Variation in Spending around Surgical Episodes of Urinary Stone Disease: Findings from Michigan

Juan San Juan, Hechuan Hou, Khurshid R. Ghani,* James M. Dupree† and John M. Hollingsworth‡

From the Department of Urology, University of Michigan Medical School, Ann Arbor, Michigan

Purpose: To help rein in surgical spending there is growing interest in the application of payment bundles to common outpatient procedures like ureteroscopy and shock wave lithotripsy. However, before urologists can move to such a payment system they need to know where episode costs are concentrated.

Materials and Methods: Using claims data from Michigan Value Collaborative we identified patients who underwent ureteroscopy or shock wave lithotripsy at hospitals in Michigan from 2012 to 2015. We then totaled expenditures for all relevant services during the 30-day surgical episodes of these patients and categorized component payments (ie those for the index procedure, subsequent hospitalizations, professional services and postacute care). Finally we quantified the variation in total episode expenditures for ureteroscopy and shock wave lithotripsy across hospitals, examining drivers of this variation.

Results: A total of 9,449 ureteroscopy and 6,446 shock wave lithotripsy procedures were performed at 62 hospitals. Among these hospitals there was threefold variation in ureteroscopy and shock wave lithotripsy spending. The index procedure accounted for the largest payment difference between high vs low cost hospitals (ureteroscopy $7,936 vs $4,995 and shock wave lithotripsy $4,832 vs $3,207, each $p < 0.01$), followed by payments for postacute care (ureteroscopy $2,207 vs $1,711 and shock wave lithotripsy $2,138 vs $1,104, each $p < 0.01$). Across hospitals the index procedure explained 68% and 44% of the variation in episode spending for ureteroscopy and shock wave lithotripsy, and postacute care payments explained 15% and 28%, respectively.

Conclusions: There exists substantial variation in ambulatory surgical spending across Michigan hospitals for urinary stone episodes. Most of this variation can be explained by payment differences for the index procedure and for postacute care services.

Key Words: urinary calculi, lithotripsy, ureteroscopy, ambulatory surgical procedures, hospital charges

Abbreviations and Acronyms

BCBSM = Blue Cross Blue Shield of Michigan

BPCI = Bundled Payments for Care Improvement

ED = emergency department

MVC = Michigan Value Collaborative

PAC = postacute care

SWL = shock wave lithotripsy

URS = ureteroscopy

Accepted for publication November 15, 2017.

No direct or indirect commercial incentive associated with publishing this article.

The corresponding author certifies that, when applicable, a statement(s) has been included in the manuscript documenting institutional review board, ethics committee or ethical review board study approval; principles of Helsinki Declaration were followed in lieu of formal ethics committee approval; institutional animal care and use committee approval; all human subjects provided written informed consent with guarantees of confidentiality; IRB approved protocol number; animal approved project number.

Supported by Blue Cross Blue Shield of Michigan as part of the Value Partnerships Program (Michigan Value Collaborative).

The opinions, beliefs and viewpoints expressed by the authors do not necessarily reflect those of Blue Cross Blue Shield of Michigan or any of its employees.

* Financial interest and/or other relationship with Boston Scientific.

† Financial interest and/or other relationship with Blue Cross Blue Shield of Michigan.

‡ Correspondence: Department of Urology, North Campus Research Complex, 2800 Plymouth Rd., Building 16, 1st Floor, Room 112W, Ann Arbor, Michigan 48109 (telephone: 734-763-2797; FAX: 734-232-2400; e-mail: kinks@med.umich.edu).

With treatment related expenditures in excess of $2 billion annually urinary stone disease ranks as the second most costly urological condition in the United States.[1] The high costs of the disease are due in large part to surgery for management.[2] Thus, efforts to rein in spending for urinary stone disease must include a focus on surgical care.

One approach that may produce savings is payment bundling, in which providers are paid a single payment for all services rendered to a

0022-5347/18/1995-1277/0
THE JOURNAL OF UROLOGY®

https://doi.org/10.1016/j.juro.2017.11.075
Vol. 199, 1277-1282, May 2018
Printed in U.S.A.

patient during a prespecified episode of care, including hospital readmissions, emergency department care and other PAC such as home nursing.[3] By making providers responsible for costs that exceed the prearranged episode reimbursement bundled payments encourage more cost-effective health care decisions.

Before urologists can move toward an episode based payment system for urinary stone surgery they will require additional information from several sources. This includes billing and cost accounting data not only for the index procedure but also for the care delivered by other service providers during the surgical episode. This information will help urologists benchmark their performance. Further, it will give them a better understanding of where episode costs are concentrated. Such an understanding is essential for urologists to determine where cost reduction opportunities are likely to be found and which partnerships are most important to them.

In this context we used claims data to identify patients who underwent ambulatory surgery for urinary stone disease at hospitals in Michigan. After defining surgical episodes we totaled expenditures for all relevant services during these episodes. We then categorized component payments for the index procedure, professional services, subsequent hospitalizations and PAC. Finally we quantified the variation in total episode expenditures across hospitals where procedures for urinary stones were performed and examined drivers of this variation. Findings from our study serve to inform policymakers about the design and implementation of payment bundles for urinary stone surgery.

METHODS

Data Sources and Study Population

Our study was based on data from MVC.[4] Funded by BCBSM, MVC is a quality improvement initiative with the goal of enhancing the quality and efficiency of health care delivery in Michigan. MVC collects complete inpatient and outpatient medical claims from residents enrolled in Medicare fee for service or by the BCBSM preferred provider organization. From claims filed between 2012 and 2015 we used ICD codes 56.0, 56.31, 98.51, 0TF6XZZ, 0TF7XZZ, 0TF3XZZ, 0TF4XZZ, 0TF38ZZ, 0TF48ZZ, 0TF68ZZ, 0TF78ZZ, 0TF37ZZ, 0TF47ZZ, 0TF67ZZ and 0TF77ZZ, and CPT codes 50590, 52320, 52352, 52353, 52325 and 52356 to identify patients with urinary stone disease who underwent URS or SWL at a MVC participating hospital.

Measuring Total Episode Expenditures and Component Payments

To measure total episode expenditures we extracted payments for all services from the date of the patient surgery to 30 days following discharge home. We chose a 30-day window, given prior empirical work suggesting that spending tends to decrease to near the patient baseline approximately 4 weeks after URS and SWL.[5] Using a validated, claims based attribution method[6] we divided total episode expenditures into 4 components, including payments for 1) the index procedure, 2) subsequent hospitalizations, 3) professional services and 4) PAC. Berenson-Eggers Type of Service codes were used to subcategorize payments for professional services.[7]

Index procedure payments included index facility base and outlier payments for services rendered on the date of surgery. Professional services payments included evaluation and management payments for office and hospital outpatient department visits and consultations, surgeon and anesthesia professional fees, and payments for imaging and laboratory test interpretation, among others. We further subdivided PAC payments based on where the care was delivered and the type of service.

We performed price standardization by applying methods used by MedPAC (Medicare Payment Advisory Commission) because provider differences in total episode expenditures and component payments for URS and SWL may be confounded by differences in contractual provider-payer reimbursement and regional pricing.[8] Specifically we assigned a standardized payment amount to each service that reflected the average payment for that service in Michigan Medicare data. We also risk adjusted all payments to control for differences among providers with regard to patient age, comorbidity using hierarchical condition categories,[9] procedure acuity and high prior 30-day health care spending.

Statistical Analysis

As our initial analytical step we aggregated 30-day total episode expenditures to the hospital level by procedure type. To ensure stability in our point estimates we required that at least 10 URS and 10 SWL procedures were performed at a hospital during the study period to include that hospital. After ranking hospitals from lowest to highest by the average total episode expenditures for URS and SWL we calculated the variation in spending for stone surgery across hospitals. We also evaluated whether the rank of a hospital for average total episode expenditures was stable from year to year and the extent to which its rank for URS correlated with its rank for SWL.

Next we sorted hospitals into 4 equal groups or quartiles of spending for stone surgery. We then used parametric and nonparametric tests as appropriate to compare hospitals in the highest and the lowest spending quartiles. Specifically we examined differences in average total episode expenditures as well as differences in the means of each of the 4 component payment categories by procedure type. We further determined which component payment category contributed the most to the variation in spending for stone surgery across hospitals and quantified the amount of the variation explained by each component category.

Finally, given growing interest among payers in unplanned hospital utilization following ambulatory surgery, especially ED visits,[10] we assessed the overall rate of ED visits after URS and SWL. For patients with PAC