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Original Article

Geographic variations in orthopedic trauma billing and reimbursements for hip and pelvis fractures in the Medicare population

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ABSTRACT

We investigated geographic variations in Medicare spending for DRG 536 (hip and pelvis fracture). We identified 22,728 patients. The median number of charges, discharges, and payments were recorded. Hospitals were aggregated into core based statistical (CBS) areas and the coefficient of variation (CV) was calculated for each area. On average, hospitals charged 3.75 times more than they were reimbursed. Medicare charges and reimbursements demonstrated variability within each area. Geographic variation in Medicare spending for hip fractures is currently unexplained. It is imperative for orthopedists to understand drivers behind such high variability in hospital charges for management of hip and pelvis fractures.

1. Introduction

Hip and pelvis fractures are among the most common and expensive fractures in the United States[1–3] and occur at a higher rate within the Medicare population.[4] In 2002, 1.6 million Medicare beneficiaries were treated for hip fractures costing Medicare around $14 billion.[3] With the GDP already committing 18% to healthcare,[5] the Centers for Medicare & Medicaid Services (CMS) has begun to pilot a bundled payment model with the hopes of reducing overall Medicare costs while increasing quality of care[6]; however it is unknown if this reform will address geographic variance in hospital charges and reimbursements, a key issue in current Medicare spending.

There has been much discussion about geographic variations in hospital billing and Medicare reimbursement practices. A recent study by Rosenthal et al. highlighted the discrepancies among hospital billing across the country for a total hip replacement before medical insurance, sometimes even a 10-fold difference across hospitals.[7] Two studies by Fisher et al. found that regional variation within Medicare spending for hip fracture, colorectal cancer, or acute myocardial infarction had nothing to do with an increased quality of care or access to it, but instead was linked to an increase in the quantity of care. Fisher also noted that patients did not have better outcomes in areas of high-spending compared to low-spending areas, even though those patients received more care.[8,9]

CMS currently uses the inpatient prospective payment system (IPPS), a fee-for-service model, with a base payment rate for hospital reimbursement. This rate is determined by the local wage index in the hospital area and is then multiplied by the diagnosis-related group (DRG) that is billed to Medicare from the hospital.[10] Medicare payments are also influenced by outlier cases that require higher costs, teaching hospital status, and hospitals that take in more indigent patients than other hospitals in the area.[11]

Hip and pelvis fractures are among the top 100 DRGs billed to Medicare. Because these fractures often require significant post-acute care and follow-up,[12] spending under the current payment model has varied greatly across the country. In this study, we aim to investigate the variations in Medicare charges and reimbursements surrounding these common orthopedic trauma injuries in the Medicare population. No study has yet to look at the geographic variation among hip and pelvis fractures under the

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current Medicare IPPS. We then assess the importance of the up-and-coming bundled payment model to address the geographic variation found in the current fee-for-service model.

2. Methods

Hospital charge and Medicare reimbursement data were obtained for DRG 536 (hip and pelvis fractures without major complications or comorbidities) for the year 2011.[13] Data were divided by geographic region according to the US Census[14]: northeast, south, midwest, and west. For each of these regions, the median number of charges, discharges, and payments was documented. In addition, a charge/payment ratio was calculated using data for each region. Hospitals were aggregated into core based statistical (CBS) areas, which are used by Medicare to assign a hospital wage index to all hospitals in the same area. These CBS areas control for variation in the cost of labor across the country. In order to evaluate the variations in both hospital billing and reimbursement within each area, we then calculated the coefficient of variation (CV) for each sector with regard to both the hospital charges and reimbursements. Reimbursements were defined as average total payments that included Medicare Payments but also co-payments and additional payments by third parties.[15] CV-charge is calculated for each area as the ratio of the standard deviation (SD) of the hospital charges within the area to the mean hospital charge within the area multiplied by 100. CV-reimbursement was calculated in a similar manner.

In order to explore the relationship between cost variability and region, a one-way ANOVA test was employed to assess the difference in charges, number of discharges, payments, and charge/payment ratio between the four regions. The geographic region served as the categorical variable of four levels, while the aforementioned factors were considered as the continuous variables.

3. Results

One thousand one hundred forty-two hospitals accounted for 22,728 patients who had a hip and pelvis fracture without major complications or comorbidities (DRG 536). Table 1 shows the average discharges, charges, reimbursements, and charge to reimbursement ratio for all DRG 536 billed to Medicare during the 2011 fiscal year. The average hospital charge and SD was $17,482 (8759) with a wide range of charges ($3,986–$64,016). The average Medicare reimbursement and SD was $4,791 (1072) with a range of reimbursements ($3,144–$11,923).

There was a significant difference in the average number of hospital discharges billed to Medicare based on geographic region ($p < 0.001$). Northeast had the highest average discharges (22.02, SD = 11.8) and the west had the lowest (17.61, SD = 6.8). The average hospital charges to Medicare and the average reimbursements were also significant based on geographic region ($p < 0.001$). The west region hospitals charged the highest ($23,849, SD = 11,234) for DRG 536, followed by northeast ($19,527, SD = 9889), south ($15,844, SD = 6903), and midwest ($13,644, SD = 4265). However, the northeast had the highest reimbursement average ($5261, SD = 1220) compared to the lowest in the southern region ($15,844, SD = 6903).

On average, hospitals charged 3.75 times more than they were reimbursed. The west region charged 4.57 times more than they were reimbursed compared to the midwest which only charged 3.02 times.

For our statistical mapping, 884 hospitals accounting for 18,361 patients were assigned into 169 CBS areas. As demonstrated in Fig. 1, there was a very wide variation in hospital charges for DRG 536 within each area; we identified 4 areas with very high CV-charges between 60% and 80% (Fig. 1, orange), and 15 with high CV-charges between 40% and 60% (Fig. 1, yellow). Table 2 shows a closer look at the CBS areas with higher than average coefficient of variation for hospital charges. Even though the average hospital charge across the country is $17,482, the mean charges in these high CV CBS areas range from $30,993 to $7,127. The highest coefficient of variations was in Pittsburg, PA (67.6%) with the lowest being in Evansville, IN-KY (0.39%).

Medicare reimbursements also demonstrated variability within each area (Fig. 2), but on a lesser extent than hospital charges. Although the majority of areas (138) demonstrated a low CV (0–20%, Fig. 2, blue), 30 areas maintained a higher CV (20–40%, Fig. 2, green). Table 3 shows CBS areas with 20–40% coefficient of variation. Lexington-Fayette, KY had the highest coefficient of variations (40.7%) compared to the lowest in Springfield, IL (0.22%). Among the high CV areas, San Jose-Sunnyvale-Santa Clara, CA had

Table 1
Variations in hip and pelvis fractures w/o MCC (DRG 536) by geographic region.

Region	Discharges Mean (SD)	Charges Mean (SD)	Reimbursement Mean (SD)	Charge: reimbursement Mean (SD)
Northeast	22.02 (11.8)	$19,527 (9889)	$5261 (1220)	3.76 (1.89)
Midwest	18.93 (8.0)	$13,664 (4265)	$4567 (813)	3.02 (0.92)
South	20.28 (10.6)	$15,844 (6903)	$4484 (1011)	3.65 (1.66)
West	17.61 (6.8)	$23,849 (11,234)	$5205 (968)	4.57 (1.91)
Overall *P*	<0.001	<0.001	<0.001	

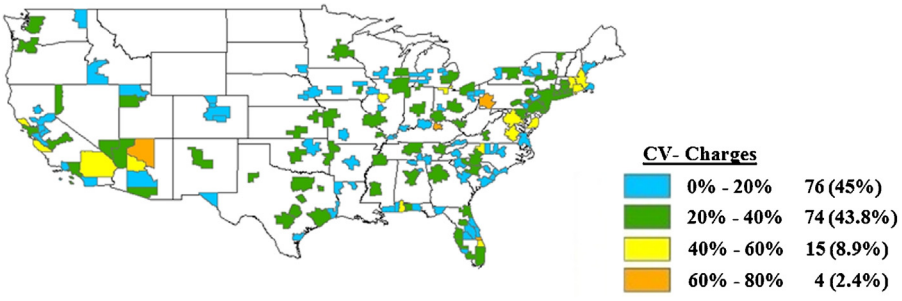

Fig. 1. Variations in hospital charges within CBSAs for fracture of hip and pelvis without MCC (DRG 536).