Predictors of Discharge to Skilled Nursing Facilities for Adult Trauma Patients

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BACKGROUND: Up to 30% of trauma patients are discharged to a skilled nursing facility (SNF). Identifying trauma patients at a high risk of discharge to a SNF may guide resource allocation and facilitate a timely discharge to ultimately shorten hospital length of stay (LOS). Therefore, we sought to identify risk factors for discharge to a SNF in adult trauma patients. We hypothesized that age ≥65, dementia/delirium, and mechanisms involving falls to be significant predictors for discharge to a SNF.

METHODS: Utilizing the Trauma Quality Improvement Program (2010-2016), we identified trauma patients with documented discharge to their home or a SNF. A multivariable analysis was performed identifying risks for discharge to a SNF.

RESULTS: Of the 1,014,547 trauma patients, 217,160 (21.4%) were discharged to a SNF. Compared to those discharged home, patients discharged to a SNF were older (76 vs. 45 years-old, p<0.001) and more often female (59.5% vs. 30.6%, p<0.001). However, patients discharged to a SNF had a lower median injury severity score (ISS) (9 vs. 10, p<0.001). Independent predictors for discharge to a SNF included age ≥65 (OR 3.57, 3.52-3.62 p<0.001), severe lower extremity injuries (OR 3.65, 3.46-3.85, p<0.001), dementia (OR 3.52, 3.43-3.60, p<0.001), and mechanisms of injuries including fall (OR 1.79, 1.76-1.81, p<0.001) and pedestrian struck (OR 1.91, 1.84-1.97, p<0.001).

CONCLUSION: Nearly a quarter of trauma patients were discharged to a SNF. A clinical scoring tool that includes parameters such as age ≥65, severe lower extremity injuries, dementia, as well as fall and pedestrian struck mechanisms may potentially be used in the future for early identification of patients at high risk for discharge to a SNF, and thereby help expedite disposition and reduce hospital costs, LOS, and hospital associated complications.

Table 1. Demographics and outcomes of adult trauma patients discharged to home or SNF using Trauma Quality Improvement Program database.

Characteristic	Home (n=797387)	SNF (n=217160)	p-value
Age, year, median (IQR)	45 (32)	76 (19)	<0.001
Female, n (%)	742092 (30.6%)	129222 (59.5%)	<0.001
ISS, median (IQR)	10 (8)	9 (7)	<0.001
Alcohol screen positive, n (%)	153860 (20.7%)	13256 (6.7%)	<0.001
AIS, n (%)			
Head severe	150690 (18.9%)	42530 (19.6%)	<0.001
Spine severe	5365 (0.7%)	2611 (1.2%)	<0.001
Thorax severe	45329 (5.7%)	6245 (2.9%)	<0.001
Abdomen severe	26849 (3.4%)	2274 (1.0%)	<0.001
Lower ext. severe	5901 (0.7%)	2619 (2%)	<0.001
Drug screen positive, n (%)	139858 (19.7%)	15302 (7.9%)	<0.001
Comorbidities, n (%)			
Congestive heart failure	14663 (1.8%)	19734 (9.1%)	<0.001
Smoker	183024 (23.0%)	22921 (10.6%)	<0.001
Chronic renal failure	5319 (0.7%)	6124 (2.8%)	<0.001
Cerebrovascular accident	11566 (1.5%)	13411 (6.2%)	<0.001
Diabetes	75553 (9.5%)	48565 (22.4%)	<0.001
History of MI	7360 (0.9%)	5605 (2.6%)	<0.001
Peripheral vascular disease	2591 (0.3%)	2708 (1.2%)	<0.001
Hypertension	202512 (25.4%)	130108 (59.9%)	<0.001
Obesity	28448 (3.6%)	9077 (4.2%)	<0.001
COPD	46277 (5.8%)	27796 (12.8%)	<0.001
Steroid use	3329 (0.4%)	2919 (1.3%)	<0.001
Cirrhosis	4550 (0.6%)	2282 (1.1%)	<0.001
Dementia	12935 (1.6%)	27688 (12.8%)	<0.001
Psychiatric illness	51652 (6.5%)	22676 (10.4%)	<0.001
ADHD	1983 (0.4%)	203 (0.1%)	<0.001
Blunt mechanism, n (%)			
Bicyclist	22648 (2.8%)	1511 (0.7%)	<0.001
Motorcyclist	52238 (6.6%)	4303 (2.0%)	<0.001
Pedestrian struck	24819 (3.1%)	5617 (2.6%)	<0.001
Fall	236136 (29.6%)	136124 (62.7%)	<0.001
Motor vehicle accident	186466 (23.4%)	20713 (9.5%)	<0.001

SNF= skilled nursing facility, ISS = injury severity score, IQR = interquartile range, COPD = chronic obstructive pulmonary disease, MI= myocardial infarction, AIS= abbreviated injury scale, ADHD= attention deficit hyperactivity disorder, ext= extremity

Table 2. Multivariable logistic regression analysis for risk of discharge to SNF vs. home

Risk factor	OR	CI	p-value
Age ≥65	3.571	3.524-3.619	<0.001
AIS			
Head severe	.693	.683-.704	<0.001
Spine severe	2.834	2.677-2.999	<0.001
Thorax severe	1.002	.971-1.034	0.902
Abdomen severe	.734	.700-.771	<0.001
Lower ext. severe	3.653	3.464-3.853	<0.001
Comorbidities			
CHF	1.900	1.850-1.952	<0.001
Smoker	.698	.686-.711	<0.001
Chronic renal failure	1.674	1.601-1.750	<0.001
CVA	1.713	1.660-1.767	<0.001
Diabetes	1.194	1.174-1.213	<0.001
History of MI	1.110	1.062-1.159	<0.001
Peripheral vascular disease	1.303	1.221-1.391	<0.001
Hypertension	1.837	1.813-1.861	<0.001
Obesity	1.086	1.054-1.119	<0.001
COPD	1.441	1.412-1.471	<0.001
Steroid use	1.506	1.417-1.601	<0.001
Cirrhosis	1.783	1.679-1.895	<0.001
Dementia	3.515	3.429-3.604	<0.001
Psychiatric illness	1.439	1.409-1.469	<0.001
ADHD	.572	.489-.668	<0.001
Drug test yes vs no	.832	.816-.849	<0.001
Alcohol screen yes vs no	.636	.623-.659	<0.001
Delirium	2.651	2.139-3.285	<0.001
Mechanism			
Motor vehicle accident	.774	.759-.790	<0.001
Pedestrian struck	1.906	1.840-1.974	<0.001
Fall	1.787	1.761-1.813	<0.001
Bicyclist	.528	.498-.560	<0.001
Motorcyclist	.720	.695-.747	<0.001

Constant	.097	-	<0.001

Table 3. Clinical outcomes in adult trauma patients discharged to home and discharged to SNF

Outcome	Home (n=797387)	SNF (n=217160)	p-value
LOS, days, median (IQR)	4 (5)	6 (5)	<0.001
ICU, days, median (IQR)	2 (2)	4 (6)	<0.001
Ventilator, days, median (IQR)	2 (4)	6 (11)	<0.001
Complications, n (%)			
Acute kidney injury	2735 (0.3%)	2824 (1.3%)	<0.001
ARDS	3931 (0.5%)	2105 (1.0%)	<0.001
Cardiac arrest	928 (0.1%)	837 (0.4%)	<0.001
Decubitus ulcer	1665 (0.2%)	2892 (1.3%)	<0.001
Deep site infection	1493 (0.2%)	464 (0.2%)	.013
Drug EtOH withdrawal	8183 (1.0%)	2636 (1.2%)	<0.001
Deep vein thrombosis	5331 (0.7%)	4347 (2.0%)	<0.001
Extremity compartment	1764 (0.2%)	286 (0.1%)	<0.001
Graft flap fail	274 (0.0%)	64 (0.0%)	.268
Myocardial infarction	873 (0.1%)	1325 (0.6%)	<0.001
Organ space infection	1860 (0.2%)	473 (0.2%)	.183
Pneumonia	9437 (1.2%)	7615 (3.5%)	<0.001
Pulmonary embolism	2942 (0.4%)	1486 (0.7%)	<0.001
CVA	710 (0.1%)	1081 (0.5%)	<0.001
Superficial infection	1990 (0.2%)	551 (0.3%)	.731
Unplanned intubation	4344 (0.5%)	3404 (1.6%)	<0.001
UTI	5977 (0.7%)	7769 (3.6%)	<0.001
CRBSI	403 (0.1%)	280 (0.1%)	<0.001
Osteoporosis	195 (0.0%)	99 (0.0%)	<0.001
Unplanned return OR	3104 (0.4%)	1033 (0.5%)	<0.001
Unplanned ICU	5520 (0.7%)	4303 (2.0%)	<0.001
Severe sepsis	1434 (0.2%)	1214 (0.6%)	<0.001
CAUTI	271 (0.0%)	436 (0.2%)	<0.001

CLABSI	41 (0.0%)	32 (0.0%)	<0.001
VAP	470 (0.1%)	408 (0.2%)	<0.001
Other	147175 (18.5%)	42182 (19.4%)	<0.001
Mortality, n (%)	0 (0%)	0 (0%)	<0.001

ASVI = axillosubclavian vessel injury, LOS = length of stay, IQR = interquartile range, ICU = intensive care unit, ARDS = acute respiratory distress syndrome, CVA= cerebrovascular accident, UTI= urinary tract infection, CRBSI= catheter-related bloodstream infection, CAUTI= catheter-associated urinary tract infection, CLABSI= central line-associated bloodstream infection, VAP= ventilator-associated pneumonia, EtOH= ethyl alcohol