3-Month and 12-Month Mortality Rates after Geriatric Hip Fractures are Improving

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INTRODUCTION: Increased mortality after geriatric hip fractures is a widely reported phenomenon. Mortality rates after geriatric hip fractures are thought to be constant, however, population level analysis of mortality trends over time are not common. The purpose of this study was to evaluate the 3 month and 1 year mortality after geriatric hip fractures from 2010 to 2019 using a statewide insurance database.

METHODS: The New York Statewide Planning and Research Cooperative System (SPARCS) database from 2010 to 2020 was queried for all patients over the age of 65 with admitted to either the hospital or emergency department with a diagnosis of a femoral neck fracture or intertrochanteric hip fracture. Diagnoses were identified with the use of ICD9/ICD10 CM diagnosis codes. Discharge status of “Expired,” “Expired at Home,” “Expired in a Medical Facility,” “Expired - Place Unknown,” “Hospice – Home,” and “Hospice - Medical Facility” were defined as mortality events. The last available encounter of any type was used to identify latest follow up. Kaplan Meier survival analysis was used to calculate 3-month and 12-month mortality rates for each discharge year. Cox proportional hazard multivariable regression controlling for gender, age, race, obesity, smoking, and Elixhauser comorbidity index was used to compare mortality hazard ratios for each year.

RESULTS:

From 2010 – 2019, a total of 142,540 patients over age 65 with a diagnosis of either femoral neck fracture or intertrochanteric hip fracture were included in the current analysis. The mean age in this patient cohort was 83.29 years (std dev 8.22) with 34% patients in the 65-80 years patient group and 66% in the 80+ age group. There were 72% female patients and 28% male patients. Majority of the patients were White (82%) with 5.1% Hispanic patients and 4.4% Black patients. Majority of the patients (86%) used Medicare as their primary insurance. The mean Elixhauser comorbidity index in the patient cohort was 7.35 (std dev 7.60). In total, 62% of the patients had a femoral neck fracture and 38% of the patients had an intertrochanteric hip fracture.

Kaplan Meier survival analysis revealed that for the complete cohort 3-month mortality rate was 9.82% (95% CI 9.65% - 9.98%) and 12-month mortality rate was 16.06% (95% CI 15.84% - 16.27%). Over time, the 3-month mortality rate went from 10.8% in 2010 to 8.6% in 2019 and the 12-month mortality rate went from 17.7% in 2010 to 14.8% in 2018 prior to rising to 16.9% in 2019.

Cox multivariate proportional hazard regression demonstrated statistically significant decreased hazard ratio from 2012 to 2019 compared to reference hazard in 2010. The mortality hazard ratio trend demonstrated continued year on year improvement from 2010 to 2018, with HR increasing from 0.88 to 0.93 from 2018 to 2019.

DISCUSSION AND CONCLUSION: Mortality after geriatric hip fractures has demonstrated a trend toward improvement in the last decade with 3-month mortality continuously decreasing 2010 to 2019 and 12-month mortality decreasing from 2010-2018 prior to increasing in 2019.

Table 1: Demographics and Patient Characteristics

Characteristic	N = 142,540[1]
Age – Mean (SD)	83.29 (8.22)
Age (bins)	
65-80	48,725 (34%)
80+	93,815 (66%)
Gender	
Female	102,778 (72%)
Male	39,762 (28%)
Race	
White	116,796 (82%)
Other or Unknown	8,722 (6.1%)
Hispanic	7,305 (5.1%)
Black	6,202 (4.4%)
Asian	3,276 (2.3%)
Native American	239 (0.2%)
Insurance	
Private	17,010 (12%)
Medicare	123,170 (86%)
Medicaid	1,583 (1.1%)
Worker's Compensation	639 (0.4%)
Other	1,129 (0.8%)
Elixhauser Index – Mean (SD)	7.35 (7.60)
Fracture Type	
FNF	89,083 (62%)
IT	53,457 (38%)
Discharge Year	
2010	15,251 (11%)
2011	14,866 (10%)
2012	14,573 (10%)
2013	14,463 (10%)
2014	14,364 (10%)
2015	14,077 (9.9%)
2016	13,174 (9.2%)
2017	13,240 (9.3%)
2018	14,325 (10%)
2019	14,207 (10.0%)

Characteristic	Forest Plot	HR[1]	95% CI[1]	p-value	q-value[2]
Discharge Year					
2010		1.00	—		
2011		0.95	0.92, 0.99	0.022	0.026
2012		0.94	0.90, 0.98	0.003	**0.005**
2013		0.94	0.90, 0.98	0.005	**0.007**
2014		0.92	0.88, 0.96	<0.001	**<0.001**
2015		0.91	0.87, 0.96	<0.001	**<0.001**
2016		0.91	0.87, 0.96	<0.001	**<0.001**
2017		0.88	0.84, 0.93	<0.001	**<0.001**
2018		0.88	0.83, 0.92	<0.001	**<0.001**
2019		0.93	0.88, 0.98	0.008	**0.010**
Gender					
Female		1.00	—		
Male		1.42	1.39, 1.45	<0.001	**<0.001**
Scaled Age (x10 years)		1.49	1.46, 1.51	<0.001	**<0.001**
Race					
Asian		1.00	—		
Black		1.05	0.96, 1.15	0.3	0.3
Hispanic		0.93	0.86, 1.02	0.12	0.14
Native American		0.92	0.69, 1.21	0.5	0.5
Other or Unknown		0.86	0.79, 0.94	<0.001	**0.001**
White		0.82	0.76, 0.89	<0.001	**<0.001**
Obesity Diagnosis		1.11	1.04, 1.18	0.002	**0.003**
Smoking/Nicotine Use Diagnosis		1.04	1.01, 1.07	0.003	**0.004**
Elixhauser Index		1.07	1.07, 1.07	<0.001	**<0.001**

[1] HR = Hazard Ratio, CI = Confidence Interval
[2] Benjamini & Hochberg correction for multiple testing