Journal of Acute Disease

Original Article

doi: 10.4103/2221-6189.268407 jadweb.org

Analysis of geriatric patients with minor spinal trauma admitted to the emergency department of a university hospital

Tufan Akin Giray[1], Afsin Emre Kayipmaz[2✉], Erkin Sonmez[3], Kemal Murat Haberal[4], Cem Yilmaz[3], Cemil Kavalci[5], Hakan Oguzturk[2]

[1]*Istinye University Faculty of Medicine, Department of Emergency, Istanbul, Turkey*

[2]*Ankara City Hospital, Department of Emergency, Ankara, Turkey*

[3]*Baskent University Faculty of Medicine, Department of Neurosurgery, Ankara, Turkey*

[4]*Baskent University Faculty of Medicine, Department of Radiodiagnostic, Ankara, Turkey*

[5]*Baskent University Faculty of Medicine, Department of Emergency, Ankara, Turkey*

ARTICLE INFO

Article history:
Received 24 July 2019
Revision 28 August 2019
Accepted 20 September 2019
Available online 1 October 2019

Keywords:
Elderly
Trauma
Vertebral column

ABSTRACT

Objective: To retrospectively analyze patients aged 65 years and over, who were admitted to a level II trauma center in Turkey due to minor spinal trauma in a period of 4 years.

Methods: The study included 64 patients aged 65 years and over, who were admitted to the Emergency Department of Baskent University Ankara Hospital between January 2011 and January 2015 and diagnosed with vertebral trauma. The information of the patients was obtained from the medical records. The clinical characteristics of patients including localizations and types of fracture, presence of additional system injuries and treatment options were investigated.

Results: The most common cause was fall, accounting for 51 (79.7%), with 7 (10.9%) due to intra-vehicle traffic accident, and 6 (9.4%) due to out-of-vehicle pedestrian injury. The most common site of trauma was the lumbar region. Of the fractures, 46.9% (n=30) were in the lumbar region, 37.5% (n=24) in the thoracic region and 15.6% (n=10) were in the cervical vertebra region. Fourteen (21.9%) patients had an additional injury. Given the fracture types, 47 fractures (74.6%) were compression, 14 fractures (22.2%) were spinous process and 2 fractures (3.2%) were burst fractures. Twenty patients (31.2%) had multilevel vertebral fractures.

Conclusions: The results of our study demonstrated the importance of vertebral fractures in the geriatric age group. In this age group, falls and motor vehicle accidents are the leading causes of vertebral traumas. Taking the necessary measures to prevent the risk factors which increase with aging is the most important step in preventing the mortality and morbidity that may occur as a result of vertebral fracture.

✉Corresponding author: Afsin Emre Kayipmaz, Ankara City Hospital, Department of Emergency, Ankara, Turkey.
E-mail: aekayipmaz@hotmail.com
Tel: 90-312-5526000

How to cite this article: Giray TA, Kayipmaz AE, Sonmez E, Haberal KM, Yilmaz C, Kavalci C, et al. Analysis of geriatric patients with minor spinal trauma admitted to the emergency department of a university hospital. *J Acute Dis* 2019; **8**(5): 191-194.

1. Introduction

Trauma has been one of the leading causes of emergency department admissions[1]. As life expectancy increases with each passing year, admissions of geriatric patients aged 65 years and over, especially patients with geriatric trauma in emergency department are becoming more frequent[2]. Akoglu *et al.* reported that 22% of the patients presented to the emergency department of a university hospital with trauma were geriatric patients[3].

Trauma cases in the geriatric age group result in higher mortality and morbidity compared to other age groups. These patients are at risk of traumas due to underlying systemic diseases and reduced physiological reserves[4]. These risk factors form a basis for falls and motor vehicle accidents, which are the leading causes of trauma in the geriatric population.

Determining the frequency of spinal traumas and concomitant systemic injuries in the geriatric age group will help to take necessary measures to prevent the risks. By correcting the preventable causes of geriatric traumas, the morbidity and mortality that may develop due to traumas can be prevented.

The aim of our study is to retrospectively analyze patients aged 65 years and over, who were admitted to a level Ⅱ trauma center in Turkey due to minor spinal trauma in a period of 4 years.

2. Materials and methods

This cross-sectional, observational study was conducted retrospectively after obtaining the approval of the ethics committee (The approval number: KA 15/70). The study included 64 patients aged 65 years and over who were admitted to the Adult Emergency Department of Baskent University Ankara Hospital between January 2011 and January 2015 and diagnosed with vertebral trauma. The information of the patients included in the study was obtained from the medical records and hospital automation system. The clinical characteristics of patients including localizations and types of fracture, presence of additional system injuries and treatment options were investigated.

The data were analyzed using the SPSS 17.0 software for Windows. Descriptive variables were expressed as "*n*", percentage (%).

3. Results

There were a total of 64 patients aged 65 years and over, who were diagnosed with vertebral fracture between January 2011 and January 2015. Of the patients, 17 (26.6%) were between 65-74 years of age and 26 (40.6%) were between 75-84 years of age, while 21 (32.8%) were older than 85 years of age. Of the patients, 35.9% (*n*=23) were male and 64.1% (*n*=41) were female. Of the patients, 32.8% (*n*=21) were admitted in autumn, 25% (*n*=16) in summer, 23.4% (*n*=15) in spring, and 18.8% (*n*=12) were admitted in winter.

Table 1. Fracture in cervical vertebra region.

Fracture sites	*n*	Percent
C1	1	1.6
C2	4	6.3
C2 and C7	1	1.6
C4 and C5	1	1.6
C5	1	1.6
C5 and C6	1	1.6
C6 and C7	1	1.6
C7	2	3.1

The most common cause was fall. Of the patients, 51 (79.7%) were exposed to vertebral injury due to fall, 7 (10.9%) due to intra-vehicle traffic accident, and 6 (9.4%) were exposed to vertebral injury due to out-of-vehicle pedestrian injury. The most common site of trauma was the lumbar region. Of the fractures, 46.9% (*n*=30) were in the lumbar region, 37.5% (*n*=24) in the thoracic region and 15.6% (*n*=10) were in the cervical vertebral region. Fourteen (21.9%) of the patients had an additional injury. Moreover, 4 patients (6.3%) had intracranial hemorrhage, 7 patients (10.9%) had thoracic trauma, and 7 patients (10.9%) had extremity trauma. Considering the additional systemic injury, additional injury was most commonly present in patients aged 75-84 years.

A total of 1 patient (1.6%) had pneumothorax, 3 patients (4.7%) had pulmonary contusion, 6 patient (9.4%) had costal fracture, 1 patient (1.6%) had epidural hemorrhage, 1 patient (1.6%) had subdural hemorrhage, 1 patient (1.6%) had subarachnoid hemorrhage, 1 patient (1.6%) had cerebral edema, and three patients (4.7%) had pelvic fracture. None of the patients had hemothorax, spleen or liver laceration.

None of the patients had abdominal injury.

While 45 patients (70.3%) were discharged from the emergency department, 12 patients (18.7%) were admitted to the neurosurgery department. Five (41.6%) of the patients admitted to the neurosurgery department underwent surgical intervention. Seven patients (10.9%) were admitted to the departments other than neurosurgery due to additional injuries, while 2 of them (28.5%) required orthopedic surgical treatment. Only 1 out of 64 patients was exitus. (1.6%)

Table 2. Fracture in thoracal vertebra region.

Fracture sites	*n*	Percent
T1	1	1.6
T1 till T8	1	1.6
T3 and T4	1	1.6
T3 till T5	1	1.6
T4 and T5	1	1.6
T5	2	3.1
T6 and T7	1	1.6
T6 till T8	1	1.6
T8	2	3.1
T8 till T10	1	1.6
T9 and T10	1	1.6
T10	1	1.6
T11	2	3.1
T12	11	17.2

Table 3. Fracture in lumbar region.

Fracture sites	*n*	Percent
L1	16	25.0
L1 and L2	2	3.1
L1, L2 and L4	1	1.6
L1, L3 and L4	1	1.6
L1, L3 and L5	1	1.6
L1 till L4	1	1.6
L2	4	6.3
L2 and L3	1	1.6
L2 and L4	1	1.6
L3	3	4.7
L4	1	1.6
L5	2	3.1

The sites of the vertebral fractures are shown in Table 1-3. Considering the fracture types, one patient had all three types of compression, spinous process, and burst fractures. This patient was exitus. Other patients had only one type of fracture. Given the fracture types, 47 fractures (74.6%) were compression, 14 fractures (22.2%) were spinous process and 2 fractures (3.2%) were burst fractures. Twenty patients (31.2%) had multilevel vertebral fractures.

4. Discussion

Accidental injuries are one of the leading causes of death in the geriatric patient. Moreover, these injuries can result in immobility, causing patients to become needy for home care[5]. In the study by van der Jagt-Willems *et al.*, 66% of the patients were female. In line with the literature, 64.1% of the patients were female in our study[6]. This may be explained by more frequent incidence of osteoporosis in females in the geriatric age group[7].

In this study, we aimed to demonstrate the clinical characteristics of patients with geriatric vertebral fracture who were admitted to an emergency department. Traumas were most common between people aged 75-84 years with incidence as 40.6%.

Considering the mechanism of injury, we found that about 80% of the patients were brought to the emergency department due to fall. Additional systemic injuries were also common in this age group. The most common additional systemic injury was costal fracture. In geriatric vertebral traumas, falls come to the fore as in our study. It has been reported that about 40% of patients fall at least once during a year, and this rate and fall-related complications are two times higher over the age of 75 years[5]. In line with the literature, about 80% of traumas were caused by falls in our study. The most affected age group by traumas and associated systemic injuries was between 75-84 years. The frequent incidence of falls in this age group is attributed to the fact that these patients have certain risk factors. For example, polypharmacy, decline in cognitive function, decreased daily activity, visual, balance and gait disturbances, as well as diseases such as muscle weakness, arthritis and depression are shown as major risk factors for falls[8].

In the study by Tonbul *et al.*, the 3 most common injured spinal vertebrae were lumbar 1 (L1) (63.8%), thoracic 12 (T12) (12%) and lumbar 2 (L2) (10.6%)[9]. Similarly, our study found that trauma most commonly occurred in these three vertebrae (L1: 34.3%, T12: 17.2% and L2: 15.6%). It is stated that the reason why vertebral injury mostly occur in the thoracolumbar region is due to the absence of protective cage effect since the ribs end in this region. In addition, the progression of lumbar lordosis to thoracic kyphosis in this region is one of the factors that make the thoracic lumbar region vulnerable. The facet joints of the thoracic vertebrae are located in the coronal plane, while the sagittal location of those of the lumbar vertebrae also causes facet joint disorientation, which comes to the fore as another factor leading to increased fracture risk[10].

The most common internal organ injury due to vertebral fractures is reported to be caused by damage to the thoracic vertebrae[10]. In our study, the most common visceral injury was pulmonary contusion associated with thoracic vertebral lesion (4.7%). Hebert *et al.* reported that the most common concomitant injury with vertebral injury was extremity trauma (26.5%)[11]. Whereas, in our study, it was costal fracture (9.4%). The difference may be due to the fact that the most common cause of trauma was motor vehicle accident in the abovementioned study, while it was same-level fall in our study.

Armagan *et al.* reported that 36 out of 46 patients with vertebral trauma were hospitalized. Of the patients, 23 (50%) were hospitalized by neurosurgery, while 13 (28.2%) were hospitalized by orthopedics. Nine of the patients hospitalized in neurosurgery (69.2%) and 6 of the patients hospitalized in orthopedics (46.1%) required surgical treatment, while other patients received conservative treatment[12]. In our study, surgical treatment was performed on 5 patients (41.6%) by neurosurgery and on 2 patients (28.5%) by other departments.

In the study by Erturer *et al.*, the most common type of fracture was compression fracture with 57%[10]. Similarly, compression fracture was the most common type of fracture in our study (74.6%).

In conclusion, we determined 64 geriatric cases of vertebral fractures in a 4-year period in the emergency department of our hospital. Of the patients, 64.1% were female and the highest number of admissions was in the age group of 75-84 years (40.6%). The most common fracture sites were L1 and T12 (34.3% and 17.2%, respectively). We found that the most common additional injury was costal fracture (9.4%). A total of 7 patients underwent surgical treatment (10.9%). The results of our study demonstrated the importance of vertebral fractures in the geriatric age group. In this age group, falls and motor vehicle accidents are the leading causes of vertebral traumas. Necessary measures should be taken to prevent the risk factors, then to decrease the mortality and morbidity as a result of vertebral fracture.

Conflict of interest statement

The authors report no conflict of interest.

References

[1] Polat O, Kabacam G, Guler I, Ergisi K, Yildiz A. Surveillance analysis of the patients attended to Ibni Sina Hospital Emergency Department. *Turk J Emerg Med* 2005; **5**(2): 78-81.

[2] Karadag B, Cat H, Ozturk AO, Basat O, Altuntas Y. Patients admitted to emergency outpatient clinic and kept under observation: a survey of three years. *Akad Geriatri* 2010; **2**: 176-185.

[3] Akoglu H, Denizbasi A, Unluer E, Guneysel O, Onur O. Demographic characteristics of trauma patients of the emergency department of Marmara Universty Hospital. *Marmara Med J* 2005; **18**(3): 113-122.

[4] Jacobs DG. Special considerations in geriatric injury. *Curr Opinion Crit Care* 2003; **9**: 535-539.

[5] Rubenstein LZ. Falls in older people: epidemiology, risk factors and strategies for prevention. *Age Ageing* 2006; **35**(S2): ii37-ii41.

[6] van der Jagt-Willems HC, Vis M, Tulner CR, van Campen JP, Woolf AD, van Munster BC, et al. Mortality and incident vertebral fractures after 3 years of follow-up among geriatric patients. *Osteoporos Int* 2013; **24**(5): 1713-1719.

[7] Kanis JA, Johnell O, Oden A, Borgstrom F, Zethraeus N, De Laet C, et al. The risk and burden of vertebral fractures in Sweden. *Osteoporos Int* 2004; **15**(1): 20-26.

[8] American Geriatrics Society, British Geriatrics Society, American Academy of Orthopaedic Surgeons Panel on Falls Prevention. Guideline for the prevention of falls in older persons. *J Am Geriatr Soc* 2001; **49**(5): 664-672.

[9] Tonbul M, Yilmaz MR, Ozbaydar MU, Adas M, Altan E. Long-term results of conservative treatment for thoracolumbar compression fractures. *Acta Orthop Traumatol Turc* 2008; **42**(2): 80-83.

[10]Erturer E, Tezer M, Ozturk I, Kuzgun U. Evaluation of vertebral fractures and associated injuries in adults. *Acta Orthop Traumatol Turc* 2005; **39**(5): 387-390.

[11]Hebert JS, Burnham RS. The effect of polytrauma in persons with traumatic spine injury. *Spine* 2000; **25**(1): 55-60.

[12]Armagan E, Al G, Erdem M, Ozguc H, Tokyay R. With vertebral and/or spinal injuries who were admitted to first aid and emergency room at medical school of Uludag University. *Ulus Travma Acil Cerrahi Derg* 2000; **6**(2): 110-113.