

Which Patients are More Likely to Require Postoperative Inpatient Rehabilitation After Operative Intervention of Traumatic Hip Fractures?

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Background

There has been little investigation into the factors making patients more likely to be discharged to a rehabilitation facility versus home after operative fixation of hip fractures. It has been shown that discharge to SNF after TJA is associated with poorer outcomes, higher rates of infection, and increased costs.¹⁻³ In addition, pre-injury ability to ambulate independently, early postoperative mobilization, and quicker time to surgery have been associated with discharging home after hip surgery.⁴

Objective

Purpose: To determine relevant demographic, injury, hospital course and surgical characteristics that make patients more likely to be discharged to a postoperative rehabilitation facility as opposed to being discharged home after operative fixation of a traumatic hip fracture.

Methods

71,849 patients who underwent operative fixation of a hip fracture from 2017-2019 at institutions who submitted data to the American College of Surgeons (ACS) Trauma Quality Programs (TQP) database were analyzed retrospectively

Number of patients discharged home: 15,671

Number of patients discharged to rehabilitation facility: 56,178

Various demographic, injury, hospital course and surgical characteristics were compared between both groups. All data were analyzed using SAS version 9.4. Descriptive variables were compared using chi-square tests for proportional variables and t-tests for continuous variables (Table 1). A multivariable regression adjusted by age, race, comorbidities, dependent health status, anticoagulation therapy and substance abuse was used to compare method of operative fixation and post-surgical complications between both groups (Table 2).

Results

Table 1: Demographic Group Comparison

	Rehab N=56,178	Home N=15,671	P value
Age	76.6 (±9.9)	65.4 (±14.9)	<0.0001
Gender			
Male	32.9%	41.5%	<0.0001
Female	67.1%	58.5%	
Race			
White	90.2%	87.8%	<0.0001
Black	4.9%	5.5%	0.003
Asian	1.4%	2.0%	<0.0001
Other	3.5%	4.8%	<0.0001
Comorbidity			
Smoker	13.1%	24.5%	<0.0001
Diabetes	26.3%	17.7%	<0.0001
Alcohol Use Disorder	3.1%	4.8%	<0.0001
Currently receiving chemotherapy for cancer	1.02%	0.97%	0.55
Congenital anomalies	0.5%	0.6%	0.04
CHF	9.5%	4.7%	<0.0001
Chronic Renal Failure	4.2%	1.9%	<0.0001
CVA	6.6%	4.0%	<0.0001
Disseminated Cancer	1.2%	1.0%	0.10
Advanced directive limiting care	7.9%	5.8%	<0.0001
Functionally Dependent Health Status	23.6%	16.3%	<0.0001
Hypertension	66.2%	47.8%	<0.0001
Prematurity	0.02%	0.03%	0.63
COPD	16.4%	12.1%	<0.0001
Steroid Use	2.2%	1.7%	0.003
Cirrhosis	1.2%	1.3%	0.42
Dementia	16.1%	10.3%	<0.0001
ADHD	0.2%	0.5%	<0.0001
Anticoagulant Therapy	17.5%	9.5%	<0.0001
Angina Pectoris	0.3%	0.2%	0.01
Mental/Personality Disorder	13.0%	12.5%	0.09
Myocardial Infarction	1.6%	0.9%	<0.0001
PAD	2.1%	1.3%	<0.0001
Substance Abuse Disease	2.2%	4.5%	<0.0001
Work-related (Y/N)	1.1%	4.4%	<0.0001
Transport Mode			
Ground Ambulance	91.1%	79.1%	<0.0001
Helicopter Ambulance	0.6%	1.1%	<0.0001
Fixed-wing Ambulance	0.2%	0.6%	<0.0001
Private/Public Vehicle/Walk-in	7.8%	18.9%	<0.0001
Other	0.3%	0.4%	0.07
Trauma Center Criteria: GCS<13	0.2%	0.1%	0.10
Trauma Center Criteria: SBP<90	0.11%	0.06%	0.10
Initial EMS Pulse Rate	82.4 (±15.9)	84.1 (±16.1)	<0.0001
EMS Total GCS	14.9 (±0.5)	14.9 (±0.6)	0.0003
Pre-hospital cardiac arrest	0.19%	0.22%	0.42
Total ICU length of stay	3.9 (±3.5)	3.7 (±3.9)	0.35
Time from ED/Hospital arrival to final discharge	6.6 (±16.1)	5.6 (±4.2)	<0.0001
Time from incident to ED/Hospital arrival			
Time to: VTE prophylaxis	2.3 (±1.3)	2.3 (±1.2)	0.19
Facility level: hospital type			
For Profit	14.0%	11.6%	<0.0001
Non-profit	85.6%	87.7%	<0.0001
Government	0.4%	0.7%	<0.0001

Table 1: Demographic Group Comparison (Continued)

	Rehab N=56,178	Home N=15,671	P value
Patient positioning			
Time from Incident to EMS			
Time from EMS Dispatch to EMS arrival at scene			
Interfacility transfer Y/N	14.9%	19.6%	<0.0001
Vehicular, Pedestrian, Other Risk Injury: Fall adults: >20 ft	0.16%	0.18%	0.58
Vehicular, Pedestrian, Other Risk Injury: Auto v. pedestrian/bicyclist thrown, run over, or > 20 MPH impact	0.04%	0.11%	0.0004
Vehicular, Pedestrian, Other Risk Injury: Motorcycle crash > 20 mph	0.01%	0.12%	<0.0001
Vehicular, Pedestrian, Other Risk Injury: For adults > 65; SBP < 110	0.3%	0.1%	0.0004
Vehicular, Pedestrian, Other Risk Injury: Patients on anticoagulants and bleeding disorders	2.0%	0.6%	<0.0001
Blood transfusion Y/N	0.2%	0.1%	0.08
Blood transfusion measurement (ml)	438 (±296)	373 (±194)	0.34
Location of Fracture			
Femoral Neck	24.5%	42.5%	<0.0001
Intertrochanteric	63.5%	46.2%	<0.0001
Subtrochanteric	5.4%	5.4%	0.82
Greater trochanter	1.0%	0.9%	0.06
Lesser trochanter	0.4%	0.3%	0.07
Combined	2.3%	2.1%	0.20

Table 2: Outcome Group Comparison

	Rehab N=56,178	Home N=15,671	Adjusted p-value *	Adjusted OR * (Reference="Rehab")
ORIF	90.1%	83.5%	<0.0001	0.57 (0.54, 0.60)
Hemiarthroplasty	0.8%	0.8%	0.43	1.09 (0.88, 1.36)
Total Hip Arthroplasty	9.5%	15.9%	<0.0001	0.75 (1.65, 1.88)
Combined Fixation	0.4%	0.2%	0.001	0.97 (1.30, 2.97)
Complication				
Deep SSI	0.02%	0.01%	0.09	0.16 (0.02, 1.36)
DVT	0.33%	0.19%	0.004	0.54 (0.35, 0.83)
Superficial SSI	0.02%	0.01%	0.13	0.19 (0.02, 1.66)

* Adjusted by age, race, Comorbidities, Dependent Health Status, Anticoagulation Therapy, Substance Abuse

Discussion/Conclusions

Our study identified several co-morbidities, demographic, injury and surgical factors that were associated with a significantly higher likelihood of a patient discharged to a rehabilitation facility instead of home. Early identification of patients with these risk factors may provide an opportunity to optimize patients for discharge to home over a rehabilitation facility. Present literature supports that hip fracture patients have better postoperative outcomes when discharged to home as opposed to discharge to rehabilitation facilities.

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