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Emergency Department Presentations for Injuries in Older Adults Independently Known to be Victims of Elder Abuse

Tony Rosen, MD MPH^a, Elizabeth M. Bloemen, MPH^{a,b}, Veronica M. LoFaso, MD^a, Sunday Clark, MPH ScD^a, Neal Flomenbaum, MD^a, and Mark S. Lachs, MD MPH^b

^aDivision of Emergency Medicine, Weill Cornell Medical College, 525 East 68th Street, New York, NY 10065, USA

^bDivision of Geriatric and Palliative Medicine, Weill Cornell Medical College, 525 East 68th Street, Box 39, New York, NY 10065, USA

Abstract

Background—Elder abuse is under-recognized by Emergency Department (ED) providers, largely due to challenges distinguishing between abuse and accidental trauma.

Objective—To describe patterns and circumstances surrounding elder abuse-related and potentially abuse-related injuries in ED patients independently known to be physical elder abuse victims.

Methods—ED utilization of community-dwelling victims of physical elder abuse in New Haven, CT from 1981-1994 was analyzed previously. Cases were identified using Elderly Protective Services data matched to ED records. 66 ED visits were judged to have high probability of being related to elder abuse and 244 of indeterminate probability. We re-examined these visits to assess whether they occurred due to injury. We identified and analyzed in detail 31 injury-associated ED visits from 26 patients with high probability of being related to elder abuse and 108 visits from 57 patients with intermediate probability and accidental injury.

Results—Abuse-related injuries were most common on upper extremities (45% of visits) and lower extremities (32%), with injuries on head or neck noted in 13 visits (42%). Bruising was observed in 39% of visits, most commonly on upper extremities. 42% of purportedly accidental injuries had suspicious characteristics, with the most common suspicious circumstance being injury occurring >1 day prior to presentation and the most common suspicious injury pattern being maxillofacial injuries.

Corresponding author: Tony Rosen, MD MPH, 525 East 68th Street, New York, NY 10065, USA, +44-001-212-746-0780 (phone), +44-001-212-746-4883 (fax), aer2006@med.cornell.edu.
Elizabeth M. Bloemen: elb3003@med.cornell.edu
Veronica M. LoFaso: turboron@aol.com
Sunday Clark: suc2010@med.cornell.edu
Neal Flomenbaum: nef2002@med.cornell.edu
Mark S. Lachs: mslachs@med.cornell.edu

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Conclusion—Victims of physical elder abuse commonly have injuries on upper extremities, head, and neck. Suspicious circumstances and injury patterns may be identified and are commonly present when victims of physical elder abuse present with purportedly accidental injuries.

Keywords

elder abuse; injuries; emergency medicine

INTRODUCTION

Elder abuse is common and has serious consequences. An estimated 10% of U.S. older adults are victims of elder abuse annually,¹⁻³ which may include physical abuse, sexual abuse, emotional / psychological abuse, neglect, or financial exploitation.¹⁻⁴ Elder abuse victimization significantly increases mortality^{5,6} as well as emergency department (ED) usage,^{7,8} hospitalization,⁹ and nursing home placement.^{10,11} The annual U.S. direct medical costs are estimated at \$5.3 billion.¹² Anticipated increases in the geriatric population will likely dramatically increase this disease burden and cost.¹³⁻¹⁵

Though elder abuse and neglect occurs commonly, it is estimated that as few as 1 in 24 cases of elder abuse is reported to the authorities,^{1,3,16} and much of the associated morbidity and mortality results from this delay in discovery and intervention.¹⁷ Health care provider assessment represents a critical but often missed opportunity to identify elder abuse, as many older adults have no other contact outside the home. Emergency physicians, who typically manage acute injuries and illnesses, are particularly well positioned to identify abuse.

Though extreme cases may be apparent on a cursory assessment, most are subtle.¹⁸ Victims may not be willing or able to report the actual circumstances surrounding their injury. Health care providers must be vigilant and identify clues¹⁸ from the circumstances and injury patterns. Distinguishing between elder abuse and accidental trauma or illness is made more challenging by the normal physiologic changes that occur with aging.^{17,19-22} Therefore, improved understanding of pathognomonic injury patterns and forensic findings that distinguish between elder abuse and accidental injury or illness is critically needed.²³ While research into other types of interpersonal abuse has led to many advances, elder mistreatment has lagged behind.²³ To our knowledge, few studies exist which systematically evaluate injury patterns in physical elder abuse.^{17,18,24-26}

The aim of our research is to describe patterns and circumstances surrounding elder abuse-related and potentially elder abuse-related injuries in older adult ED patients independently known to be victim of physical elder abuse.

METHODS

To more completely understand the injury patterns and physical findings for elder abuse victims, we analyzed data for 572 ED visits among 111 subjects initially compiled and described in detail by Lachs and colleagues.⁸ Briefly, this group identified and evaluated ED utilization by physical elder abuse victims living in the community of New Haven, CT.⁸

Cases were identified using records from Connecticut's Elderly Protective Service (EPS) program, which is responsible for investigating reported elder abuse.⁸ EPS physical abuse cases from 1985-1992 were included. EPS investigation information was extracted using a structured abstraction form and included the physical injuries sustained, the implement and mechanism of injury, the relationship of the abuser to the victim, circumstances surrounding the event, substance or alcohol use, and the source of EPS referral.⁸

Identifiers were coded within these records to match these EPS clients to patient records in ___ Hospital and ___ Hospital Emergency Departments.⁸ At the time the study was conducted, these were the only two EDs in New Haven. Every ED visit during a 5-year period before or after the date of the first EPS determination of verified physical abuse was identified and evaluated, which included records from 1981 through September 1994.⁸ Data collected from the ED record included chief complaint, physical findings, radiologic studies, and disposition from the ED, and a narrative synopsis of the ED visit.⁸ No charts were excluded because of missing data. To our knowledge, this represents the only existing dataset that combines adult protective service records and medical chart review to examine in detail circumstances, findings, and results of ED visits for known victims of physical elder abuse.

The original investigators evaluated each ED visit and assigned a probability rank that the individual ED visit was related to elder abuse using a four-point ordinal rating system. Possible ranks were: 0 (visit unlikely to be related to abuse), 1 (low but discernable probability that visit was related to abuse), 2 (indeterminate probability that visit was related to abuse), 3 (high probability that visit was related to abuse).⁸ High probability visits were those in which elder abuse was directly stated or implied in the narrative.⁸ Indeterminate probability visits were those in which (1) any injury or sequela of injury was noted (even if alternative explanation was provided), (2) pain to any body part was noted (excluding abdominal or cardiac chest pain), (3) alcohol or substance abuse was noted, (4) a psychiatric diagnosis was mentioned, or (5) the visit or subsequent hospital admission was explicitly designated to be social (i.e. without a medical chief symptom).⁸

For the current analysis, we further examined the data for the 66 ED visits with high probability of resulting from abuse to assess whether the visit was due to physical elder abuse that caused injury. For these visits, we recorded the victim's demographic information, the mechanism and implement of injury, and circumstances surrounding the physical abuse. We also assessed whether radiographic imaging was ordered to assess the injuries and the final disposition of the ED visit. We recorded information on all identified injuries and focused on the presence and details for three injury types: fractures, bruising, and lacerations. We recorded the anatomic location of all injuries, categorizing these locations into five body regions (skull/brain, maxillofacial/dental/neck, torso, upper extremities, lower extremities) based on previous literature.¹⁷

Given our ultimate research goal of assisting providers with the identification of subtle, frequently missed cases of elder abuse, we separately evaluated abstractions of the 244 intermediate probability ED visits to identify cases where the presentation included physical injury regardless of cause. For these visits, we recorded similar demographic, mechanism,

ED visit, and injury information. For each visit, we reviewed the EPS abstraction to identify whether this visit was subsequently identified or suspected by EPS case workers involved to have been related to abuse. We also closely evaluated each visit to assess for the presence of circumstances of presentation or injury patterns that were potentially concerning for or with an increased likelihood of elder abuse, which we have defined as suspicious for abuse. We developed a list of these suspicious characteristics based on the limited evidence-based research on elder abuse injury and on current expert opinion. Potentially suspicious circumstances included: injuries occurring >1 day before presentation, multiple ED visits for similar complaints, and an ED visit for elder abuse within 30 days of presentation. Potentially suspicious injury patterns included: maxillofacial injuries, injuries to upper extremity above wrist, upper (1-5) rib fractures, atypical injury combinations: burn and fracture, and radiologic imaging with acute and older injuries. In child abuse research, retrospectively evaluating medical provider contacts prior to abuse detection to assess whether suspicious circumstances or injury patterns existed is common.²⁸⁻³² This potentially useful analytic technique has seldom been used in elder abuse, however. We hoped to use it to identify how frequently clues exist suggesting an injury is non-accidental in cases where elder abuse is not directly reported.

All EPS and ED narrative abstractions were reviewed in detail by two of the authors (TR, EB), and all disagreements were resolved by consensus. Analyses for the results presented here were conducted using Stata v12.0 (Stata Corp, College Station, TX). Descriptive statistics are presented as frequencies and percentages. The initial study was approved by ___ and ___ Institutional Review Boards (IRB) / Human Investigation Committees. The additional analysis reported here was considered exempt from IRB review by the ___ IRB.

RESULTS

Injuries from ED Visits with High Probability of Resulting from Elder Abuse

Among the 66 ED visits with high probability of being related to elder abuse, we identified 31 ED visits from 26 patients where the visit was for an injury caused by physical elder abuse. For these visits, victims were primarily female (81%), and the abuser was most commonly the victim's husband (25%) or daughter (19%). Nineteen percent of victims and 27% of abusers had a history of chronic alcohol abuse. Fifteen percent of victims were cognitively impaired, and 15% of victims and 27% of abusers had a known psychiatric diagnosis. Characteristics of these visits are detailed in Table 1. Household items used to inflict injuries included: broomstick (n=2), fireplace poker (n=1), hammer (n=1), knife (n=1), cane (n=1), fork (n=1), radio (n=1), telephone (n=1), and unknown object (n=1). Though one-quarter were admitted to the hospital, most victims were discharged home, typically back into the care of the abuser.

Injury patterns are described in Table 2. Notably, injuries on the head or neck were noted on 13 visits (42%). Fractures were discovered in nearly one-third of visits, with bones fractured including: hip / femur (n=2), rib(s) (n=2), left zygoma (n=1), nasal bone (n=1), cervical spine (n=1), pelvis (n=1), tibia / fibula (n=1), and metacarpal (n=1). The most commonly bruised location was the eye / orbit (n=3). In 69% of visits where bruising was noted (n=9), it was found in more than a single body region. Among the three lacerations, 2 (67%) of

these injuries required staples/sutures for closure. Other injuries included subdural hematoma (n=1) and corneal abrasion (n=1).

Injuries from ED Visits with Indeterminate Probability of Resulting from Elder Abuse

Among the 244 ED visits with indeterminate probability of being related to elder abuse, we identified 108 ED visits from 57 patients where the ED visit was due to physical injury for any reason. These injury victims were primarily female (81%), and the abuser was most commonly the victim's son (37%) or daughter (18%). Characteristics of these visits are shown in Table 3.

Review of EPS narratives identified one ED visit that was subsequently suspected by EPS case workers involved to have been related to abuse. The abstraction for this ED visit is shown in Table 4. Based on the presence of upper extremity injury above the wrist, this ED visit was also identified as suspicious in our retrospective analysis.

Including the ED visit identified as suspicious by EPS, 42% (n=45) of purportedly accidental injury-related ED visits had potentially suspicious characteristics (Examples of ED visit abstractions from these presentations are in Table 4 and characteristics are displayed for Table 5). The most common suspicious circumstance was that the injury occurred >1 day prior to presentation, with one ED visit >1 month after injury. The most common suspicious injury patterns were maxillofacial injuries and injuries to upper extremity above the wrist. Eight ED visits had multiple suspicious features, often including both circumstances and injury patterns. Thirteen of the subjects (48%) accounting for 16 ED visits (36%) with suspicious injury patterns or circumstances never had elder abuse identified on previous or subsequent ED visits. Only 2 of these subjects had abuse identified and reported to EPS by other, non-ED-based medical providers. Notably, 5 ED visits with two or more suspicious features (3 subjects) never had elder abuse identified on previous or subsequent ED visits.

DISCUSSION

Our research adds to the limited existing literature on injury patterns in elder abuse and, to our knowledge, is the first study to investigate and describe injuries in elder abuse victims presenting to the ED. Physical elder abuse victims presenting to the ED for abuse-related injuries in this study were commonly women and few had cognitive impairment or a psychiatric diagnosis. The most common mechanisms of injury in our study were beating with fists / assault and striking with household object, and a variety of common household items were used in physical abuse. This is consistent with previous research examining severe elder abuse injuries.²⁵

We found that injuries, and bruising in particular, are most commonly found on the upper extremities. This evidence supports previous findings that elder abuse victims were much more likely than controls to have bruises to the lateral or ulnar aspect of the right arm,^{18,24} typically because of grabbing during physical altercations.²⁴ Previous studies of intimate partner violence have also noted that injuries on the upper extremities are more common than in controls.³³⁻³⁵ Reliance on the larger literature of intimate partner violence is relevant

to improve understanding of injuries in physical elder abuse because some elder abuse is “domestic violence grown old,” family violence that began earlier in life and persists into old age.^{16,36}

In our study, victims of physical abuse were also likely to have injuries on their face and neck. This confirms previous findings from multiple studies.^{17,18,25} These injuries may occur when a victim is punched in the face or choked / strangled.^{24,25} Facial injuries are also more common in victims of child abuse³⁷ and intimate partner violence^{33-35,38,39} than non-abused controls. Notably, fractures of the mid-face and left zygoma may be particularly suggestive of abuse in intimate partner violence,³⁴ typically due to a punch from a right-handed abuser. As these injuries are not as common for victims of falls and other accidental injuries, this may represent an important forensic distinction that should be evaluated in future research.

Notably, a significant percentage of patients suffering from physical elder abuse were initially reported in the ED to have “fallen,” highlighting that identifying patients at risk for physical elder abuse in a group of patients who present with “accidental fall” is of clinical importance. This is further supported by our finding that the large majority of potentially accidental injuries suffered by elder abuse victims were falls, and that many of these falls had suspicious characteristics. The significance of “fall” as a potential false story for abuse related injuries has been raised by previous researchers,^{24,40} and may be a particular issue for cognitively impaired victims. In one study, analysis of cognitively impaired older adults in the ED found that reported history of fall was significantly related to bruises on the breast, internal injuries, and upper extremity dislocations,^{24,40} suggesting that, though these injuries are possible from falling, they are unusual, and should raise the suspicion of elder abuse.^{24,40} In addition, though most falls are accidental, older adults can be tripped, dropped, or pushed by an abuser,^{24,40} and falls are a common cause of violence-related, non-accidental geriatric injury.⁴⁰ In this context, our findings emphasize that all emergency providers caring for an older adult after a fall injury should obtain a detailed history of the circumstances surrounding the fall and be aware of the possibility of a false story.^{24,40} Older adults, even those with cognitive impairment, can often relate how an injury occurred,^{18,24} and a caregiver who is unwilling to allow the patient to contribute to the history may be suggestive that abuse has occurred. If ED providers have any suspicion of abuse, history should be taken without caregivers or family present.

Our work suggests that suspicious circumstances and injury patterns may be identified and that these features are commonly present when victims of physical elder abuse present with purportedly accidental injuries. These findings suggest that at least some of these ED visits were likely due to abuse rather than accidents. Further, it shows that clues are often present in presentations for “accidental” injury that ED providers may use to raise their suspicion of abuse and prompt further evaluation. Particularly concerning is that a significant percentage of these abuse victims who presented to the ED after suspicious “accidental” injuries did not present at all during the study period to the ED reporting abuse. This underscores that, similar to child abuse and intimate partner violence, ED providers must maintain a high level of suspicion for elder abuse, as victims may not be willing or able to report.

We found that a large percentage of subjects with abuse-related and purportedly accidental injuries received radiologic studies as part of their ED evaluation. This suggests a significant potential role for radiologists in the evaluation of injury patterns potentially suggestive of abuse.¹⁷ This also raises the possibility that radiologic technologists, who have the opportunity to privately assess and interview patients while conducting imaging examinations, may have an important role in screening for elder abuse in injury patients.⁴¹

We found it interesting that acute alcohol use / intoxication was much more commonly noted in the accidental ED visits than those associated with physical elder abuse. While alcohol abuse by the perpetrator is a well-recognized risk factor in elder abuse,^{25,42-45} alcohol abuse by the victim is also beginning to be recognized as a potentially important contributor to physical elder abuse and injury.^{25,45} While alcohol use certainly increases risk for a wide range of accidental injuries, the fact that the patient was intoxicated may have led ED providers to assume that the injury was an alcohol-related accident rather than investigating the possibility of elder abuse.

Particularly worrisome is that such a large percentage of victims were discharged home into the care of their abusers even after physical elder abuse was identified during the ED visit. This is consistent with previous findings,²⁵ where, even in cases of severe physical abuse with injury, many victims are discharged with the perpetrator of abuse and elect not to press charges. This highlights the challenges associated with this complex public health problem and the need for multi-disciplinary solutions including alternative housing options to protect at-risk elders. Due to the case-finding methodology of our study, all of the cases we evaluated were eventually reported to adult protective services. Recent research suggests, however, that physicians inconsistently report even severe cases.³⁶

Limitations

This study has several limitations. Findings from two Northeastern urban EDs from 1985-94 may not be generalizable to current ED elder abuse injury patterns or patterns seen in other clinical settings. However, there is no reason to suspect that physical abuse is different depending on the secular period or location studied. Our results are based on retrospective evaluation of abstractions of ED clinical charts. They are dependent on the accuracy and completeness of initial injury descriptions within these medical records, which were not intended for clinical research, and the accuracy and completeness of the abstractions.

This study only includes victims whose abuse was identified by Connecticut's Elder Protective Service program. This EPS sample may reflect victims experiencing more acute or severe abuse allowing identification. It also likely reflects victims who have a better support system, increased ability to report abuse, and better health care literacy. A group likely dramatically underrepresented is victims with cognitive impairment, who are thought to be at greater risk for elder abuse.⁴⁰

Because of the methodology of the original study, we were unable to capture information about visits to non-New Haven EDs for injury-related care and did not have the ability to identify a control group. Notably, the initial investigators found (from EPS narratives) that 23 subjects sought care in other EDs during the study period and estimated that the actual

number was much higher.⁸ Also, after abuse-related injury, victims may have sought care in physician offices, clinics, or other settings.

In this analysis, we were only able to evaluate a small number of cases of physical elder abuse causing injury and of other ED visits for purportedly accidental injury by physical elder abuse victims. We also can only speculate whether any of the injuries treated during these ED visits were actually related to abuse in this retrospective study. This requires caution when drawing conclusions from these data. Larger, prospective studies of elder abuse presentations to the ED are needed to improve understanding of this dangerous and underappreciated phenomenon.

CONCLUSIONS

Our work expands the existing knowledge about injury patterns and circumstances consistent with and suspicious for physical elder abuse and highlights the important role of the ED in screening and identification. Future research is needed to comprehensively and systematically examine and describe common injury patterns, physical findings, and forensic biomarkers in elder abuse victims presenting to the ED and compare these to other geriatric injury victims. Ultimately, clinical decision rules should be designed and validated to assist busy emergency providers in identifying potential elder abuse victims.

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ARTICLE SUMMARY

1. Why is this topic important?

Elder abuse is common and may have serious consequences. Despite this, abuse is seldom recognized in injured geriatric patients by Emergency Department providers, largely due to challenges distinguishing between abuse and accidental trauma.

2. What does this study attempt to show?

This study describes patterns and circumstances surrounding elder abuse-related and potentially abuse-related injuries in ED patients independently known to be physical elder abuse victims.

3. What are the key findings?

Abuse-related injuries were most common on upper extremities (45% of visits) and lower extremities (32%), with injuries on head or neck noted in 13 visits (42%). Bruising was observed in 39% of visits, most commonly on upper extremities. 42% of purportedly accidental injuries had suspicious characteristics, with the most common suspicious injury pattern being maxillofacial injuries and the most common suspicious circumstance being injury occurring >1 day prior to presentation.

4. How is patient care impacted?

Our work expands existing knowledge about injury patterns and circumstances consistent with and suspicious for physical elder abuse and highlights the important role of the ED in screening and identification. Future research has the potential to aid in the development of targeted screening and intervention strategies to mitigate elder abuse

Table 1

Characteristics of Emergency Department Visits for Physical Elder Abuse with Injury (n=31), 1981-1994

	n	%
<i>Mechanism of Injury</i>		
Beating with fists / assault	10	32
Striking with household object	8	26
Pushing or Throwing	6	19
Stabbing	2	6
Grabbing	2	6
Fall after altercation	1	3
Kicking	1	3
Strangulation	1	3
Unarmed fight / brawl between victim and abuser	1	3
No explanation / found down	3	10
Injury attributed to "fall"	4	13
X-ray or CT scan ordered	21	68
<i>Disposition</i>		
Discharge home	19	61
Discharge to SNF	1	3
Discharge to Other Location	1	3
Admission	9	29

Table 2

Characteristics of Abuse-Related Injuries in Victims of Physical Elder Abuse (n=31) Presenting to the Emergency Department, 1981-1994

	n	%
<i>Body region(s) of Injury</i>		
Skull / Brain	8	26
Maxillofacial / dental / neck	8	26
Torso	7	23
Upper Extremity	14	45
Lower Extremity	10	32
<i>Fracture</i>		
Any	9	29
Skull / Brain	0	0
Maxillofacial / dental / neck	3	10
Torso	2	6
Upper Extremity	1	3
Lower Extremity	4	13
<i>Bruising</i>		
Any	12	39
Skull / Brain	3	10
Maxillofacial / dental / neck	6	19
Torso	3	10
Upper Extremity	9	29
Lower Extremity	5	16
<i>Laceration</i>		
Any	3	10
Skull / Brain	1	3
Maxillofacial / dental / neck	0	0
Torso	1	3
Upper Extremity	0	0
Lower Extremity	1	3

Table 3

Characteristics of Emergency Department visits (n=108) for Injuries Not Identified as Due to Abuse among Known Victims of Physical Elder Abuse, 1981-1994

	n	%
<i>Mechanism of Injury</i>		
Fall	74	69
Household/workplace accident	10	9
Animal bite	7	6
Found down	5	5
Motor vehicle accident	5	5
Seizure	1	1
Punched a wall	1	1
No clear cause noted	5	5
Suspicious circumstances of ED presentation *	22	20
Acute alcohol use / intoxication		
Victim	19	18
Abuser	1	1
X-ray or CT scan ordered	66	61
Suspicious injury pattern [†]	25	23
<i>Disposition</i>		
Discharge home	91	84
Discharge to SNF	3	3
Admission	9	8
Walked out of ED	1	1
Death	1	1
No Information Given	3	3

* Narratives of each ED visit were evaluated for potentially suspicious circumstances surrounding the ED presentation: injuries reported to have occurred >1 day before presentation, multiple ED visits for similar complaints, and/or ED visits with an ED presentation for elder abuse within 30 days before or after.

[†] Injury descriptions within each ED visit were evaluated for potentially suspicious injury patterns, including: maxillofacial injuries, injury to upper extremity above wrist, upper (1-5) rib fractures, atypical injury combinations: burn and fracture, radiologic imaging with acute and older injuries.

Table 4

Examples of Abstraction Narratives Describing Emergency Department (ED) Visits with Suspicious Circumstances of Presentation and/or Injury Patterns for Injuries not Identified as Due to Abuse among Known Victims of Physical Elder Abuse, 1981-1994

Narrative	Suspicious Circumstances or Presentation and/or Injury Patterns
Patient presents to ED via ambulance complaining of right shoulder injury. Patient slipped and fell down 3-4 stairs at home. Shoulder x-ray with compression fracture. Shoulder immobilized with swath and sling. Patient instructed: ice, tylenol. Follow up with Dr. [name redacted].	Upper extremity injury above the wrist *Injuries subsequently suspected by Elderly Protective Services (EPS) workers to have been related to abuse
Patient presents to ED complaining of left hip fracture after fall. Taken to operating room and treated with Austin-Moore hemiarthroplasty. Transferred to rehab services for post-operative physical therapy. Full thickness burn to right index finger was also noted that was treated by Plastic Surgery Department. Prognosis good. Discharge home. Patient aphasic and unable to give any history of injuries. Social work note discusses only spouse's anxiety over patient's recovery in time for daughter's wedding and details of transfer to rehab.	Atypical injury combination: burn and fracture
Patient presents to ED complaining of left rib pain. Patient reports she fell down 2 days ago. Patient was seen in ED 2 days ago with shortness of breath and did not mention falling at that time. Chest x-ray reveals multiple old rib fractures and new 5th rib fracture. Patient is discharged home, to follow up in ED clinic in 2 weeks.	Injury occurred >1 day before presentation Radiologic imaging with acute and older injuries
Patient's daughter states that patient fell approximately 1 week ago at his home. She then brought patient to her home. She states that patient only complained of pain on his right side at that time. Pt is currently confused, disoriented, but it is unclear if he was confused prior to his fall. Family insists there has been a change in his mental status. Pt has a small avulsion on his left forehead and swollen upper lip. Chest x-ray, cervical spine x-ray, CT scan of head are all negative for acute findings. Patient diagnosed with facial bruises and baseline dementia. Patient was discharged home with daughter via wheelchair.	Injury occurred >1 day before presentation Maxillofacial injuries

Table 5

Potentially Suspicious Circumstances of Emergency Department (ED) Presentation and/or Injury Patterns among ED Visits (n=45) for Injuries not Identified as Due to Abuse among Known Victims of Physical Elder Abuse, 1981-1994

	Subjects	ED visits
<i>potentially suspicious injury / ED presentation circumstances</i>		
injury occurred >1 day before presentation	8	10
multiple ED visits for similar complaint	3	9
ED visit for elder abuse within 30 days of presentation	3	3
<i>potentially suspicious injury patterns</i>		
maxillofacial injuries	10	13
injury to upper extremity above wrist	8	8
upper (1-5) rib fractures	2	3
atypical injury combinations: burn and fracture	1	1
radiologic imaging with acute and older injuries	1	2
two or more suspicious features	6	8