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Analysis of Transurethral Resection of the Prostate Costs across New York State Hospitals Using Severity of Illness Score

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Abstract

Introduction: Using data on surgical treatment for benign prostatic hyperplasia we evaluated the effect of beneficiary health status on hospital reported costs.

Methods: We examined the records of 9,895 patients in the New York State Hospital Inpatient Cost Transparency database who underwent surgical treatment for benign prostatic hyperplasia, including laser prostatectomy and traditional transurethral resection of the prostate, in New York State from 2009 to 2011.

Results: Using the 3M™ APR-DRG (All Patient Refined Diagnosis Related Group) severity of illness index as a measure of patient preoperative health we found a significant increase in the cost of transurethral resection of the prostate for patients with higher severity of illness scores. We confirmed an increase in the cost and the cost variability of transurethral resection of the prostate for patients with higher severity of illness scores.

Conclusions: Our findings illustrate the inherent unpredictability of cost forecasting and budgeting for these patients.

Key Words: prostatic hyperplasia, transurethral resection of prostate, severity of illness index, costs and cost analysis, New York

Abbreviations and Acronyms

BPH = benign prostatic hyperplasia

CCI = Charlson comorbidity index

CCR = cost-to-charge ratio

NRS = nutritional risk score

NYSDOH = New York State Department of Health

SOI = severity of illness

TURP = transurethral resection of prostate

With health care costs rising at an unsustainable rate health spending is predicted to increase to 19.3% of the national gross domestic product by 2023.[1] The relative contribution of urological disease to increasing costs is significant[2] and expected to increase with the aging population of the United States. As economic pressures mount, national and regional efforts in health care policy have targeted containment of health care costs. For example, instead of the traditional fee-for-service model, bundled payment physician compensation aims to promote value based care.[3] This

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bundled payment covers the entire cost of treatment from hospital admission to discharge and includes any treatment for complications within a fixed period. Bundled payments have the potential to improve care by promoting care coordination, best practices and data driven performance improvement. They can potentially lower the cost of care by eliminating waste and promoting a connection between price and cost.[4]

To effectively contain facility costs we must understand the source of the widespread cost variations. TURP is considered the gold standard treatment of BPH, although a growing percent of patients with BPH are instead undergoing laser treatment. In this study we used the publically available Hospital Inpatient Cost Transparency database to study the effect of patient SOI on reported costs of hospital discharges for TURPs performed in New York State hospitals from 2009 to 2011. In addition, we compared data generated by SOI groupings against data on other variables, including year of procedure, New York State region, hospital teaching status, hospital size (more or fewer than 350 beds) and yearly volume of operations (more or fewer than 100 discharges after TURP).

Materials and Methods

We obtained Hospital Inpatient Cost Transparency data from the NYSDOH website.[5] NYSDOH calculates costs using the CCR methodology in SPARCS (Statewide Planning and Research Cooperative System), a comprehensive data reporting system that collects patient characteristics, diagnoses, treatments, services and charges for every hospital discharge in the state. CCR links hospital discharge data to previously estimated costs for each hospital or hospital group published by CMS (Centers for Medicare and Medicaid Services).[6] NYSDOH produces annual hospital costs by applying its CCR to total inpatient costs and total inpatient charges as reported by the hospital in its annual institutional cost reports submitted to the department.

Using this data set we identified hospital reported yearly mean average costs and discharge volumes for TURP APR-DRG 482 in New York State from 2009 to 2011. APR-DRG 482 includes patients with the ICD-9-CM principal diagnosis of BPH (600.00 or 600.01) with a procedure (60.21 or 60.29).[7] These data are stratified by APR-DRG SOI and include the volume of discharges in APR-DGR severity of illness at each hospital for each year.

APR-DRG is a prospective classification system used to synthesize clinical information and stratify patients according to the reason for admission, severity of illness and risk of mortality. A patient is first assigned to a base APR-DRG and then separately assigned 2 subclasses, including risk of mortality and SOI. Patients can be assigned to 1 of 4 risk levels, including minor, moderate, major and extreme. The presence of multiple comorbid conditions in combination increases the severity of illness for a patient and the increase in SOI accurately reflects the increased difficulty and costs involved in treating the patient. The clinical logic of APR-DRGs has undergone the most intensive scrutiny of any severity system on the market.[8–10]

Hospital level variables included year of procedure, New York State region, hospital teaching status, hospital size (more or fewer than 350 beds) and yearly volume of operations (more or less fewer 100 discharges after TURP). New York State region as profiled by the Department of Health[11] was designated as Capital District, Central New York, Long Island, New Rochelle, New York City, Buffalo and Rochester.

We compared the discharge volume weighted average hospital cost of TURP by APR-DRG SOI category for all available years in New York State hospitals. ANOVA was performed along with pairwise comparisons for each SOI. To assess the independent significance/effect of SOI on cost we used a multivariate regression model to independently analyze each hospital category. This was done to ensure that the increase in cost with increasing SOI and SOI were not caused by a confounding variable of hospital size, academic/teaching status, etc.

Results

From 2009 to 2011 a total of 9,895 TURPs were performed in 166 hospitals in New York State. The figure shows average [F1] hospital costs stratified by patient SOI. For the 2009 to 2011 time frame the 5,495 patients in the minor SOI group, the 3,529 in the moderate SOI group, the 781 in the major SOI group and the 90 in the extreme SOI group had an average cost to the hospital of $5,522.59, $7,291.98, $15,456.43 and $35,128.88 per TURP, respectively (ANOVA $p < 0.001$). When grouped by year of procedure, New York State region,

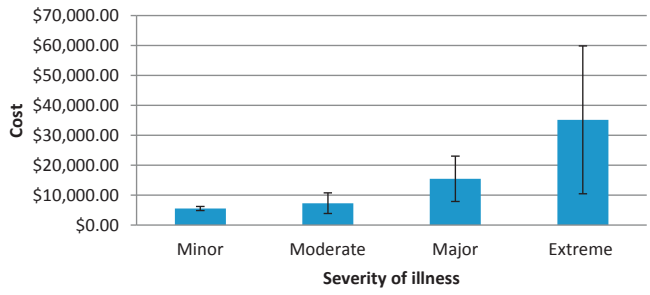

Figure. Average TURP hospital cost in New York State from 2009 to 2011 stratified by patient SOI. Error bar size indicates 1 SD per SOI distribution.