Fall related injuries in elderly patients in a tertiary care centre in Beirut, Lebanon

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Abstract

Context: Falls cause significant morbidity and mortality, constituting 38.9% of trauma visits to the emergency department (ED) in Lebanon. Elderly have increased risk of falls due to co-morbidities. Injury-related deaths are most common in developing countries, and few studies have examined falls internationally. Aims: Describe characteristics, injury patterns, and outcomes of elderly treated for fall injuries at a tertiary care centre in Lebanon. Settings and Design: Retrospective observational chart review of elderly presenting after a fall to the ED. Subjects and Methods: Retrospective observational study of elderly (≥65 years) patients who presented to the ED at a tertiary care center in Lebanon with the chief complaint of “fall” over a 6-year period. Statistical Analysis Used: Descriptive analysis. Results: Two hundred and thirty-five patients were included; mean age was 78.1 (±7.2) years with female predominance (60.5%). Falls occurred at home (99.2%) and from ground level (96.4%). Patients presented by private transport (85.8%). The initial impact was to the head in 31.2% of patients with 47.8% on antiplatelet/anticoagulation therapy. Imaging includes extremity X-ray (46.6%) and head/cervical spine computed tomography (39.5%). Dispositions included home (58.9%), regular floor (23.3%), operating room (7.9%), and intensive care unit (5.9%). Pelvic/hip repair was the most common surgical procedure. Most injuries were non-life-threatening. Overall mortality was 2%. Conclusions: Falls have a high impact on the elderly population in Lebanon, with most occurring at home, resulting in pelvic/hip injuries and a mortality of 2%. There is a need to implement multifaceted fall prevention programs to mitigate such injuries and improve patient safety and outcomes.

Keywords: Elderly, fall, injury

Introduction

Falls are among the leading causes of injuries in the United States.¹ They constitute 38.9% of emergency trauma visits in Lebanon.² Elderly have increased risk due to comorbidities, leading to depression and functional decline.³ Treating fall injuries cost $19 billion US dollars annually.⁴ Few studies have examined falls internationally.⁵ Although injury-related deaths are common in developing countries,⁶ no studies have been conducted in Lebanon.

Understanding injury etiologies, gaps in prevention, and trauma systems help tailor interventions to improve outcomes. This study describes characteristics, injury patterns, and outcomes of the elderly treated for fall injuries at a tertiary care center in Lebanon.

Subjects and Methods

Study design and setting

Retrospective observational chart review was done for elderly (≥65 years) patients presenting to the emergency department (ED) at a tertiary care center in Lebanon with the chief complaint of “fall” over a 6-year period (July 1, 2009– July 1, 2015). This is one of the largest tertiary care and trauma centers in Lebanon, a 420-bed university hospital serving a population of approximately 2.4 million
and receiving the injured from the scene, transfers from other hospitals, and neighboring countries.\(^2\)

The institutional review board of the same institution approved this study.

**Study population**

Elderly who presented to the ED at a tertiary care center in Lebanon were considered eligible, and all with a chief complaint of “fall” were included without sampling. Patients with missing charts were excluded from the study [Figure 1].

**Data collection**

Research fellows collected data from ED and inpatient electronic medical records. Variables include demographics, Emergency Severity Index (ESI) score, comorbidities, mode of arrival, event details, injury description, Injury Severity Score (ISS), Glasgow Coma Scale (GCS), ED imaging, procedures, and dispositions.

**Data analysis**

Research Electronic Data Capture, an application for building and managing online surveys and databases, was adopted for data entry. Statistical Software “SPSS” version 24.0 (IBM Corp., Armonk, NY) was used for cleaning, management, and analyses. A descriptive analysis was conducted. Categorical variables were tabulated and analyzed using frequency and percentage whereas continuous ones were summarized as mean ± standard deviation, median, and interquartile range.

**Results**

A total of 253 patients were included in this study. The mean age was 78.1 (±7.2) years. They were female (60.5%), Lebanese (94.5%), and married (71.5%). Most had medium acuity ESI of 3 (72.7%). Hypertension was the most common comorbidity (72.7%). Almost half of the patients (47.8%) were on antiplatelet/anticoagulation therapy [Table 1].

Only 3.6% fell from the above ground level. Most falls occurred at home (99.2%) and 85.8% of patients presented to the hospital through private transportation. Initially, the location of impact was the head (31.2%), followed by extremities [Table 2].

Injuries were nonlife-threatening with low ISS (96.4%), mild or no traumatic brain injury (GCS ≥13) (95.7%). Imaging includes extremity X-ray (46.6%) and head/cervical spine computed tomography (CT) (39.5%). Surgical procedures were mostly for injuries of the pelvis/hip and upper extremities. Few required endotracheal intubation (4.0%), central venous

![Figure 1: Inclusion and exclusion flow chart](image-url)
access (3.2%), tracheostomy (1.2%), and craniotomy for hematoma evacuation (0.4%) [Table 3].

Dispositions include home (58.9%), regular floor admission (23.3%), operating room (7.9%), and intensive care unit (5.9%). Few left against medical advice (2.8%) or to another hospital (1.2%). Reported complications include pneumonia, sepsis, circulatory shock, cardiac arrest, urinary tract infection, and acute kidney failure. Overall mortality was 2% [Table 4].

**DISCUSSION**

Although demographics, injury patterns, and outcomes of falls have been studied, this is the first to describe, in detail, fall injury mechanisms in elderly patients in Lebanon.

Females were predominant in our study. This has been previously reported, especially in elderly. Activities leading to falls are mostly regular day-to-day ones, resulting in fractures in women with postmenopausal lack of estrogen and osteoporosis.[7]

Home injuries were most common, consistent with studies showing that falls at home increase with age.[7] This was expected because of the homebound lifestyle associated with that age.

Most patients arrived at the hospital through private transport, similar to a study in Germany where those who fell below 3 meters presented to the ED by private transportation.[8] A study from Lebanon reported that functional screening or requiring full assistance was a strong predictor for emergency medical services (EMS) utilization.[9] Injuries resulting in inability to walk were not common in our study with <18% requiring surgical procedures, explaining low rate of EMS use (14.2%).

Imaging was mostly selective for extremity X-ray and head/cervical spine CT. Pan-scan imaging of elderly sustaining falls from ground level has been studied. Although there was decrease in-hospital stay, no significant association was found with mortality.[10]

The initial head impact was the most common, consistent with another study where 37% of elderly who fell in long-term care had a head impact.[11] Moreover, 47.8% of our patients were on antiplatelet/anticoagulation therapy. Elderly patients who are taking Vitamin K antagonists have twice the risk of intracranial hemorrhage, even with a therapeutic international normalized ratio.[12] This can result in increase in admission rate, resource utilization, and poor outcome.

Mortality was 2%, higher than the rate of 61.6/100,000 for US residents over 65 years.[13] Reasons for increased mortality in the developing world include rapid aging from health neglect and lack of expertise to treat predisposing conditions and complications.[14] Furthermore, the risk of mortality after hip
fractures was found to be elevated even years after injury.\[15\] In our study, 11.5% of the patients required a surgical procedure to repair a pelvic/hip fracture, accounting for 63% of all patients admitted to the operating room.

Patients at risk of falls can be identified through history taking and physical examination. A screening method entitled “Timed Up and Go Test” can be used to measure the time taken to stand up from a chair, walk 3 meters, and sit down.\[16\] Moreover, guidelines for fall prevention can include a partnership with professionals for exercise, safety assessment, and patient education with a successful implementation of such programs in the US through workshops by trained leaders and physical therapists.\[17\]

Limitations are due to the study’s retrospective nature, including incomplete charting and description of sustained injuries. Since inclusion criteria were based on chief complaints, patients who presented with “decreased level of consciousness” due to earlier fall were likely missed. Specific details of the injuries were not reported. Data were collected from one institution because of the absence of a national trauma registry and although others might report different experiences with falls, the American University of Beirut Medical Center is the largest tertiary care center with referrals from most hospitals in the country. An initiative to launch a trauma registry to examine the impact of injuries on different subsets of the population in Lebanon is needed. This study highlights in detail injuries related to fall in elderly patients in Lebanon and can serve as a baseline for future fall prevention programs.

### CONCLUSIONS

Falls have a high impact on the elderly in Lebanon with most occurring at home, resulting in pelvic/hip injuries and mortality of 2%. Public awareness is needed. Prevention programs can be multifaceted and address the safety of environment at home, medications and screening for risk of fall using validated tools.

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### Conflicts of interest

There are no conflicts of interest.

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