

## Trauma in elderly patients: a study of prevalence, comorbidities and gender differences

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**SUMMARY: Trauma in elderly patients: a study of prevalence, comorbidities and gender differences.**

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*Aim. Trauma, in geriatric patients, increases with age, and is a leading cause of disability and institutionalization, resulting in morbidity and mortality. The aim of our study was to analyse the prevalence of trauma, the related risk factors, mortality and sex differences in the prevalence in a geriatric population.*

*Patients and method. We observed 4,554 patients (≥65 years) with home injuries or car accidents. Patients were evaluated with ISS (Injury Severity Score) and major trauma with ATLS (Advanced Trauma Life Support). The instrumental investigation was in the first instance, targeted X-Ray or whole-body CT.*

*Results. In over four years of study we treated 4,554 geriatric:*

*2,809 females and 1,745 Males. When the type of trauma was analysed the most common was head injury, followed by fractures of lower and upper limbs. In our experience hospitalization mainly involved patients over 80. In all patients mortality during assessment was 0.06%.*

*Discussion. The geriatric patient is often defined as a "frail elderly", for the presence of a greater "injury sensitivity". This is due to the simultaneous presence of comorbidity, progressive loss of full autonomy and exposure to a high risk of traumatic events. Optimal management of the trauma patient can considerably reduce mortality and morbidity.*

*Conclusions. Falls and injuries in geriatric age are more frequent in women than in men. Among typical elder comorbidities, osteoporosis certainly causes a female preponderance in the prevalence of fractures. Our discharge data demonstrate that disability, which requires transfer to health care institutions, has a greater effect on women than men.*

KEY WORDS: Geriatric trauma - Elderly patients - Comorbidity - Mortality - Gender.

## Introduction

Trauma, in geriatric patients, increases with age, and is a leading cause of disability and institutionalization, also resulting in morbidity and mortality (1-5).

A deficit across the: visual, auditory, musculoskeletal and nervous systems, with reduced visual acuity, lower perception of pure tones, postural instability, deterioration of reflexes and/or slowing of reaction time, are closely related to age.

Also, comorbidities and drug therapies increase risk of trauma in the elderly (6-11).

Environmental risk alone may be enough to cause the traumatic event or may be a facilitating element.

The immediate and/or late consequences, which the elderly incurs in after a traumatic event are numerous: fractures, contusions, bruises, wounds, visceral lesions, head injuries, post-fall syndrome, death (12-14).

The most dangerous are craniofacial traumas which are related to high mortality, the most frequent, however, are hip fractures.

The hip fracture (especially proximal) is often secondary to an altered static and dynamic balance and, for the elderly, is one of the most debilitating traumatic event (15-19).

Disability determines sequelae directly proportional to age, such as prolonged bed rest, post-fall Syndrome, increased risk of secondary and tertiary

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related events (pneumonia, bedsores, thromboembolic events etc.), greater recourse to the use of drugs, etc. (11).

All this leads to a significant increase in individual and social costs (hospitalization, home care, institutionalization) and risk of mortality (20-24).

The aim of our study was to analyse, from September 2012 to December 2016, the prevalence of trauma, related risk factors, mortality and sex differences in the prevalence in a geriatric population treated at our Emergency Department (UOC MCAU with OB).

## Patients and method

From September 2012 to December 2016, we recorded 22,549 patients with "TRAUMA", 20.2% (4,554 cases) involved the elderly ( $\geq 65$  years) with home injuries or car accidents.

Patients were evaluated with ISS (Injury Severity Score) (25, 26).

Major trauma (multiple injuries), was evaluated in the Shock Room by a multidisciplinary team, the approach followed the guidelines of the Advanced Trauma Life Support (ATLS).

The instrumental investigation was in the first instance, targeted X-Ray or whole-body CT.

Data on age, sex, hemodynamic parameters, mechanism of injury, number and location of lesions, medical history (focused on finding any concomitant pathologies) were collected.

According to the World Health Organization classification (WHO), patients were divided into 3 age groups:

- Age 65-74 yrs;
- Age 75-84 yrs;
- Age  $\geq 85$  yrs.

## Results

In over four years of study (September 2012-December 2016) we treated 4,554 geriatric trauma, 20.2% of overall trauma cases in all ages (22,549 cases).

The patients studied, aged between 65 and 103 years old, were predominantly female: 2,809 females (61.7%) and 1,745 males (38.3%) (Figure 1).

Over 60% of patients, evaluated with the ISS, had score  $> 15$  (class of gravity V- severe injuries), and 40% a score  $< 15$  (severity class I to IV).

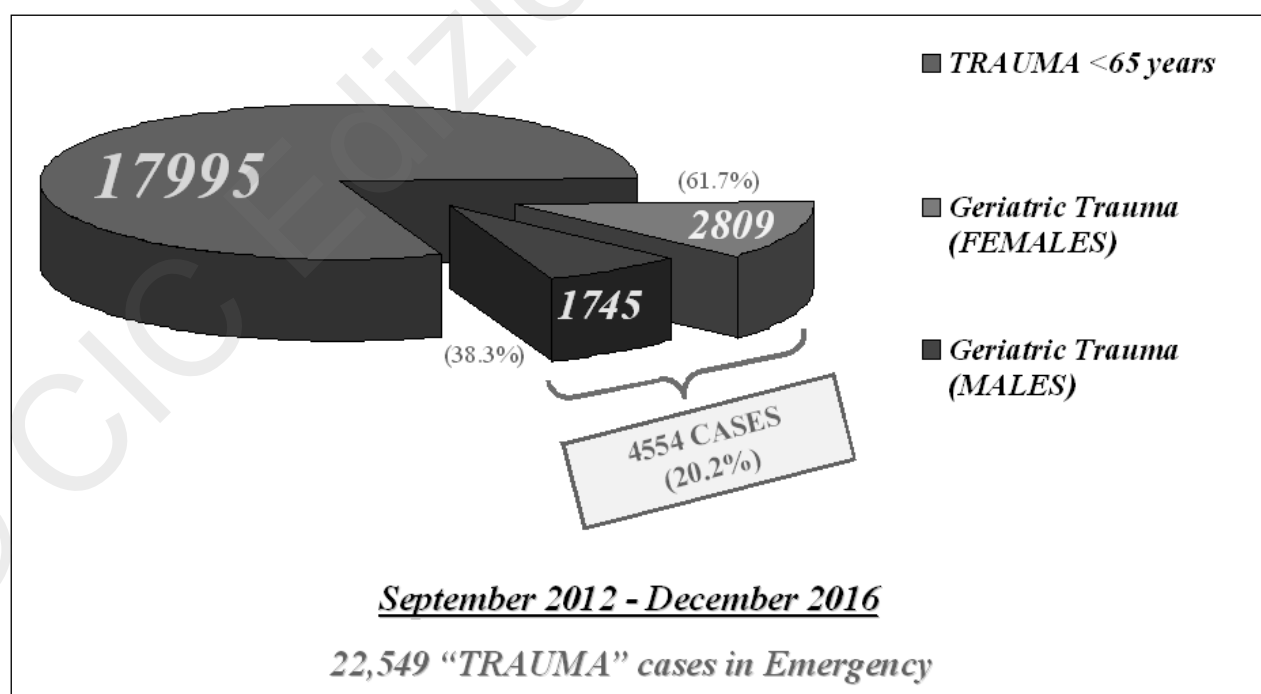


Figure 1 - Complex Trauma Card.

The prevalence of trauma, in our population, was almost steady for each year of study.

The most affected age group was between 75 and 84 years (859 patients).

The prevalence in females was constant in each year of study, in each age group (65-74, 75-84; >85) and in each type of trauma except for abdominal trauma.

Moreover, despite the age group with larger number of traumas was between 75-84 years, in the comparison between the sexes, whilst women had a higher prevalence of trauma in this age range, men presented more commonly with trauma in the age range 65 and 74 years.

When the type of trauma was analysed the most common was head injury: 1,431 cases (792F/639M), followed by fractures of lower and upper limbs (1,575 cases: 1086F/489M, in 826 lower and 749 upper).

Chest trauma was recorded in 513 cases (299F/214M), facial in 443 cases (247F/196M), spinal 231 cases (127F/104M), pelvic (183 cases: 131F/52M), abdominal in 54 cases (21F/33M) (Figure 2).

An increased frequency in patients aged over 85 of head trauma due to fall was observed.

The head injury in this age group was N=614 over a total of 1,431 (42.9%), with a female predominance 335F (54.6%) / 279M (45.4%).

Head trauma is often associated with facial trauma (lesions of nasal bones, upper and/or lower jaw).

The prevalence of facial trauma in men and women was similar to that seen in head trauma, with a higher prevalence in females and a higher frequency in the aged >85, with 209 cases (47.2%) (out of 443 total), 112 women and 97 men.

In our series, head injury following a fracture of the lower and upper limbs occurred in 1,575 cases: 826 lower limbs and 749 upper limbs.

The lower limb injuries are more frequent in the over 80, with 382 cases, 259 women and 123 men, there is a constant majority of women in all three age groups.

Hip fracture (571 cases) is the most common injury, followed by lateral malleolus and knee fractures.

Hip fractures have a higher prevalence in females than in males (423F/148M) and a larger number of cases were observed in 2013 and in 2015, respectively 147 and 156 cases, compared to the study period.

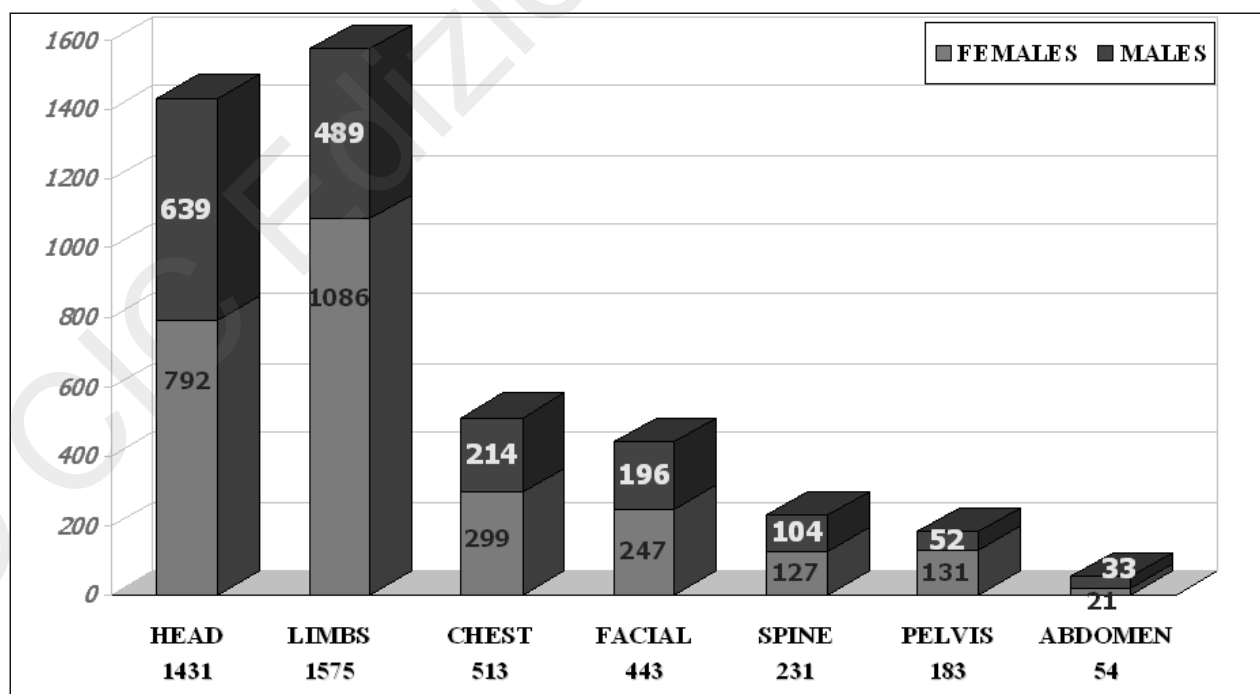


Figure 2 - Causes of multiple traumas.

The most frequent upper limb fracture (749 cases) was humerus (259 cases), with a considerably female majority (202F/57M).

Chest trauma associated with rib fractures, often accompanied by severe complications, such as pneumothorax, hemothorax or pulmonary contusions had a prevalence of 11.3% (513 cases) and more frequently was observed in patients over 80, with 228 cases in females (122F/106M).

Abdominal trauma was only 1.2% of all traumatic events (54 cases) and was the only type higher in males (21F and 33M).

Among minor trauma, the higher frequency was recorded for blunt trauma 26.7% (1,218 cases: 679F/539 M), mainly recorded in the age group 65-74 years (603 cases: 341F/262M).

We report the prevalence of most frequent comorbidities observed in Table 1.

In our experience hospitalization mainly involved patients over 80 (N 674 patients, 421 women and 253 men).

Rapid discharge was more frequent in the 65-74 age group, with a total of 879 patients, including 459 women and 420 men.

Among the 4,554 patients admitted to the emergency department for trauma, 18.9% (N 862 patients of which 506 women and 356 men) refused hospitalization.

In all patients mortality during assessment was 0.06% (3 deaths out of 4554 cases).

The 3 patients who died were female and belonged to the age group over 80.

It was not possible to estimate the prevalence of long-term mortality.

## Discussion

Given an increased aging population geriatric subjects (> 65 years) represent a significant portion of the population (27).

The frequent service use of emergency facilities amongst the elderly appears mostly related to a higher prevalence of traumatic events due to falls and/or accidental injuries (28-31).

Falls associated with syncopal events are recurrent.

The geriatric patient is often defined as a "frail elderly", for the presence of a greater "injury sensitivity" (32).

This is due to the simultaneous presence of comorbidity, progressive loss of his full autonomy and exposure to a high risk of traumatic events (6-9).

Optimal management of the trauma patient can considerably reduce mortality and morbidity and results in a shorter hospital stays (33-38).

The early use of CT-scans is a useful method, in hemodynamically unstable elderly patients, for quick diagnosis of site and number of injuries to avoid any delay in treatment.

In our experience the correct application of protocols in the Shock Room was fundamental in reducing mortality and morbidity (39-41).

Special care should apply to patients treated with anticoagulants or antiaggregation, in this population morbidity can be observed with a delay following the traumatic event (42).

We showed that, in geriatric age, the most common trauma in the emergency department was head

TABLE 1 - REPORT PREVALENCE COMORBIDITIES.

COMORBIDITY (%/patients)	PREVALENCE COMORBIDITIES (%/patients)		
	65-74 years	75-84 years	≥ 85 years
Diabetes	9% (409)	10% (455)	10% (455)
Hypertension	60% (2732)	75% (3415)	76% (3461)
Coronary Artery Disease	23% (1047)	31% (1411)	33% (1502)
Dementia	4% (182)	14% (637)	26% (1184)
Reversible anticoagulant therapy	11% (501)	19% (865)	19% (865)
Antiplatelet therapy	11% (501)	13% (592)	13% (592)
Cerebral vascular disease	8% (364)	12.2% (552)	12.5% (569)

trauma (31.4%), associated or not with other injury and/or fractures.

Often these patients are in pharmacological treatment with anticoagulants and/or antiaggregants and delayed risk of bleeding must be evaluated.

Recent studies underscore the need to re-evaluate patients for an observational period greater than 24 hours, followed by a second CT- scan, also in case of negative initial CT (43).

This protocol, in all probability, can detect cases of delayed intracranial hemorrhage.

## Conclusions

Our data are similar to those in the current literature.

Falls and injuries in geriatric age are more frequent in women than in men, and the proportion increases with age.

Among typical old age comorbidities, osteoporosis certainly causes a female preponderance in the prevalence of fractures; the reduction of skeletal mass due to osteoporosis is greater in postmenopausal women than in men of the same age.

Hip fractures in female patients, over 65, are the most frequent, after wrist or proximal humerus ones.

Among all traumas affecting elderly patients, hip fractures are important, in most cases, this type of trauma determines an increase in institutionalization and can lead to clinical and social problems.

Our discharge data demonstrate the same prevalence and degree of disability produced by trauma in both sexes.

But it is once again evident that disability, which requires transfer to health care institutions, has a greater effect on women than men.

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