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DRG migration: A novel measure of inefficient surgical care in a value-based world

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ABSTRACT

Background: Diagnosis-Related Group (DRG) migration, DRG 331 to 330, is defined by the assignment to a higher cost DRG due only to post admission comorbidity or complications (CC).

Methods: We assessed the 5% national Medicare data set (2011–2014) for colectomy (DRG's 331/330), excluding present on admission CC's and selecting patients with one or more CC's post-admission to define the impact on payments, cost, and length of stay (LOS).

Results: The incidence of DRG migration was 14.2%. This was associated with statistically significant increases in payments, hospital cost, and LOS compared to DRG 331 patients.

Conclusions: When DRG migration rate was extrapolated to the entire at risk population, the results were an increase of Centers for Medicare and Medicaid Services (CMS) cost by \$98 million, hospital cost by \$418 million, and excess hospital days equaling 68,669 days. These negative outcomes represent potentially unnecessary variations in the processes of care, and therefore a unique economic concept defining inefficient surgical care.

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1. Introduction

Colectomy is a common procedure in the patient population covered by the Center for Medicare and Medicaid Services (CMS) and is performed for a number of common disease states including, but not limited to colorectal cancer, diverticulitis, and inflammatory bowel disease. CMS reimburses hospitals for colectomy based on Medicare Severity-Diagnosis Related Group (MS-DRG). The MS-DRG uses a three-tier system adopted in 2007, felt to better reflect the severity of illness and economic exposure of the provider compared to the prior two-tier DRG system. This system for colectomy also represents significant incremental cost to CMS by category for the MS-DRGs (331- \$9913; 330- \$15,150; and 329- \$29,586). The primary drivers of MS-DRG assignment are (in increasing order of severity: no complication/comorbidity, Complication/comorbidity (CC), Major complication/comorbidity (MCC).

For colectomy, patients with no CC are classified as DRG 331; patients with at least 1 CC but no MCC are classified as DRG 330 and patients with MCC are classified as DRG 329. As a result, it is

possible to further separate DRG 330 patients into three groups: 1) only CC's which occur during the admission; 2) only CC's present on admission (i.e., pre-existing co morbidity); or 3) a combination of pre-existing CC's and CC's developing during the admission. The first group of 330 patients mentioned would have been considered DRG 331 on admission, and therefore, would have "migrated" to the more expensive MS-DRG 330 only due to postoperative events implying potentially inefficient care with opportunities for process improvement for prevention. Such inefficiency has been described differently by others; however, the conclusion remains the same regarding the negative impacts on cost and resource use.¹ Therefore, understanding the specific reasons for this "migration" and its effect on healthcare resource utilization may help surgeons, hospitals, and policymakers to better collaborate on meaningful quality improvement to realize shared savings. This type of analysis allows all the stakeholders to understand the potential cost of new processes of care, the effectiveness of these processes, and the potential impact on provider margin and payor savings. A rational assessment of these factors is important before making conclusions about quality or implementing significant changes in payment policy.

The purpose of this study was to use the concept of DRG migration to assess the impact only of postoperative complications on payor and provider costs, and hospital bed consumption

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utilizing only the mandated and regulated data reported to CMS for billing purposes.

2. Methods

2.1. Data

The retrospective study uses 5% national Medicare data from the CMS. The database contains information pertaining to claims for procedures and services provided to Medicare beneficiaries. Specifically, we used Medicare provider analysis and review file (MedPAR) for inpatient claims and beneficiary summary files.

2.2. Study population

The study population included patients undergoing colectomy in 2011–2014. We identified patients with DRG 331 and 330. DRG 331 is described as the code for major abdominal small and large bowel surgery without comorbidity/complication, whereas, DRG 330 is described as major abdominal small and large bowel surgery with comorbidity/complication. We included patients if they were 65 years or older.

2.3. DRG migration rate

DRG migration was defined as the occurrence of only post admission CC's in patients assigned to DRG 330 in the database. The exclusion of pre-admission CC's helps to define a population where adverse outcomes were related exclusively to the processes of care rather than the impact of significant physiologic derangements, which would require risk adjustment methodologies to compare outcomes. CCs were identified based on the Medicare CC database. We defined the DRG migration rate as the ratio of patients designated as "migrated" to the sum of migrated 330 patients and DRG 331 patients.

2.4. Outcomes

We distinguished the impact of DRG migration on excess hospital length of stay (LOS) and CMS charges and payments. These charges refer to the total value (covered and non-covered) of all services provided, and these payments refers to the amount covered by Medicare and therefore, underestimates patient or secondary insurer costs by as much as 20%.

2.5. Covariates

Patient demographics such as age, gender, race/ethnicity, and region were used as covariates in this study. Race/ethnicity was classified as non-Hispanic white, non-Hispanic black, Hispanics and others. Regions were classified as South, Northeast, West, and Midwest.

2.6. Statistical analysis

We used descriptive statistics to describe the study cohort and outcomes. Categorical variables were reported using proportion and continuous variables using mean and standard deviation. Analysis of variance was used to compare LOS, charges, and payments across different groups.

The Institutional Review Board at the University of Texas Medical Branch approved the study. SAS 9.4 was used for all statistical analysis.

3. Results

3.1. DRG migration rate

A total of 22,673 colectomies were performed during the study period, of which, 15,380 (68%) were DRG 330 and 7383 (32%) were DRG 331. In the DRG 330 group, 1577 patients had no CC present on admission but developed post-admission CC's: 644 patients with 1 CC, 371 with 2 CC, 129 with 3 CC, 47 with 4 CC and 33 with 5 CC. As for 353 patients, zero CCs were coded and they were excluded (1577-353 = 1244 post-admission CCs). We used 7383 patients with DRG 331 and 1244 patients from DRG 330 for DRG migration analysis. The DRG migration rate was 14.4% (1244/[1244 + 7387]).

3.2. Demographics and outcomes

The mean age was 73 years, and the majority of patients were female (59%) and non-Hispanic Whites (86%). No significant difference was observed between two groups of patients, i.e., DRG 331 and DRG migrated patients, for demographic characteristics.

DRG migrated patients had significantly higher LOS (7.6 vs. 4.8 days), total charges (\$63,149 vs. \$46,339), and CMS Payment (\$11,159 vs. \$7210) compared to DRG 331 patients. In DRG migrated patients, a greater number of CC's were associated with higher LOS, total charges and Medicare payments (Fig. 1).

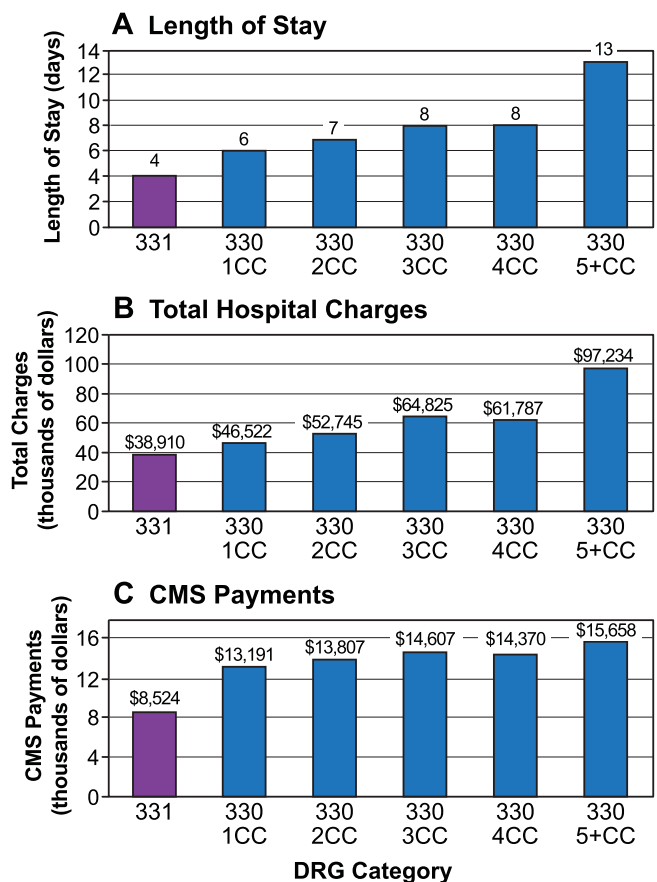


Fig. 1. DRG Migration increases the median Length of Stay (A), Total Hospital Charge (B), and CMS Payments (C). x-axis = DRG 331 (purple box), DRG 330 with 1 CC, DRG 330 with 2 CC, ... 5 + CC (blue box). y-axis = outcomes. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

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