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Prospective observational study to see the outcome of trauma patients in elderly age group in emergency department of a tertiary care hospital

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Abstract
Background: *Trauma is a common cause of admission to hospital emergency department. Elderly patients differ significantly from younger patient in physiology, shock response, mechanisms and types of injury. The aim of this study is to evaluate the cause of admission, and to assess outcome of trauma patients in elderly age group (>65 years).*
Methods: *A Prospective observational study conducted in emergency Department of General Surgery, Government Medical College , Jammu. 200 patients over age 65 years and who met the criteria of a trauma patient (injury severity score [ISS] > 12) on admission were recruited in the study. The mechanism of injury, injury type, special care unit used, complications and outcomes were recorded.*
Results: *Cause of injury in majority of patients was RTA and most common site of injury was head. The mean GCS score was 14.2, duration of hospital stay was 16.2 days, ICU admission was 12.3 days, ICU stay duration was 15.1 days and hospital mortality was seen in 56 patients . Majority of complications were DVT, hypercoagulable state, Pleural effusion, pneumonia and renal failure. 40/56 in patients with ISS >32. The difference was significant (P< 0.05).*
Conclusion:*Maximum deaths occurred in those elderly patients whose ISS was >32 and who had maximum number of complications.*
Keywords: *Trauma, Elderly, Emergency, Complications*

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I. Introduction

The fastest growing population consists of older adults, with the rate of all aging populations growing much faster than in the pas**t.** The proportion of the world's population aged over 60 will increase by almost double from 12% to 22% between 2015 and 2050, as reported by WHO. The number of people aged 60 and over accounting for 20% of the population.[1]

Elderly trauma victims complicate medical demands by frequently arriving with a larger number of co-morbid conditions than individuals in other age groups; they also have a decreased ability to tolerate severe injury for long periods of time. Previous studies have shown that, although this subgroup represents a smaller proportion of traumas, these patients require a disproportionate amount of hospital resources. However, it has also been shown that elderly victims who survive the initial traumatic event can regain much of their previous level of functioning.[2,3]

Elderly patients differ significantly from the younger trauma patient in physiology, shock response, mechanisms and types of injury.[4] An appreciation of these differences reduces the risk of under-triaging, so avoiding delay in investigation and diagnosis and decreasing morbidity and mortality. Impaired physiological responses or system failures may also mask injuries and their severity, making clinical assessment and treatment more difficult.[5] For example, haemorrhage and/or hypoperfusion can be missed because basal vital signs do not reflect shock response. Medication such as beta-blockers, anticoagulants and steroids further hide the normal shock response. Co-morbid factors such as renal and hepatic impairment, chronic steroid use or previous malignancy, further increase the mortality risk in the elderly trauma patients, by up to five times.[6] The present study was conducted to assess outcome of trauma patients in elderly age groups.

II. Materials & Methods

The present study comprised of 200 patients over age 65 years presented in emergency, Department of General Surgery, Government Medical College, Jammu and who met the criteria of a trauma patient (injury severity score [ISS] > 12) on admission were recruited in the study. Ethical permission was obtained before starting the study.

Data such as name, age, gender etc. was recorded. The mechanism of injury (MOI), injury type, special care unit used, complications and outcome was recorded. Results were tabulated and assessed statistically using Mann Whitney U test using SPSS version 21.0. P value less than 0.05 was considered significant.

III. Results

Table I Distribution of patients

Total- 200		
Gender	**Male**	**Female**
Number	120	80

Table I shows that out of 200 patients, males were 120 and females were 80.

Table II Assessment of parameters

Parameters	**Variables**	**Number**	**P value**
Cause of injury	High energy fall	16	0.02
	Low energy fall	14	
	RTA	125	
	Burn	12	
	Gun- shot injury	8	
	Machinery	10	
	Pedestrian	15	
Site of injury	Head	77	0.05
	Thorax	35	
	Abdomen	40	
	Spine	15	
	Lower extremity	12	
	Upper extremity	13	
	Others (face, neck)	8	
Special care unit used	ICU	25	0.17
	NCCU	110	
	Stepdown	65	

Table II shows that cause of injury was high energy fall in 16 and low energy fall in 14, RTA in 125, burn in 12, gunshot injury in 8, machinery in 10 and pedestrian in 15 cases. Site of injury was head in 77, thorax in 35, abdomen in 40, spine in 15, upper extremities in 13, lower extremities in 12 and other in 8 cases. Special care unit used by elderly patients was ICU in 25, NCCU in 110 and stepdown in 65. The difference was significant ($P < 0.05$).

Table III AIS and admission

Parameters	Variables	Number	P value
AIS	Head >3	43	0.04
	Neck >3	5	
	Face >3	11	
	Chest >3	17	
	Abdomen >3	24	
	Spine >3	11	
	Extremities >3	17	
	Surface >3	2	
GCS		14.2	-
Duration of hospital stay (days)		16.2	-
ICU admission (days)		12.3	-
ICU stay duration		15.1	-
Hospital mortality		56	-

Table III shows that AIS head >3 was seen in 43, neck >3 in 5, face >3 in 11, chest >3 in 17, abdomen >3 in 24, spine >3 in 11, extremities >3 in 17 and surface >3 was seen in 2 patients. The mean GCS score was 14.2, duration of hospital stay was 16.2 days, ICU admission was 12.3 days, ICU stay duration was 15.1 days and hospital mortality was seen in 56 patients. The difference was significant (P< 0.05).

Table IV Assessment of complications

Complications	Number	P value
Stroke	5	0.01
DVT	16	
Hypercoagulable state	14	
Pneumonia	10	
UTI	16	
SSI	11	
Pleural effusion	12	
Renal failure	4	
ARDS	5	

Table IV shows that complications were stroke in 5, DVT in 16, hypercoagulable state in 14, pneumonia in 10, UTI in 16, SSI in 11, pleural effusion in 12, renal failure in 4 and ARDS in 5 patients. The difference was significant (P< 0.05).

Table V Patient complications and mortality compared with ISS

ISS	Number	Patients with complications	Died	P value
12-17	22	12	7	0.04
18-24	28	16	9	
25-32	34	25	15	
>32	56	40	25	

Table V, graph I shows that there were 22 patients with ISS 12-17 and 12 having complications from which 7 died. 9 patients died having 16 complications out of 34 patients with ISS 18-24. Maximum deaths occurred in 25/40 in patients with ISS >32. The difference was significant (P< 0.05).

Graph I Patient complications and mortality compared with ISS

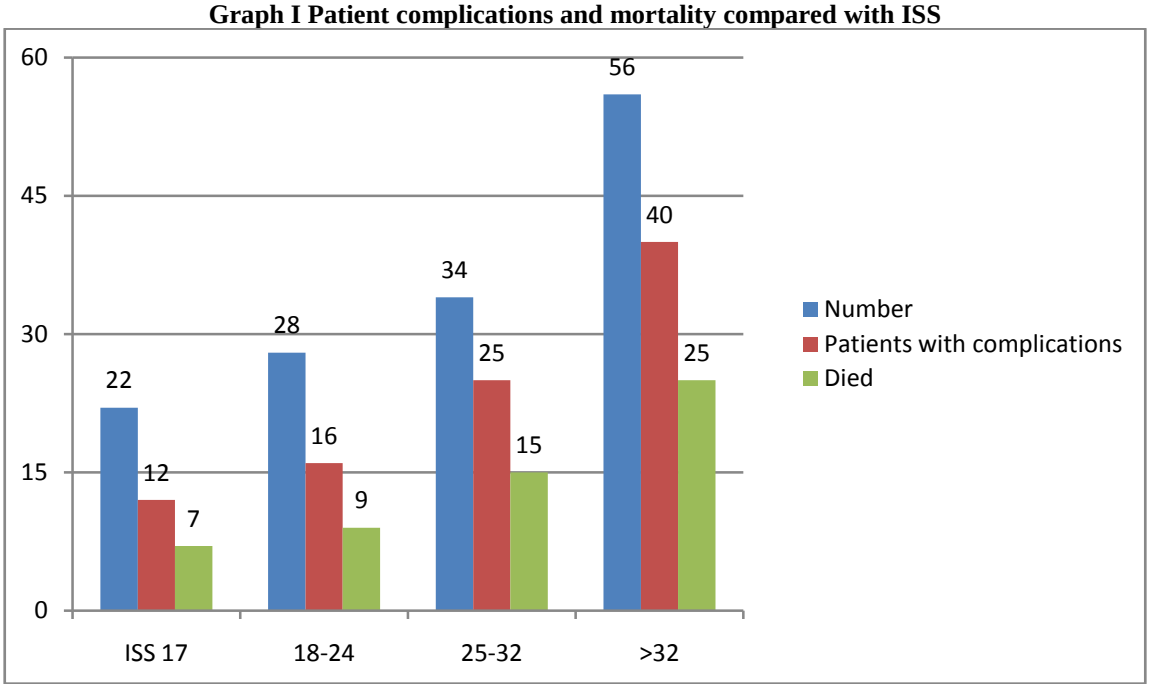

Table VI ICU stay and mortality

ICU stay	Mortality	P value
<12 days	16	0.01
>12 days	40	

Table VI shows that there were 16 mortalities in patients with <12 days ICU stay and 40 mortalities in patients with >12 days. The difference was significant (P< 0.05).

IV. Discussion

Elderly patients account for more than 50% of the deaths that result from trauma, even though they make up only 30% of total admissions.[7,8] Although the elderly suffer from comorbid conditions and limited physiological reserves that may predispose them to die with a less severe injury, a high percentage of elderly patients return to their home.[9] This fact encourages careful analysis of these patients to identify trends in injury patterns and complications that could be avoided, thereby allowing more of these patients to survive their initial injuries.[10] Prompt whole body computed tomography (CT) is the gold standard in elderly trauma imaging, as for younger patients. This decreases the duration of hospital stay, intensive therapy unit (ITU) admission rates,

morbidity and mortality, even if the patient has a high ISS.[11]The present study was conducted to assess outcome of trauma patients in elderly age groups.

We found that out of 200 patients, males were 120 and females were 80. Gowing et al[12] found that elderly trauma cases accounted for 125 of the total 460 trauma admissions. More than 50% of trauma deaths occurred among elderly patients, of whom 65 were men and 34 were women. Their mean age was 77 years, with an age range of 66–95 years. The average ISS score was 23. MOI included falls (64%), motor vehicle collision (27%), injury from machinery (3%), injury from natural and environmental causes (2%), suicide or self-inflicted injury (3%) and burns (1%). The mean length of stay was 14.6 days, but this ranged from 1 to 111 days. Of the 99 patients, 14 were admitted to the ICU for a total of 37 days, and 9 of these died. Of the total of 67 (67%) patients who were discharged from hospital, 46% were discharged home and 32% died. Falls accounted for the most frequent MOI, followed by motor vehicle collisions. The most common injury in the falls group was subdural hematoma, whereas fractures were the most common injuries in the motor vehicle collision group. The most frequent complications included urinary tract infections and aspiration pneumonias. Neither age nor MOI was correlated with injury severity. Increasing age and injury severity were predictors for complications and mortality while in hospital.

We observed that cause of injury was high energy fall in 16 and low energy fall in 14, RTA in 125, burn in 12, gunshot injury in 8, machinery in 10 and pedestrian in 15 cases. Site of injury was head in 77, thorax in 35, abdomen in 40, spine in 15, upper extremities in 13, lower extremities in 12 and other in 8 cases.Special care unit used by elderly patients was ICU in 25, NCCU in 110 and stepdown in 65.Special care unit used by elderly patients was ICU in 25, NCCU in 110 and stepdown in 65.Wongweerakit et al[13]determined the age cut point at which age impacts the mortality rate in trauma patients. A total of 1,523 trauma patients ≥40 years were included in the study. The median age in both the survival and death groups was 61 years, with gender in both groups being similar (p value 0.259). In the multivariate logistic regression analyses, the adjusted odds ratio (OR) showed that increasing age was significantly associated with mortality (OR 1.05; 95% CI, 1.02–1.07; p value 80 years, the odds of mortality were significantly increased (OR 3.29, 95% CI, 1.24–8.68; p value 0.016 and OR 3.29, 95% CI, 1.27–12.24; p value 0.018, respectively).

We found that AIS head >3 was seen in 43, neck >3 in 5, face >3 in 11, chest >3 in 17, abdomen >3 in 24, spine >3 in 11, extremities >3 in 17 and surface >3 was seen in 2 patients. The mean GCS score was 14.2, duration of hospital stay was 16.2 days, ICU admission was 12.3 days, ICU stay duration was 15.1 days and hospital mortality was seen in 56 patients.Complications were stroke in 5, DVT in 16, hypercoagulable state in 14, pneumonia in 10, UTI in 16, SSI in 11, pleural effusion in 12, renal failure in 4 and ARDS in 5 patients. There were 22 patients with ISS 12-17 and 12 having complications from which 7 died. 9 patients died having 16 complications out of 34 patients with ISS 18-24. Maximum deaths occurred in 25/40 in patients with ISS >32. There were 16 mortalities in patients with <12 days ICU stay and 40 mortalities in patients with >12 days.Bell and colleagues studied older patients presenting to the emergency department after a fall. In terms of hospital resource use, 57.2% were admitted to hospital, 48% with a fracture and 52% for investigation of the medical cause of the fall. Knudson and colleagues[14] state that long-term survival is mainly determined by host factors and not by injury severity in patients with femoral neck fractures. One of the largest comparisons of trauma victims, based on age, has revealed several aspects of trauma outcome that vary with a person's age. Elderly (≥ 65 yr) patients had significantly higher mortality rates than younger (< 65 yr) trauma patients after stratification by ISS, Revised Trauma Score and other preexisting comorbidities. A patient age over 65 years was associated with a 2- to 3-fold increased mortality risk in mild (ISS < 15), moderate (ISS 15–29) and severe traumatic injury (ISS ≥ 30), compared with a patient age under 65 years.
The shortcoming of the study is small sample size.

V. Conclusion

We found that maximum deaths occurred in those elderly patients whose ISS was >32 and who had maximum number of complications.

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A Prospective observational study to see the outcome of trauma patients in elderly age group in Emergency Department of GMCH, Jammu

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