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Cost Analysis of Total Joint Arthroplasty Readmissions in a Bundled Payment Care Improvement Initiative

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ABSTRACT

Background: The Bundled Payment for Care Improvement (BPCI) Initiative is a Centers for Medicare and Medicaid Services program designed to promote coordinated and efficient care. This study seeks to report costs of readmissions within a 90-day episode of care for BPCI Initiative patients receiving total knee arthroplasty (TKA) or total hip arthroplasty (THA).

Methods: From January 2013 through December 2013, 1 urban, tertiary, academic orthopedic hospital admitted 664 patients undergoing either primary TKA or THA through the BPCI Initiative. All patients readmitted to our hospital or an outside hospital within 90-days from the index episode were identified. The diagnosis and cost for each readmission were analyzed.

Results: Eighty readmissions in 69 of 664 patients (10%) were identified within 90-days. There were 53 readmissions (45 patients) after THA and 27 readmissions (24 patients) after TKA. Surgical complications accounted for 54% of THA readmissions and 44% of TKA readmissions. These complications had an average cost of \$36,038 (range, \$6375–\$60,137) for THA and \$38,953 (range, \$4790–\$104,794) for TKA. Eliminating the TKA outlier of greater than \$100,000 yields an average cost of \$27,979. Medical complications of THA and TKA had an average cost of \$22,775 (range, \$5678–\$82,940) for THA and \$24,183 (range, \$3306–\$186,069) for TKA. Eliminating the TKA outlier of greater than \$100,000 yields an average cost of \$11,682.

Conclusion: Hospital readmissions after THA and TKA are common and costly. Identifying the causes for readmission and assessing the cost will guide quality improvement efforts.

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To promote coordinated and efficient care by physicians and hospitals, the Centers for Medicare and Medicaid Services (CMS) established the Bundled Payments for Care Improvement (BPCI) Initiative in 2011 [1]. Traditionally, when services are provided, Medicare makes separate payments for all the services necessary for the complete care of a single health care problem. Critics of the

traditional payment model suggest that it detracts from ease of care efficiency by rewarding increased utilization of resources and interventions and not rewarding quality. The goal of the BPCI Initiative is to achieve “higher quality, more coordinated care at a lower cost to Medicare [2]” by creating incentives to deliver care in the most efficient and cost-effective manner while improving quality. Through the BPCI Initiative, hospitals are paid one standard predetermined sum for an all-inclusive episode of care, or “bundle,” that can begin a certain time before an episode and continue for an established length of time after surgery. In exchange for this payment, the cost of all care during the bundled period, including the cost of any additional procedures or readmissions to any facility within this time frame is the financial responsibility of the initial provider. Performance metrics are also included in such arrangements to ensure quality is maintained [2,3].

Our urban, tertiary, academic orthopedic hospital participated in the BPCI Initiative by establishing a CMS target price for a total joint arthroplasty (TJA) episode of care. This arrangement included both financial and performance accountability on the part of the

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participating hospital. CMS has offered 4 different models of a bundled payment agreement of various time periods and payment arrangements. Of the 4 BPCI Initiative models proposed by CMS (3 are retrospective and 1 is prospective), this hospital agreed to model 2. Under this model, each episode of care includes costs accrued 72 hours before admission, the inpatient stay, post-acute care, and all additional costs incurred up to 90 days after discharge. The other 3 models in the BPCI Initiative include 2 other retrospective payment models and 1 prospective payment model. In model 2, hospital readmissions during the 90-day period are included, and they can amount to a substantial cost impacting the margin for these cases significantly. This study seeks to report costs of readmissions for surgical and medical complications within a 90-day episode of care for BPCI Initiative primary total hip arthroplasty (THA) or total knee arthroplasty (TKA).

Methods

From January 2013 to December 2013, all Medicare patients undergoing either primary THA or TKA at our institution were enrolled in the BPCI Initiative. The BPCI Initiative agreement included all patients assigned to Medical Severity–Diagnosis-Related Groups: 469 and 470 patients undergoing primary THA or TKA. CMS followed all patients enrolled in the BPCI Initiative throughout the 90-day period after surgery. This included TKA, THA, partial hip arthroplasty, and partial or total hip resurfacing among others, including prosthetic treatment of femoral neck fractures. Unicompartamental knee arthroplasties and revision TJAs were not part of this bundled payment agreement. All readmissions occurring at any institution, regardless of length of stay (LOS) or observation status, were tracked and reported to the primary institution and included as part of the bundle. CMS then retrospectively reconciled all payments against the agreed-upon target price of the 90-day bundle. If the total was below the target price, the primary institution is reimbursed the difference. If the total payments were above the target price, the institution was required to pay the difference and assumed ownership of the burden associated with complications requiring readmission. Thus, every patient readmitted to our hospital or an outside hospital (OSH) within 90-days from the index episode was identified by CMS and reported. The reasons for readmission as reported by CMS for patients readmitted to the primary institution and OSHs were identified. Medical records were available for patients readmitted to the primary institution, and chart review was performed on these patients to verify the reasons for readmission. Reasons for readmission were then categorized based on whether they were associated with a surgical complication or a medical condition.

The associated costs, days until readmission, readmission length, and initial discharge disposition for each readmission were then analyzed. The available data for the costs of readmissions to the primary institution included data of both the direct cost burden to the hospital and the corresponding CMS reimbursement, whereas the data of costs of readmissions to OSHs included only CMS reimbursements to the respective institutions of the readmission. Reconciliation of the episode of care only included the costs of CMS reimbursement for the episode. We include the cost burden or direct cost to our institution of the actual readmission as an illustration of the difference between CMS reimbursement and the actual cost of care. The primary institution does not have access to financial data for OSHs; thus, the actual cost burden to OSHs was not readily available.

Results

A total of 664 Medicare patients received either a THA or TKA and were enrolled in the BPCI Initiative (357 THAs, 307 TKAs) in

2013. Eighty readmissions in 69 of the 664 patients (10%) occurred within 90 days. Fifty-three readmissions (45 patients) were identified after THA (66% of all readmissions, ages 49–91, 18 males, and 28 females). The overall readmission rate after THA was 13%. Twenty-seven readmissions (24 patients) were identified after TKA (34% of all readmissions, ages 47–83, 7 males, and 17 females). The overall readmission rate after TKA was 8%.

Compared to the average index admission LOS for all enrolled patients (3.6 days), readmitted patients had a higher index LOS. Readmitted patients stayed an average of 4.7 days (range, 2–12 days) and 4.5 days (range, 3–22 days) after THA and TKA patients, respectively. Readmitted patients returned after an average of 33 days (range, 4–90 days) after THA with an average LOS of 5 days (range, 1–18 days). After TKA, readmitted patients returned after an average of 29 days (range, 0–77 days) postoperatively with an average LOS of 6 days (range, 1–26 days).

Of the 45 patients readmitted after THA, 23 (51%) were initially discharged to either a subacute nursing facility or inpatient rehab facility, while 16 of the 24 patients (67%) readmitted after TKA were initially discharged to either a subacute nursing facility or inpatient rehab facility. The remaining 22 of the 45 THA patients (49%) and 8 of the 24 TKA patients (33%) were discharged home with or without services after the index admission.

THA and TKA readmissions due to surgical complications accounted for 54% and 44% of the indications for readmissions, respectively. These complications included infection (11, 1.5%), wound complications (8, 1.1%), bleeding (7, 1.0%), periprosthetic fracture (5, 0.7%), hip dislocations (4, 0.6%), and postsurgical pain (4, 0.6%), with an average cost of \$36,038 (range, \$6375–\$60,137) for THA and \$38,953 (range, \$4790–\$104,794) for TKA. When 1 outlier of a deep periprosthetic joint infection costing \$104,794 was eliminated, the average cost of a surgical TKA readmission was \$27,979 (range, \$4790–\$40,774).

Medical conditions requiring readmission within 90 days of discharge included gastrointestinal disease (11, 1.5%), pulmonary disease (8, 1.1%), genitourinary/renal complications (6, 0.8%), hematologic (6, 0.8%), cardiovascular (3, 0.4%), endocrine disorders (2, 0.3%), syncope (2, 0.3%), rheumatologic (1, 0.1%), lumbago (1, 0.1%), and an open ankle wound (1, 0.1%), with an average cost of \$22,775 (range, \$5678–\$82,940) for THA patients and \$24,183 (range, \$3306–\$186,069) for TKA patients. When 1 outlier for a patient with sepsis and pneumonia was eliminated, the average cost of a medically managed TKA readmission was \$11,682 (\$3,306–\$24,076).

Forty-three readmissions were to OSHs (54%), and the remaining 37 readmissions were to the primary institution (46%). Cost data were unavailable for 7 of the readmissions to the primary institution and 2 readmissions to OSHs. The average CMS reimbursement for readmissions after THA to the primary institution was \$20,517. There was an average direct cost of \$31,880 to the primary institution for these readmissions. The average CMS reimbursement for readmissions after THA at OSHs was \$7683 (Fig. 1).

The average CMS reimbursement for readmissions after TKA to the primary institution was \$20,505. The same readmissions had an average direct cost of \$45,901 to the primary institution. The average CMS reimbursement for readmissions after TKA at OSHs was \$9423 (Fig. 2).

Discussion

In this report, we identified the cost burden of readmissions after primary THA and TKA in a model 2 bundled payment agreement. CMS tracks and reports all readmissions of patients participating in the BPCI Initiative occurring within the United States. This enables participating institutions, such as ours, to know with

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