (ICD-9 Group 996, 15.51%), and wound complications (ICD-9 Group 998, 18.49%). The readmissions cohort had a significantly higher mean LOS (4.7 days vs. 3.4 days, p <0.0001). Patients with any comorbid conditions (e.g., CHF, COPD, diabetes, PE, CAD) had higher readmission rates than those with none (18.7% vs. 7.8%, p =0.0002). Adjusting for patient age, sex, race, payer type, and LOS, those with CHF or CAD were more likely to be readmitted compared to those without CHF or CAD (CHF: odds ratio [OR] =1.71, 95% confidence interval [CI]=1.03-2.84; CAD: [OR] =1.93, 95% CI=1.48-2.53). In comparing the readmission diagnoses, we found that 22 of 87 patients were incorrectly coded for a rate of 25.3% (95% CI = 16.6%, 35.8%). The most common incorrect coding was related to post-operative stiffness and need for manipulation after TKA. There were several mis-categorizations regarding postoperative infection (cellulitis vs. wound dehiscence vs. deep infection).

Conclusions: Readmission after THA or TKA occurs with substantial frequency. Procedure-related complications and wound complications accounted for more readmissions than medical complications. We also found that increased LOS and the presence of co-morbidities may predispose total joints patients to readmission within 90 days of discharge. Unfortunately, readmission diagnoses were frequently coded incorrectly. The rate of mis-coding suggests the need for regular audits and highlights the need for clear documentation in the medical record. A clearer understanding of the factors related to complications should make a reduction in their occurrence possible; however, use of readmission diagnoses without specific attempts to assure their accuracy may not be an appropriate quality measure given the frequency with which errors occur.

Summary: The readmission rate after TKA and THA at this institution was found to be 7.9%; the most common readmission diagnoses were procedure-related and wound complications. Coding accuracy was a concern.