Brief Report

Emergency department recidivism in adults older than 65 years treated for fractures ☆,☆☆

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ABSTRACT

Objectives: Fractures in older adults are a commonly diagnosed injury in the emergency department (ED). We performed a retrospective medical record review to determine the rate of return to the same ED within 72 hours (returns) and the risk factors associated with returning.

Methods: A retrospective medical record review of patients at least 65 years old discharged from a large, academic ED with a new diagnosis of upper extremity, lower extremity, or rib fractures was performed. Risk factors analyzed included demographic data, type of fracture, analgesic prescriptions, assistive devices provided, other concurrent injuries, and comorbidities (Charlson Comorbidity Index). Our primary outcome was return to the ED within 72 hours.

Results: Three hundred fifteen patients qualified. Most fractures were in the upper extremity (64% [95% confidence interval {CI}, 58%-69%]). Twenty patients (6.3% [95% CI, 3.9%-9.6%]) returned within 72 hours. Most returns (15/20, 75%) were for reasons associated with the fracture itself, such as cast problems and inadequate pain control. Only 3 (<1% of all patients) patients returned for cardiac etiologies. Patients with distal forearm fractures had higher return rates (10.7% vs 4.5%, $P = .03$), and most commonly returned for cast or splint problems. Age, sex, other injuries, assistive devices, and Charlson Comorbidity Index score (median, 1 [interquartile range, 1-2] for both groups) did not predict 72-hour returns.

Conclusion: Older adults with distal forearm fractures may have more unscheduled health care usage in the first 3 days after fracture diagnosis than older adults with other fracture types. Overall, revisits for cardiac reasons or repeat falls were rare (<1%).

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1. Introduction

Older adults with fractures present significant challenges to the emergency department (ED) and the US health system as a whole. The number of older adults, 65 years old or older, treated for a fracture in the ED has increased 24% from 2001 to 2008 and continues to rise with the aging population [1]. In contrast to patients with hip fractures who are treated almost exclusively as inpatients, most (50%-70%) older adults with other fractures are treated as outpatients [1,2]. These patients have increased needs for home health care, subacute rehabilitation, and physical and occupational therapy [3]. A prospective study of 230 older adults with blunt trauma injuries such as fractures,

contusions, and sprains found that 40% had functional decline within the first week of discharge from the ED and that 49% required new social services. Patients with extremity fractures had the highest likelihood of requiring new services [4]. A better understanding of the risk factors behind the increased health care needs in this population could help us direct therapy, interventions, and disposition planning.

Both the Society for Academic Emergency Medicine and the American Geriatrics Society recognize the need for identifying risk factors for poor outcomes in older adults and injured older adults in particular [5,6]. Identifying patients at high risk for poor outcomes after ED discharge could lead to early interventions to improve patient care. One criterion for poor outcomes in the short-term setting is ED recidivism or return to the ED within 72 hours. Although this is not a perfect indicator of patient safety, it does identify a subset of patients who require further care [7,8]. Older adults are at increased risk for ED recidivism, with an average 72-hour rate of return of 3.2% for all ED patients older than 65 years compared to 0.47% rate for all adults [9]. We hypothesized that the addition of a nonhip fracture would result in increased ED recidivism. Our objectives for this study were to determine the rate of 72-hour returns and any factors associated with an increased likelihood of return for older adults with nonhip fractures.

2. Methods

2.1. Study design

This study approved by the institutional review board was a retrospective medical record review designed to identify factors associated with 72-hour return to the ED among older adult patients with fractures.

2.2. Study setting and population

Adults at least 65 years old diagnosed with a nonhip extremity or rib fracture and discharged from the ED were included. The study setting was a large, academic hospital with an annual ED census of 120,000 patients. Exclusion criteria included hospital admission, initial treatment at an outside facility, or *incomplete ED medical record* (defined as >2 major data points missing, ie, physical examination, physician medical record note, diagnosis).

2.3. Study protocol

The hospital's electronic medical record system (EPIC; Epic Systems Corporation, Verona, WI), a direct computer data entry system, was queried for *International Classification of Diseases, Ninth Revision*, codes 807, 810 to 818, and 820 to 826, and discharged status for a 12-month period (August 2010-July 2011) in ED patients at least 65 years of age. Patient demographics, fracture type, treatment, prescriptions, and comorbidities were examined. Comorbidities not in the medical record were presumed to be absent. *Patients in private residence* were defined as those not in a skilled nursing or assisted living facility (as there is no formal definition of *assisted living*, we used this term if it was so documented). The medical records were reviewed by trained, nonblinded study physicians (LS, RS) and documented on a standardized abstraction form.

2.4. Measurements

The *International Classification of Diseases, Ninth Revision*, fracture diagnoses were confirmed by radiographic interpretation of an attending radiologist. The Ageless Charlson Comorbidity Index, a weighted numerical tally of comorbidities validated in ED patients, was calculated [10,11]. The primary outcome was 72-hour return to the ED.

2.5. Data analysis

Data was analyzed using Stata v.12 (StataCorp, College Station, TX). Descriptive statistics included means with standard deviation, median with interquartile range (IQR), and proportions with 95% confidence intervals (CIs) as appropriate. Comparisons were made using the Student t test, with a sensitivity of $P < .05$ considered significant. Ten percent of medical records were abstracted twice, and interrater reliability on the primary end points of fracture type ($\kappa = 0.80$) and 72-hour returns ($\kappa = 0.80$) was good. However, agreement on individual comorbidities was lower ($\kappa = 0.4$).

3. Results

Over 12 months, 533 older-adult patients were diagnosed with a rib or a nonhip extremity fracture in the ED, of whom 39.8% (n = 208) were admitted and 60.2% (n = 325) were discharged. In 10 (3%) of these, either the medical records were missing physician notes or the patients were treated first at an outside institution, leaving 315 patients eligible for the study (Table 1). The median age was 77 years (IQR, 69-83), and 77% of patients were women. Most were community-dwelling older adults (95%), with only 4% returning to skilled nursing facilities and 1% to assisted living. The Ageless Charlson Comorbidity Index was low (median 1 [IQR, 1-2]; range, 0-7). Formal cognitive assessment was not done; however, the diagnosis of dementia as a documented comorbidity was noted in 11% of patients.

Among the 315 study patients, most fractures (64% [95% CI, 58%-69%]) were located in the upper extremity, most commonly distal forearm fractures (n = 93). Patients with rib fractures made up 12% (95% CI, 8.6%-16%) of the patients discharged, and the remaining 24% (95% CI, 19%-29%) of patients had lower extremity fractures (Table 1).

The overall rate of return within 72 hours was 6.3% (95% CI, 3.9-9.6%) (n = 20). No patients returned more than once to the ED within that frame. Reasons for return included cast or splint problems (n = 11, 55%), pain control (n = 4, 20%), cardiac complaints (n = 3, 15%), fall with another fracture (n = 1, 5%), and need for higher level of care (n = 1, 5%). The highest rate of returns was seen in patients with distal forearm (11%, n = 10/93), ankle (12%, n = 4/39), and hand fractures (13%, n = 3/24); however, the proportions of patients with ankle and hand fractures were much lower, and therefore the 95% CIs are broad. Patients with rib and upper arm fractures had lower return rates. The admission rate among those returning was 35% (n = 7/20), with 3 admissions for cardiac issues (atrial fibrillation with rapid ventricular rate in 2 patients and chest pain in a third patient). Other admissions were for uncontrolled pain, inability to care for self, fall with new fracture, and possible compartment syndrome.

Risk factor analysis did not demonstrate any significance of age, sex, comorbidity index overall or dementia in particular, assistive devices, or concurrent injuries (Table 2). Charlson Comorbidity Index was low and not associated with returns (means, 1.45 ± 0.02 for returning patients and 1.47 ± 0.01 for nonreturning patients). Most patients (78% [95% CI, 73%-82%]) were given either a prescription or a recommendation for pain control at home, with the majority receiving an opioid analgesic (n = 192, 60% [95% CI, 56%-67%]). Lack of analgesia did not appear to be a factor in predicting 72-hour return rate, as the patients returning had a higher rate of opioid analgesic prescription than those who did not return (17/20 returns, 85%, vs 175/295 nonreturns, 59%; $P = .02$). However, those that received a prescription for opioid analgesics were not more likely to return than those prescribed acetaminophen or a nonsteroidal anti-inflammatory drug ($P = .20$). Although several patients returned for inadequate pain control, there were no returns from complications of analgesics such as respiratory depression, overdose, or constipation.

Almost half of patients (47.3% [95% CI, 42%-53%]) received assistive devices upon discharge. Slings were the most common device (29% of patients), and 20% received devices to aid mobility (wheelchairs,

Table 1
Discharge rates and 72-hour return rates stratified by fracture type in older adults discharged from the ED

Anatomical group	Total number (discharged and admitted)	Patients discharged (% of fracture type discharged)	72-h returns (percentage of those discharged returning)
Upper arm	128	85 (66%)	2 (2.4%) [95% CI, 0.01%-8.2%]
Distal forearm	105	93 (87%)	10 (11%) [95% CI, 5.3%-19%]
Hand	26	24 (92%)	3 (13%) [95% CI, 2.6%-34%]
Ribs	95	38 (40%)	0 (0%) [95% CI, 0%-9.2%]
Upper leg	54	9 (17%)	1 (11%) [95% CI, 0.3%-48%]
Ankle	70	39 (56%)	4 (10%) [95% CI, 2.9%-24%]
Foot	31	27 (87%)	0 (0%) [95% CI, 0%-13%]
Total	523	315 (60%)	20 (6.3%) [95% CI, 3.9%-9.6%]