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ORIGINAL ARTICLE

Is there value in retrospective 90-day bundle payment models for shoulder arthroplasty procedures?

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Background: The Centers for Medicare & Medicaid Services Bundled Payments for Care Improvement (BPCI) initiative was implemented as part of the Affordable Care Act. We implemented a retrospective payment model 2 for a 90-day total shoulder arthroplasty (TSA) episode to assess the value of TSA BPCI at our private practice.

Methods: Expenditures and postacute event rates of 132 fee-for-service (FFS) patients who underwent a TSA operation between 2009 and 2012 were compared with 333 BPCI patients who had a TSA operation in 2015. The 90-day postacute events included an inpatient rehabilitation facility (IRF), skilled nursing facility (SNF), and home health (HH) admissions and readmissions. Expenditures were converted to 2016 dollars using the Consumer Price Index. Wilcoxon tests and multivariate generalized estimating equation were used to assess independent cost-drivers.

Results: The median FFS expenditure was \$21,157 (interquartile range, \$16,894-\$30,748) compared with \$17,894 (interquartile range, \$15,796-\$20,894) for BPCI ($P < .0001$). The BPCI patients had significantly lower rates of SNF admissions (34% FFS vs. 16% BPCI; $P < .001$), IRF admissions (3% FFS vs. 0.6% BPCI; $P = .05$), HH utilization (49% FFS vs. 41% BPCI; $P = .05$), and readmissions (14% FFS vs. 7% BPCI; $P = .01$). After controlling for postacute events in the multivariate regression model, we found BPCI had a 4% decrease in expenditures ($P = .08$). All postacute events were independently associated with higher expenditures.

Conclusions: Our private practice implemented cost-containment practices, including clinical guidelines, patient navigators, and a BPCI management team. IRF and SNF utilization and the 90-day readmission rate significantly decreased. As a result, we were able to control the postacute spending, which resulted in decreased costs of performing TSA surgery.

The Novant Health Institutional Review Board deemed this study a quality improvement effort and, thus, exempt from Institutional Review Board oversight. The statements contained in this document are solely those of the authors and do not necessarily reflect the views or policies of Centers for Medicare & Medicaid Services. The authors assume responsibility

for the accuracy and completeness of the information contained in this document.

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Health care providers in the United States (US) have traditionally been compensated based on the fee-for-service (FFS) payment model. Within the FFS framework, health care providers charge for each service or procedure delivered, and patients pay for each health care service upon receipt. A FFS payment model thus incentivizes the volume of health care services delivered, perhaps at the expense of the quality of the health care.^{6,13} As the costs of health care in the US have increased to 17.8% of the US Gross Domestic Product, improvements to health care delivery are imperative.⁹

In response to soaring costs, the landscape of health care delivery is shifting from a volume-based system to a value-based system.^{1,5,8,19} Providers in a value-based health care system are incentivized to deliver care that produces the best outcomes at the lowest cost. Providers that do not deliver value-based care to their patients are financially penalized.¹⁷ In an effort to improve the efficiency of the US health care system and the value of the health care delivered, the Patient Protection and Affordable Care Act mandated the development, testing, and implementation of alternative payment models that aim to achieve these value-based goals.^{4,10}

The 2 most common types of payment models are based on capitation and bundling. Under a capitation, or global payment model, a single payment is disbursed to a health care organization to cover an array of services for a defined patient population.⁷ Although which model will have the largest effect on containing costs and improving outcomes is debated, this report focuses on bundled payments. Bundled payment models reimburse a predetermined dollar amount to cover all services provided during the predetermined, clinically defined episode of care rather than separate, individual costs for each service rendered.^{4,14} Health care providers are financially rewarded if the costs are lower than the predetermined payment. Conversely, health care providers are financially penalized if the costs exceed the predetermined payment amount. Bundled payments will theoretically benefit all stakeholders; however, empirical evidence is lacking. Stakeholder benefits include (1) patients receive proven cost-effective care; (2) providers earn profit margins, and manufacturers with cost-effective products will be competitive in value-based market; and (3) payers will reduce spending.¹⁷

The Centers for Medicare & Medicaid Services (CMS) established bundled payment models and implemented the Bundled Payments for Care Improvement (BPCI) initiative in 2013 as a first test of an alternate bundle payment and delivery models.⁴ Four payment and delivery models^{2,3} were designed and implemented under the BPCI initiative.

At our private practice in 2015, we selected a retrospective payment model (BPCI Payment Model 2) for a 90-day

episode of care, which included acute and postacute care for shoulder arthroplasty and other orthopedic procedures. The clinic created infrastructure to support the BPCI initiative. Initially, physician groups based on specialty were charged with defining appropriate clinical practice guidelines for each procedure covered. A BPCI management team, which included a manager, analysts, and patient navigators, was developed to ensure compliance with guidelines and processes. An orthopedic surgeon was named as the Vice Chief Quality Officer, with a key responsibility of overseeing the BPCI initiative, as well as a Quality Improvement committee that provides oversight and guidance. The BPCI team also worked with hospitals and ancillary service providers to reduce costs and postoperative events over the episode of care. Because these payment models are relatively new, the data to determine their success is sparse. The purpose of the study was to assess the value of the BPCI shoulder arthroplasty bundle at our private practice.

Materials and methods

This study used a retrospective cohort. We used CMS data aggregated and provided by our convener to compare the total expenditures of upper extremity diagnosis-related group (DRG) 483 with specific Current Procedural Terminology (American Medical Association, Chicago, IL, USA) code 23472. Medicare patients who underwent total shoulder arthroplasty (TSA) surgery between January 2009 and December 2012 were defined as traditional FFS ($n = 132$) and were compared with Medicare BPCI patients ($n = 333$) who were operated on between January 2015 and December 2015. The dates for the FFS group were chosen because CMS used these data to determine our reconciliation payment amount; thus, these data were available to us. It is also important to note that the difference in volume over the years was parallel with the growth of the practice and the addition of surgeons.

Postacute events and expenditures were analyzed. Postacute events included admission to an inpatient rehabilitation facility (IRF), admission to a skilled nursing facility (SNF), utilization of home health (HH), and hospital readmission within the 90-day episode. Expenditures were defined as acute expenditures (hospitalization), postacute expenditures (treatment costs incurred within 90-days of discharge), and total expenditures (sum of acute and postacute expenditures).

All expenditures were converted to 2016 dollars by applying the Consumer Price Index conversion factor. By using the Manning and Mullahy method,¹² we found that expenditures were non-normally distributed and are thus described using median and interquartile range (IQR). Wilcoxon tests were used to analyze the differences in expenditures between traditional FFS and BPCI cases. One-sided Fisher exact tests were used to determine differences in the rate of postacute events between the groups. Multivariable generalized

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