

Elder Abuse: What Should Radiologists Be Aware of?

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Abstract

Objectives: Imaging findings of child abuse were mostly determined through these studies. There are very few studies on elderly abuse in the literature. The aim of this study was to determine the radiologic imaging features of the consequences of abuse in elderly patients admitted to our hospital and to increase the awareness of radiologists.

Methods: Forty-six patients presented to our hospital's emergency department with a complaint of physical injury and were retrospectively diagnosed with elder abuse in a 5-year period. The diagnosis of elder abuse was confirmed by integrating clinical follow-up, history, and other patient parameters, including imaging. The patients were retrospectively evaluated in terms of age, gender, reason for hospitalization, location of the bone fracture, and fracture characteristics (side, type, and location in the bone).

Results: A total of 46 patients (21 female, 25 male) were included in the study. Hypertension (40 patients, 86.9%) was the most common accompanying chronic disease. Falling was the most common reason for admission; there were 35 patients (76.1%). All included patients had fractures. These most frequently occurred in the upper extremity (18 patients, 39.1%), head and neck fractures (14 patients, 30.4%), and chest fractures (12 patients, 26.1%). Long bone fractures were mostly distal and diaphyseal (60.9%). Two patients died, one was female and the other was male (4.3%).

Conclusion: In conclusion, it should be noted that radiological signs of elder abuse exist. All patients examined in our study had bone fractures. The most common injury was in the upper extremity. Long bone fractures were distal and diaphyseal.

Keywords: Elder abuse, physical abuse, aged, elderly, assessment tools, independent medical evaluation, diagnosis, awareness

Introduction

Elder abuse has severe physical and psychological effects but is often hidden. Screening tools can help detect and prevent harm.¹

Although it has a much older history, elder abuse was first described in medical literature in the 1970s. Many early attempts to define the clinical spectrum of this condition and develop effective intervention strategies were limited until recently. However, the last two decades have seen advances in research on elder abuse.²

Elder abuse is not a new phenomenon but has been a topic of constant interest and concern in recent years. A definition used worldwide has been developed by the World Health Organization since 1995: "Elder abuse is a single or repeated act or lack of appropriate action, occurring in any relationship in which there is an expectation of trust, which causes harm or hardship to the older person".^{1,3}

In addition, elder abuse although it may increase comorbidities, is generally not noticed, and it increases the risk of disease and death in old age.²

People usually commit abuse close to the elderly person, such as relatives or caregivers, and it is often performed physically, sexually, psychologically, or economically.⁴ Unfortunately, this abuse is a

community health concern, and it is considered a widespread and growing social problem all over the world.^{4,5}

Dong⁶ the prevalence of elder abuse among cognitively intact older adults in North and South America was approximately 10%. This rate varies widely and rises to 47.3% in older adults with dementia. The general incidence is between 3% and 18.5%, depending on the research method. Although the rate of reported elder abuse is significant, the number of unidentified, unreported elder abuse cases is believed to be much higher, according to the "iceberg" theory.⁷

Since doctors and nurses are the first people that victims of abuse may encounter, they are in a position to know these cases best and play a significant role in detecting, reporting, and preventing elder abuse. However, the reporting level of these cases is much lower than the actual incidence.⁷ Reporting of abuse does not exceed 2% of cases due to reasons such as the victim's fear of reprisal and expulsion from home, the desire to protect the perpetrator, and in some cases, the elderly person with dementia does not remember it.⁸

Radiologists who evaluate pediatric patients play a critical role in detecting child abuse. When the radiologist evaluates the image in detail, he often suspects abuse even before the pediatrician. However, radiologists do not currently have this role in elder abuse cases.⁹ In a



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patient suspected of being a victim of elder abuse, diagnosis may be facilitated by collaboration between the clinician and the radiologist.¹⁰

Limitations to the diagnostic role of radiologists include a lack of knowledge and a paucity of systematic studies on the distinctive imaging findings of physical abuse in the elderly. The lack of a clear characterization due to under-disclosure by victims and under-recognition by physicians increases the need for more objective and systematic detection of physical elder abuse, especially as the population ages and the number of cases continues to increase. Given that 24% of emergency department visits are made by the elderly patient population and that most patients undergo imaging studies during these visits, diagnostic imaging has exciting potential to provide the necessary objectivity and support for the detection of physical elder abuse.¹¹

There are many studies on child abuse in the literature. Imaging findings of child abuse were mostly determined through these studies. There are very few studies on elderly abuse in the literature. The aim of this study was to determine the radiologic imaging features of the consequences of abuse in elderly patients admitted to our hospital and to increase the awareness of radiologists.

Methods

Ethical approval was obtained from the Ankara Training and Research Hospital (KAEK-2021-11-08.0014987.03) Local Ethics Committee for this study, and the Helsinki principles were followed.

Patient Selection and Radiological Evaluation: Our study is a retrospective review of 46 patients who presented to our hospital's emergency department with a complaint of physical injury and were diagnosed with elder abuse over 5 years.

The diagnosis of elder abuse was confirmed by integrating clinical follow-up, history, and other patient parameters, including imaging. There was no use of judicial authority records.

The inclusion criteria for the studies were those who were diagnosed with elder abuse following subsequent examinations and those who applied to the emergency department with a complaint of physical injury. Elderly patients who were suspected of elder abuse but not confirmed or who were injured after another trauma were excluded.

The patients were retrospectively evaluated in terms of age, gender, reason for hospitalization, location of the bone fracture, and fracture characteristics (side, type, and location in the bone).

In our hospital, all patients underwent computed tomography (CT) examinations containing bone and soft tissue windows using 16-slice and 128-slice CT scanners for the area with complaints. Imaging was performed in the supine position, and scanning was performed in the craniocaudal direction with and without iodine contrast injection. The slice thickness was 1 mm. Image reconstruction was performed in the axial, coronal, and sagittal planes.

Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) (IBM SPSS 22.0, IBM Corporation®, Armonk, NY, USA). The normal distribution of the data was evaluated using the Kolmogorov-Smirnov test. Descriptive statistics were obtained. The Mann-Whitney U test was used for comparisons between groups. A p value <0.05 was considered significant.

Results

The study included 46 patients. The mean age of 46 patients included in the final analysis was 76.7±2.3 years. Twenty-five (54.3%) of the patients were male and 21 (45.7%) were female.

There were accompanying comorbid diseases in 44 (95.6%) patients. Hypertension is the most common chronic disease (40 patients, 86.9%). Other chronic diseases were osteoporosis in 36 patients (81.8%), coronary artery disease in 34 patients (73.9%), diabetes mellitus in 25 patients (54.3%), and dementia in 5 patients (10.9%).

The comorbidities of the patients are shown in Table 1.

Falling was the most common reason for admission; there were 35 patients (76.1%). Six of them (13.0%) were admitted to the hospital because of a loss of consciousness. The remaining 5 patients (10.9%) presented with various types of extremity pain.

While 42 of the patients (91.3%) were exposed to physical abuse, 4 patients (8.7%) were neglected. However, 43 of the patients (93.5%) were psychologically abused, and economic abuse was present in 21 patients (45.6%). There were no cases of sexual abuse.

All included patients had fractures. There were no fractures in more than one anatomical location. When the patients' fractures were examined, it was discovered that they most frequently occurred in the upper extremity (18 patients, 39.1%), head and neck fractures (14 patients, 30.4%), and chest fractures (12 patients, 26.1%). Most patients (52.2%) had soft tissue lesions at the fracture site (Figures 1 and 2).

The number and location of trauma-related lesions detected in our study group are summarized in Table 2.

Long bone fractures were mostly distal and diaphyseal (60.9%) (Figure 1). It was also discovered that 71.7% of the patients' fractures were not displaced. 15.2% of the patients had a concurrent joint dislocation.

Twenty-four of 46 patients (52.2%) had accompanying soft tissue lesions. All of them had ecchymosis in the trauma area. Hematoma was observed in 16 patients (34.8%) and edema was observed in 12 patients (26.1%). There was an incision in 4 patients (8.7%).

The soft tissue lesions of the patients are shown in Table 2.

In our study, two patients died, one was female and the other was male (4.3%).

Discussion

Elder abuse is a public health problem that is often overlooked because it is difficult to diagnose and doctors are not familiar with it.^{4,7} The lack of well-defined criteria for the diagnosis of elder abuse, as in child abuse, makes diagnosis difficult.

Table 1. Chronic disease of patients		
Chronic disease	Number	Percentage (%)
Hypertension	40	86.9
Osteoporosis	36	78.3
Coronary artery disease	34	73.9
Diabetes mellitus	25	54.3
Dementia	5	10.8
Total	46	100

Table 2. Number and location of fractures and trauma-related soft tissue lesions in patients		
Fracture location	Number	Percentage (%)
Upper extremity	18	39.1
Head and neck fractures	14	30.4
Chest fracture	12	26.1
Lower extremity	2	4.3
Soft tissue lesions		
Hematoma	16	34.8
Edema	12	26.1
Incision	4	8.7
Total	46	100



Figure 1. A 75-year-old female patient. A displaced spiral fracture is observed in the coronal (A, B, C, arrows) and axial computed tomography images (D, E, arrows) of the proximal diaphysis of the humerus

Because elder abusers are frequently vulnerable, they have few opportunities to discuss their abuse. This is something that emergency physicians and radiologists should always keep in mind. The effectiveness of radiologists in detecting elder abuse is lower than that of the child abuse. According to previous studies, the cause of this situation is a lack of information and a breakdown in communication with the clinician.¹²

The aim of this study was to determine the radiological imaging characteristics of the consequences that may occur due to abuse in elderly patients and to increase the awareness of radiologists.¹¹

In our study, all patients had bone fractures, and the most frequently affected area was the upper extremity. There were accompanying comorbid diseases in 95.6% of the patients. Falling is the most common reason for admission. Long bone fractures were mostly distal and diaphyseal. The mean age was found to be 76.7 years, similar to studies in the literature. No significant difference was observed.¹³

According to previous studies on large series, female and male elderly patients are exposed to abuse at equal rates.¹⁴ In our study, the male-female ratios were almost equal.

In their study, Mouton et al.¹⁴ found that the most common comorbidities were psychiatric diseases, dementia, and heart diseases, respectively. Kavak and Özdemir,⁸ similar to our study, found comorbidities to be osteoporosis, hypertension, and cardiovascular diseases.

Similar to the study by Kavak and Özdemir,⁸ in our study, the most common presentation was falls, followed by loss of consciousness. The elderly are frequently affected by osteoporosis and other chronic diseases that increase their risk of falling. However, falling because of being pushed by the caregiver is considered abuse. This should also be considered when caring for the elderly.

Acierno et al.¹⁵ showed that emotional-psychological abuse is more common than physical abuse in the elderly population. In our study, physical abuse was a priority, which may be related to our selection of patients with fractures. In addition, although there was sexual abuse in Acierno et al.'s¹⁵ study, it was not present in our study. This situation can probably be explained by cultural reasons.

In our study, all patients had bone fractures. Several studies in the literature included patients who suffered physical injuries without bone fractures or those with bone fractures in more than one location.

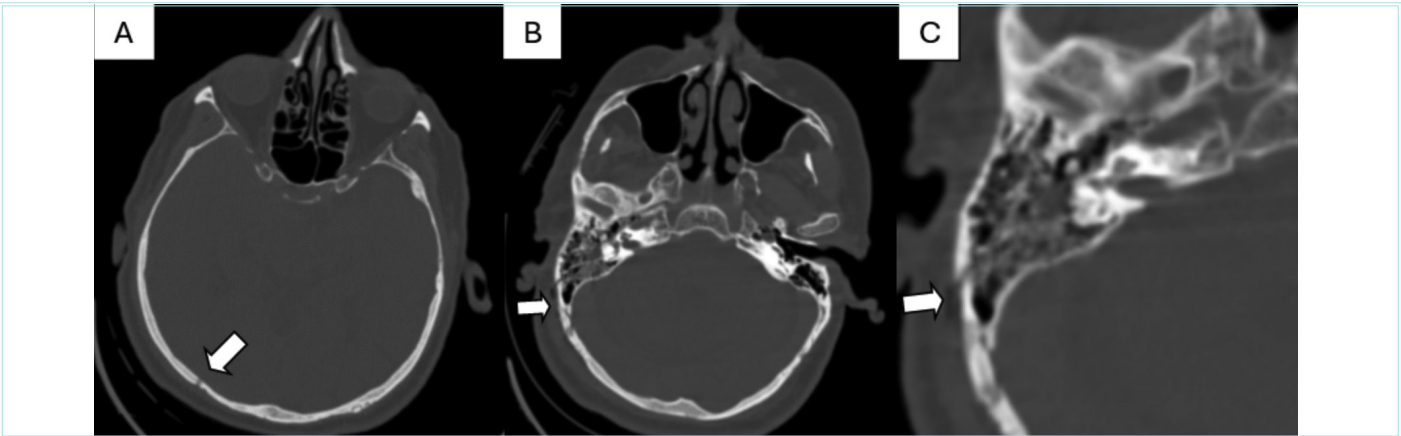


Figure 2. A 69-year-old male patient. Occipital fracture in axial computed tomography images (A, arrow) and temporal bone mastoid segment linear nondisplaced fracture in axial computed tomography images (B, C, arrows)

This is due to the heterogeneity and the different distribution of bone fractures.

Frazão et al.¹⁶ reported that head and neck injuries, followed by upper extremity injuries, are the most common injuries in abused elderly patients. Murphy et al.⁹ reported in their study that, being present in 44% of the victims, the upper extremity is the most common location subjected to trauma in the elderly who are abused. In accordance with previous data, the upper extremity and head and neck were the most frequently affected locations in our study.

In most studies, fractures were observed to be distal and diaphyseal. This could mean that it could be a warning marker for elder abuse.

The mortality rate due to elder abuse is reported to be 6-18.3%.¹⁷ The mortality rate from trauma exposure increases over time. Nagurney et al.¹⁸ found that the most common cause of death from elder abuse was subdural hematoma in their study. In another study, head and neck injuries in elderly patients were the most common injuries among those who died due to abuse.¹⁹ In our study, the mortality rate was found to be 4.3%, lower than that reported in the literature. The reason for this may be that head and neck injuries are less severe.

Ziminski et al.²⁰ found that soft tissue lesions accompanied more than half of the patients, similar to our study.

Study Limitations

Our study has some limitations. First, as this was a retrospective study, extensive data review and detailed history taking were not possible, and because of the retrospective design, there is a slight possibility of bias in patient selection. Second, our relatively small sample size reduces the power of our results. Different results may be obtained if the number of participants is increased. Third, being a single-center study is another limitation.

Conclusion

In conclusion, it should be noted that radiological signs of elder abuse exist. All patients examined in our study had bone fractures. The most common injury was in the upper extremity. Long bone fractures were distal and diaphyseal. Our study provides direction for future research to be alert to radiological findings that may be seen in elder abuse and to assist in the diagnosis.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the Ankara Training and Research Hospital Local Ethics Committee (KAEEK-2021-11-08.0014987.03).

Informed Consent: Since the study was a retrospective study, informed consent was not required by the ethics committee.

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