ArnotHealth
Graduate Medical Education

The Geriatric Trauma Patient: A Neglected Individual in a Mature Trauma System

LECOMT
LAKE ERIE CONSORTIUM FOR OSTEOPATHIC MEDICAL TRAINING

Madison Morgan, Kellie Bresz, Eric Bradburn, DO, Tamer Shtayyeh DO, Jean Paul Leva DO, Tawnya Vernon, David Harrison MD, Jennifer A.T. Schwartz, MD

Introduction:

Trauma patients age greater than 65 years of age represent the fastest growing demographic in the U.S. As such, their care has been emphasized by trauma entities such as the ACSCOT. Unfortunately much of that focus has been on their care once they reach the hospital with little attention on the access of geriatric trauma patients (GTPs) to trauma centers (TCs). We sought to determine the rate of geriatric undertriage (UT) to TCs within a mature trauma system. We hypothesized that the GTP would have a higher UT rate

(UTR) compared to their younger counterpart.

Table 1. Summary of ZCTA (n=1,707) Level Demographics by UTR Group

	Lower Quartile	Middle Box	Upper Quartile	All	p-value
n	427	853	427	1,707	
Median UTR	30.0%	50.5%	65.2%	50.5%	-
Median 13 year Trauma (ISS>9) per 1K Population 65+	50.6	51.3	48.8	50.5	0.188
Median 13 year Trauma (ISS>15) per 1K Population 65+	29.4	29.5	27.3	28.8	0.030
Median Total Population Density	370.8	198.2	255.2	263.6	<0.001
Median Population Age 65+ Density	60.7	30.8	43.4	42.9	<0.001

Methods:

From 2003-2015, all geriatric (age 65 or older) trauma admissions with an Injury Severity Score (ISS) greater than 9 from the PTSF registry and those meeting trauma criteria (ICD-9: 800-959) from the Pennsylvania Health Care Cost Containment Council (PHC4) database were included. UTR was defined as patients not admitted to accredited TCs (n=35) divided by the total number of patients as from the PHC4 database. PHC4 contains inpatient admissions within PA while Pennsylvania Trauma Systems Foundation (PTSF) reports admissions to PA TCs. ArcGIS Desktop and GeoDa were used for geospatial mapping of UT with a spatial empirical Bayesian smoothed UTR and Stata for statistical analyses.

Table 2. Summary of PHC4 Patient Level (n=111,626) Demographics by UTR Group

	Lower Quartile	Middle Box	Upper Quartile	All	p-value
n	32,214	52,325	27,087	111,626	
Race: White Alone	88.7%	90.8%	93.8%	90.9%	<0.001
Race: Black Alone	6.0%	3.5%	2.1%	3.9%	
Race: Asian Alone	0.7%	0.6%	0.4%	0.6%	
Race: Other or Unknown	4.6%	5.1%	3.7%	4.6%	
Hispanic	2.3%	0.6%	0.3%	1.0%	<0.001
Female	57.3%	59.1%	60.6%	59.0%	<0.001
Age 65-74	26.0%	24.3%	22.6%	24.4%	<0.001
Age 75-84	39.7%	39.8%	38.7%	39.5%	
Age 85+	34.3%	35.9%	38.7%	36.2%	
Self/Uninsured	0.5%	0.3%	0.2%	0.3%	<0.001
Medicare	82.5%	84.2%	84.5%	83.8%	
Medicaid	0.7%	0.4%	0.4%	0.5%	
Commercial	15.8%	14.4%	14.3%	14.8%	
Other/Unknown	0.6%	0.6%	0.6%	0.6%	
ISS 10-15	42.0%	42.9%	44.5%	43.1%	<0.001
ISS 16-25	48.3%	48.7%	48.1%	48.5%	
ISS >= 26	9.8%	8.4%	7.4%	8.5%	
AIS Head >= 3	50.3%	49.9%	47.3%	49.4%	<0.001
AIS Chest >= 3	19.1%	17.0%	16.2%	17.4%	<0.001
AIS Abdomen >= 3	3.0%	2.7%	2.3%	2.7%	<0.001
AIS Face >= 3	0.1%	0.1%	0.1%	0.1%	0.055
AIS Extremities >= 3	26.0%	28.7%	32.0%	28.7%	<0.001
AIS External >= 3	<0.1%	<0.1%	<0.1%	<0.1%	0.828
Transfer in from Another Hospital	7.0%	12.1%	9.4%	10.0%	<0.001
Transfer to Another Hospital	3.2%	4.5%	5.1%	4.3%	<0.001
Treated at a Trauma Center	84.2%	60.1%	42.6%	62.8%	<0.001
Mortality	7.7%	7.9%	7.1%	7.7%	<0.001
LOS > 5 days	42.6%	43.7%	42.8%	43.1%	0.004

RESULTS:

PTSF had 58,336 cases while PHC4 had 111,626 that met inclusion criteria, suggesting a geriatric UTR of 47.7% across PA. Geospatial mapping reveals significant clusters of UT regions with high UTR in some of the rural regions with limited access to a TC. High UTR appears to be mostly centered around non-TCs. UTR for patients with an ISS greater than 15 was 48.4%.

Conclusion:

There is a significant number of moderate to severely injured GTPs that do not get

admitted to a TC within a mature trauma system. Increased emphasis needs to focus prehospital management on identifying the severely-injured geriatric patient including specific geriatric triage protocols.

Conflict of Interest:
The authors declare no conflict of interest.

References:
1. Federal Interagency Forum on Aging-Related Statistics. Older Americans 2016: Key Indicators of Well-Being. Federal Interagency Forum on Aging-Related Statistics. Washington, DC: U.S. Government Printing Office. August 2016.
2. Bradburn et al "Loccation, Location, Location : Place of Injury Matters for the Unexpected Geriatric Survivor" Feb 19 2020

Penn Medicine
Lancaster General Health