In- and Out-of-Hospital Mortality in Severely Injured Elderly Trauma Patients:

A Retrospective Analysis

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Background

Older adults are a significant and growing segment of the global population. The percentage of people aged ≥65 years worldwide is expected to increase from 9.3% in 2020 to 16.0% in 2050 worldwide, exceeding 1.5 billion. Trauma is currently the fifth leading cause of death, and one third of healthcare resources are spent on patients aged ≥65. Numerous studies have documented increased in-hospital mortality rates in geriatric trauma patients. However, data on long-term mortality rates in elderly, severely injured trauma patients are lacking.

Purpose

The main objective of the study was to evaluate in- and out-of-hospital (1-, 2- and 3-year) mortality rates of patients aged ≥65 years, sustaining an acute trauma with an Injury Severity Score (ISS) ≥16. The second objective was to compare the mortality rates of different age groups (65-80 years vs. >80 years vs. general population) and ISS groups (ISS ≥16 vs. ISS ≥25). Independent risk factors for 1-year mortality were evaluated.

Methods

Retrospective analysis of all patients ≥65 years, who sustained an acute trauma with an injury severity score (ISS) ≥16 points and were treated in the Emergency Department of our level I trauma center between January 1, 2017, and December 31, 2022. Demographic details, injury mechanism and pattern (Abbreviated Injury Scale (AIS) scores for different body regions, ISS, as well as mortality rates at the various time points were extracted from the electronic patient files. Patients were further stratified into two age groups: 65-80 years and >80 years at the time-point of trauma

Patients (n=1189)	65-80 years	≥80 years	p-value
Males	506 (67.0%)	230 (53.0%)	<.001
GCS	12.8 (±3.8)	13.4 (±3.1)	<.001
Injury mechanism	**65-80 years**	**≥80 years**	**p-value**
Traffic accident	207 (27.5%)	59 (13.7%)	<.001
Fall at ground level	79 (10.5%)	81 (18.7%)	<.001
Fall below 3m	290 (38.4%)	231 (53.2%)	<.001
Fall over 3m	105 (13.9%)	28 (6.5%)	<.001
Injury characteristics	**65-80 years**	**≥80 years**	**p-value**
Median ISS	24.4 (±8.4)	23.9 (±6.9)	0.004
ISS >25	398 (52.7%)	253 (58.3%)	0.063
AIS Head ≥3	513 (67.9%)	326 (75.1%)	0.009
AIS Thorax ≥3	235 (31.1%)	100 (23.0%)	0.003
AIS Abdomen ≥3	48 (6.4%)	18 (4.1%)	0.109
AIS Upper Extr. ≥3	11 (1.5%)	3 (0.7%)	0.239
AIS Lower Extr. ≥3	129 (17.1%)	68 (15.7%)	0.527

Table 1: 1189 patients were evaluated (median ISS=24).
Head injuries were most prevalent (75.1%), followed by thoracic (23%), lower extremity (15.7%), abdomen (4.1%), and upper extremity injuries (0.7%).

Results

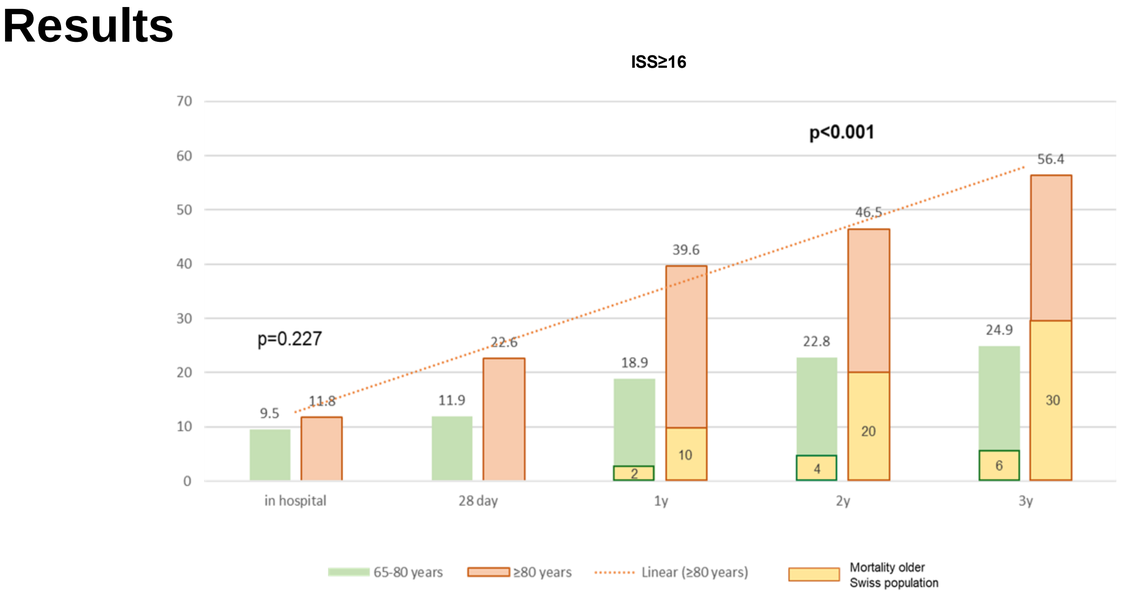

Figure 1: Comparison of post-injury mortality rates in patients aged 65-80 and >80 years with ISS ≥16 at various time points (in-hospital, 1-, 2-, and 3-year intervals) with mortality rates in the elderly Swiss population.
At 3 years, the mortality rate for injured patients aged 65-80 years was 24.9% vs. 6% in the Swiss population, while for those aged >80 years it was 56.4% vs. 30%, highlighting the increased long-term mortality risk associated with severe injury in the elderly.

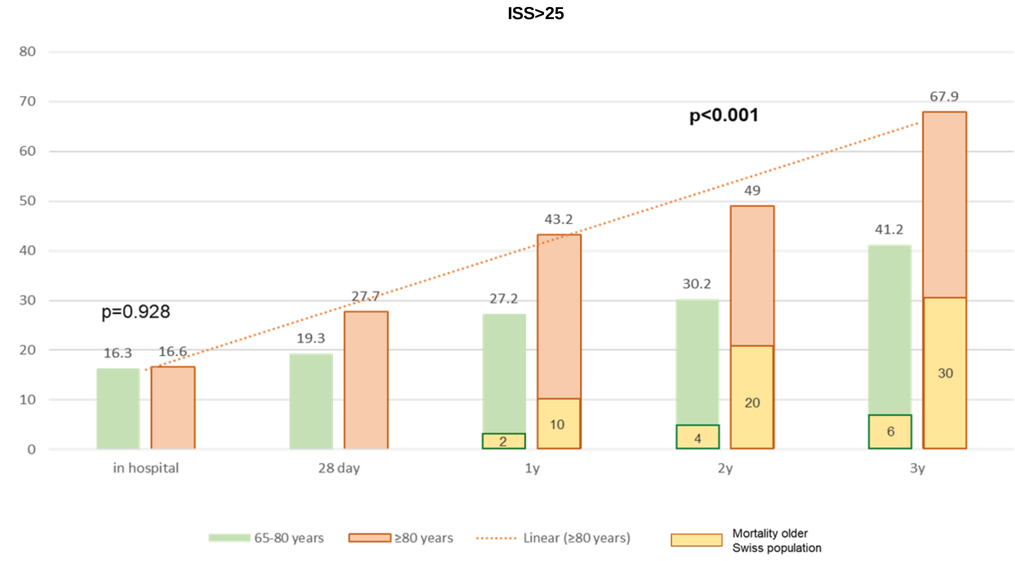

Figure 2: 1: Comparison of post-injury mortality rates in patients aged 65-80 and those over 80 with ISS >25 at various time points (in-hospital, 1-, 2-, and 3-year intervals) with mortality rates in the elderly Swiss population.
At 3 years, the mortality rate for injured patients aged 65-80 years was 41.2% vs. 6% in the Swiss population, while for those aged >80 years it was 67.9% vs. 30%, underscoring the substantial increase in long-term mortality risk due to severe injury in older adults.

Conclusion

Advanced age and higher ISS significantly increase the risk of mortality in elderly polytrauma patients.
In particular, patients aged >80 years experience an alarming increase in long-term mortality, with rates rising from 40% at 1 year to 56% at 3 years, in sharp contrast to the relatively stable mortality trend observed in the general elderly Swiss population.
It is crucial to comprehensively analyze the post-discharge survival of severely injured elderly patients and to examine how different injury patterns or accident mechanisms affect the odds of survival in order to develop and refine treatment algorithms during both the in-hospital and post-discharge recovery phases.

Risk factors 1-year mortality	p-value
Age	<.001
AIS head > 3	<.001
ISS	<.001

Table 2: Age, severity of head injury with AIS >3, and overall ISS were independent risk factors for 1-year mortality following trauma in the elderly population.