



Clinical Study

Evaluation of weekend admission on the prevalence of hospital acquired conditions in patients receiving thoracolumbar fusions



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ABSTRACT

We evaluated the Nationwide Inpatient Sample (NIS) database for increased hospital acquired condition (HAC) rate as a function of weekend admission in patients receiving thoracolumbar fusions. In 2008, the Centers for Medicare and Medicaid Services (CMS) compiled a list of HAC for a new payment policy for preventable adverse events without reimbursement of resulting hospital costs. In this, the thoracolumbar patients represented a population with significant increased rates of HAC and, to our knowledge, no prior studies have evaluated the effect of weekend admission on HAC rate. We collated data for patients who underwent thoracolumbar fusions from the 2002–2010 NIS database. Using CMS definitions, HAC were abstracted using the Ninth Edition of International Classification of Diseases Clinical Modification (ICD-9CM). Multivariate analysis assessed the impact of a weekend admission on HAC occurrence and prolonged length of stay (LOS) adjusting for patient, admission severity, and hospital covariates. There were 1,842,231 total admissions between 2002 and 2010 associated with thoracolumbar procedures. HAC occurred at a frequency of 5.2% overall. Surgical site infections ($n = 10,656$) and falls/trauma ($n = 83,999$) were the most common. After adjusting for disease severity and urgency of admission, patients admitted on the weekend were more than two times more likely to incur a HAC compared to those admitted on weekdays (odds ratio 2.41; 95% confidence interval 2.19–2.65; $p < 0.05$). HAC occurrence and weekend admission were also associated with prolonged LOS ($p < 0.05$). We found that weekend admission is associated with increased HAC rate. Though our conclusions must be tempered by limitations of the coded national database, further study is warranted to confirm this disparity and evaluate potential for improvement.

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1. Introduction

The 2005 Deficit Reduction Act modified reimbursement for acute care hospitalizations of Medicare fee for service beneficiaries if a preventable complication occurred in a patient [1]. Hospitals were required to identify conditions that were high cost and/or high volume and could have been prevented through the practice of evidence-based guidelines [2]. The Centers for Medicare and Medicaid Services (CMS) specifically developed a list of hospital-acquired conditions (HAC) dictating the new payment policy [1]. HAC, also known as never events, include iatrogenic adverse events such as air embolism, a retained foreign body, blood incompatibility, pressure ulcer, catheter-associated urinary tract infection (UTI), vascular catheter-associated infection,

manifestations of poor glycemic control, falls/trauma, deep venous thrombosis or pulmonary embolism after total knee and hip replacements and surgical site infections following orthopedic procedures (Table 1). Estimates of up to US\$9.3 billion have been attributed annually to the management of potentially preventable hospital complications [3]. Current healthcare trends emphasize improved public health measures and cost effectiveness in the setting of a cost burdened healthcare system.

Weekend admission has been a topic of recent study with the noted decrease in hospital staffing and expertise on weekends [4]. Admission on weekends have subsequently shown association with increased mortality among all hospital admissions and within subgroups of patients with pulmonary embolism, stroke, subarachnoid hemorrhage, intracerebral hemorrhage and myocardial infarction [5–12]. Of note, we have chosen to evaluate weekend admission rather than weekend surgery given the widespread interest in recent literature regarding weekend admission. The

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Table 1
Admission day demographics of thoracolumbar patients

	Weekday admission (n = 1,796,429)		Weekend admission (n = 45,802)	
	n	%	n	%
HAC Occurrence				
Yes	72,599	4.0	22,664	49.5
No	1,723,830	96.0	23,138	50.5
Patient Factors				
Race				
Caucasian	1,137,235	63.3	26,867	58.7
African	92,234	5.1	2,316	5.1
Hispanic	82,887	4.6	3,375	7.4
Asian Pacific Islander	14,443	0.8	690	1.5
Native American	5,575	0.3	265	0.6
Other	34,864	1.9	1,248	2.7
Missing	429,190	2.4	11,041	24.1
Payer status				
Medicare	569,219	31.7	10,927	23.9
Medicaid	101,816	5.7	4,782	10.4
Private insurance	876,061	48.8	22,700	49.6
Self-pay	19,236	1.1	2,847	6.2
No charge	1,882	0.1	231	0.5
Other	224,040	12.5	4,217	9.2
Missing	4,176	0.2	100	0.2
Comorbidities				
No comorbidities	555,004	30.9	14,117	30.8
One comorbidity	500,982	27.9	11,414	24.9
Two or more comorbidities	728,124	40.5	19,939	43.5
Missing	12,319	0.7	332	0.7
Age, years				
≤18	83,328	4.6	3,593	7.8
19–30	79,788	4.4	6,748	14.7
31–40	210,664	11.7	6,276	13.7
41–50	355,033	19.8	8,065	17.6
51–65	583,444	32.5	11,728	25.6
66–80	428,895	23.9	7,517	16.4
>80	55,277	3.1	1,876	4.1
Sex				
Male	784,329	43.7	25,564	55.8
Female	1,010,843	56.3	20,182	44.1
Missing	1,257	0.0	57	0.1
Admission type				
Emergency	64,148	3.6	21,285	47
Urgent	103,056	5.7	5,516	12
Elective	1,462,155	81.4	9,418	21
Newborn	48	0.0	0	0
Trauma center	4,732	0.3	3,100	7
Other	66	0.0	DS	0
Missing	161,224	9.0	6,470	14
Admission source				
Emergency department	44,572	2.5	16,773	37
Another hospital	8,214	0.5	2,357	5
Other health facility	4,915	0.3	449	0
Court/law enforcement	945	0.0	ND	ND
Routine	1,120,023	62.3	10,605	23
Missing	617,760	34.4	15,590	34
APR-DRG severity score				
No class specified	239	0.0	ND	0
Minor loss of function	814,378	45.3	6,586	14
Moderate loss of function	689,296	38.4	9,728	21
Major loss of function	248,826	13.9	23,726	52
Extreme loss of function	31,362	1.7	5,401	12
Missing	12,319	0.7	332	1
Hospital factors				
Hospital bed size				
Small	235,555	13.1	2,729	6.0
Medium	391,218	21.8	8,866	19.4
Large	1,158,852	64.5	33,858	73.9
Missing	10,805	0.6	349	0.8
Hospital region				
Northeast	274,598	15.3	6,410	14.0
Midwest	445,657	2.5	9,708	21.2

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