

Hip and Pelvic Fracture Patients Incur Significantly Different Inpatient Costs, Despite Being Reimbursed Under the Same Medicare Diagnosis-Related Group

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Background/Purpose: The current Medicare Acute Inpatient Prospective Payment System (PPS) determines reimbursement for inpatient admissions by categorizing patients into 746 Diagnosis-Related Groups (DRGs). All inpatient admissions under the same DRG are reimbursed with the same prospective, “bundled” payment, regardless of actual hospital costs. Under the current system, DRG 536 (fractures of the hip and pelvis) includes a broad spectrum of orthopaedic trauma patients with varying inpatient costs. Our aim is to evaluate differences in hospital resource utilization between four subgroups of DRG 536: acetabulum fractures, other pelvic fractures, pertrochanteric hip fractures, and transcervical hip fractures.

Methods: All patients with hip or pelvic fractures who are above the Medicare age cutoff (65 years) were identified in the 2011 and 2012 National Trauma Data Bank (NTDB). Patients were grouped into the following subgroups: acetabulum fractures, other pelvic fractures, pertrochanteric hip fractures, and transcervical hip fractures. Total inpatient length of stay, intensive care unit (ICU) stay, and ventilator time was compared across groups using multivariate analysis, controlling for preexisting comorbidities and age (Charlson Comorbidity Index [CCI]), injury severity (ISS), and hospital size (American College of Surgeons [ACS] trauma level).

Results: A total of 56,683 patients meeting inclusion criteria were identified. Of those, 6579 patients had acetabulum fractures, 15,125 had other pelvic fractures, 25,330 had pertrochanteric hip fractures, and 9649 had transcervical hip fractures. Mean length of stay was 8.5 days, 6.7 days, 6.7 days, and 6.4 days for the four previously stated groups, respectively ($P < 0.001$). Mean ICU stay was 2.8 days, 1.7 days, 0.7 days, and 0.6 days for the four groups, respectively ($P < 0.001$). Mean ventilator time was 1.5 days, 0.9 days, 0.3 days, and 0.2 days for the four groups, respectively ($P < 0.001$). In multivariate analysis (Table), after controlling for CCI, ISS, and ACS level, these differences remained significant. Compared to acetabulum fractures, other pelvic fractures were associated with 1.7 fewer days in the hospital (95% confidence interval [CI]: 1.4-1.9 days), 0.9 fewer days in the ICU (0.8-1.1 days), and 0.5 fewer days on the ventilator (0.4-0.6 days). Pertrochanteric hip fractures were associated with 1.4 fewer days in the hospital (95% CI: 1.2-1.6 days), 1.7 fewer days in the ICU (1.6-1.9 days), and 1.0 fewer days on the ventilator (0.9-1.1 days), compared to acetabulum fractures. Transcervical hip fractures were associated with 1.6 fewer days in the hospital (95% CI: 1.3-1.8 days), 1.8 fewer days in the ICU (1.6-1.9 days), and 1.0 fewer days on the ventilator (0.9-1.1 days), compared to acetabulum fractures. As expected, increasing CCI, ISS, and ACS level (up to Level I) were also associated with increased resource utilization.

Conclusion: Even after controlling for patient age, comorbidities, overall injury severity, and hospital ACS level, there with significant differences in hospital resource utilization

between the four subgroups of Medicare DRG 536. As hospitals are reimbursed the same for these admissions, outside of a single reimbursement modifier for any and all complications and comorbidities, these findings suggest either underreimbursement of higher cost patients (acetabulum fractures) or wasted Medicare payment on lower cost patients (hip fractures). While true health-care cost figures are difficult to estimate, the current analysis circumvents this, showing clear differences in resource utilization and a need for reevaluation of orthopaedic DRGs in the Medicare Prospective Payment System.

Table 1: Multivariate analysis of length of stay

Outcome: Length of stay (days)	Average length of stay	Multivariate regression coefficient (95% confidence interval)	P-value
Acetabulum fracture	8.5 days	reference	-
Other pelvic fracture	6.7 days	-1.7 days (-1.9 to -1.4 days)	< 0.001
Pertrochanteric hip fracture	6.7 days	-1.4 days (-1.6 to -1.2 days)	< 0.001
Transcervical hip fracture	6.4 days	-1.6 days (-1.8 to -1.3 days)	< 0.001
Charlson Comorbidity Index	-	+ 0.2 days (0.2 to 0.3 days)	< 0.001
Injury Severity Score	-	+ 0.2 days (0.2 to 0.2 days)	< 0.001
Hospital ACS level	-	+ 0.8 days (0.7 to 0.9 days)	< 0.001

Table 2: Multivariate analysis of ICU stay

Outcome: ICU Stay (days)	Average ICU stay	Multivariate regression coefficient (95% confidence interval)	P-value
Acetabulum fracture	2.8 days	reference	-
Other pelvic fracture	1.7 days	-0.9 days (-1.1 to -0.8 days)	< 0.001
Pertrochanteric hip fracture	0.7 days	-1.7 days (-1.9 to -1.6 days)	< 0.001
Transcervical hip fracture	0.6 days	-1.8 days (-1.9 to -1.6 days)	< 0.001
Charlson Comorbidity Index	-	+ 0.1 days (0.0 to 0.1 days)	< 0.001
Injury Severity Score	-	+ 0.2 days (0.2 to 0.2 days)	< 0.001
Hospital ACS level	-	+ 0.3 days (0.2 to 0.4 days)	< 0.001

Table 3: Multivariate analysis of ventilator time

Outcome: Ventilator time (days)	Average ventilator time	Multivariate regression coefficient (95% confidence interval)	P-value
Acetabulum fracture	1.5 days	reference	-
Other pelvic fracture	0.9 days	-0.5 days (-0.6 to -0.4 days)	< 0.001
Pertrochanteric hip fracture	0.3 days	-1.0 days (-1.1 to -0.9 days)	< 0.001
Transcervical hip fracture	0.2 days	-1.0 days (-1.1 to -0.9 days)	< 0.001
Charlson Comorbidity Index	-	+ 0.0 days (0.0 to 0.0 days)	< 0.001
Injury Severity Score	-	+ 0.2 days (0.2 to 0.2 days)	< 0.001
Hospital ACS level	-	+ 0.2 days (0.1 to 0.2 days)	< 0.001

See pages 47 - 108 for financial disclosure information.