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Retrospective analysis of patients who underwent spinal fusion surgery

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ABSTRACT

Traumatic spinal fractures are seen frequently and decrease quality of life. Spinal cord injuries influence the patients' life socially and financially. The level of the injury and the presence of the neurological deficit are significant in terms of treatment and prognosis.

This study is a descriptive, retrospective, cross-sectional study. The aim of this study is to determine the incidence and functional outcome of the traumatic injuries of the spine in patients who went spinal fusion surgery with instrumentation in the period from January 1, 2013 to January 1, 2016, at the Neurosurgery Department of Van Yuzuncu Yıl University.

We observed that 71 of the patients were men and 31 were women. The most common causes of traumatic spine fractures were high energy falls 64 (63%) and traffic accidents 38 (37%). The distribution of the injuries by vertebral segments, there were 19 cervical (24%), 4 thoracolumbar (3%), 30 thoracic (23%), 47 lumbar (50%) fractures. 21 of 102 patients had multilevel fractures. The neurological deficits were categorized using ASIA Scale 14. (14%) patients had complete neurological deficit, 10 patients (10%) had incomplete neurological deficit, 78 (76%) patients had no neurological deficit.

We can suggest that early stabilization did not also significantly improve the early preop ASIA score but improve the postop 6th Month ASIA score. Lumbar region is the most affected location of injury. Falling from height is common in this district because of the affected people are mostly construction workers and fastening seat belt in traffic accidents.

Key Words: Traumatic vertebral fracture, ASIA, epidemiology

Introduction

Spine fractures represent only a small part of all traumatic fractures, they cause disability and decrease the quality of life by influencing the patients social and financial environment more than other injuries. The spinal column can resist significant loads, however when the loading is too much the injury occurs (1).

Patients with unstable spinal fractures are generally stabilized with spinal fusion surgery as soon as possible, while the patients with a stable injury, withont major deformity or neurological deficit are generally treated conservatively. The goals of treatment for spinal fractures are to maintain the function, alignment and stability again and to prevent early or late complications. The level of the injury and the neurological deficit whether it is complete or incomplete has a significant importance in treatment and prognosis. In complete spinal cord injury the prognosis for recovery is ineffective, probably one or two levels of motor and sensory function may return. American Spinal Injury Association (ASIA), suggest ASIA Impairment Scale (AIS) and categorizes the neurological deficit as complete, incomplete or normal. Grades vary from A (complete motor and sensory loss) to E (normal neurological examination)(2,3).

Material and Methods

This study is a descriptive, retrospective, cross-sectional study. All of the patients in the study underwent spinal fusion surgery in Neurosurgery Department of Van Yuzuncu Yıl University Dursun Odabas Research and Treatment Hospital. Inclusion criteria are male or female patients of any age with traumatic vertebral injuries with or without neurological damage who underwent spinal fusion surgery with instrumentation; Exclusion criteria: Patients with traumatic vertebral injury who requested voluntary discharge or transfer to another hospital and spinal sprains managed in outpatient emergency services. Data collection was made in an automated data collection sheet (Excel) in which all the parameters; age, gender, etiology, neurologic extent of lesion, level of injury were captured. AIS (ASIA Impairment Scale) was used for the evaluation of neurological status.

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Results

The records of 102 patients diagnosed with traumatic vertebral fracture and underwent spinal surgery were collected during the period January 1, 2013 to January 1, 2016.

We observed that 71 of the patients were men and 31 were women (Graphic 1).

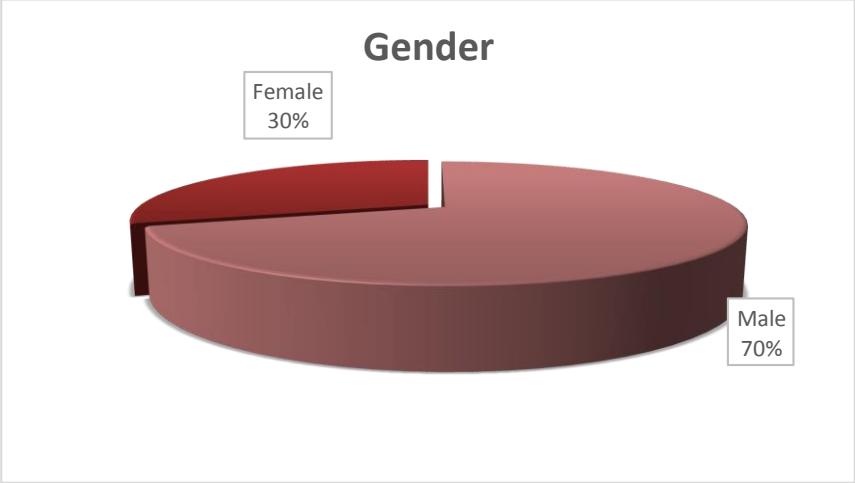
The patient's ages ranged from 12 to 75 years (Table 1).

Table 1. Age distribution according to decades

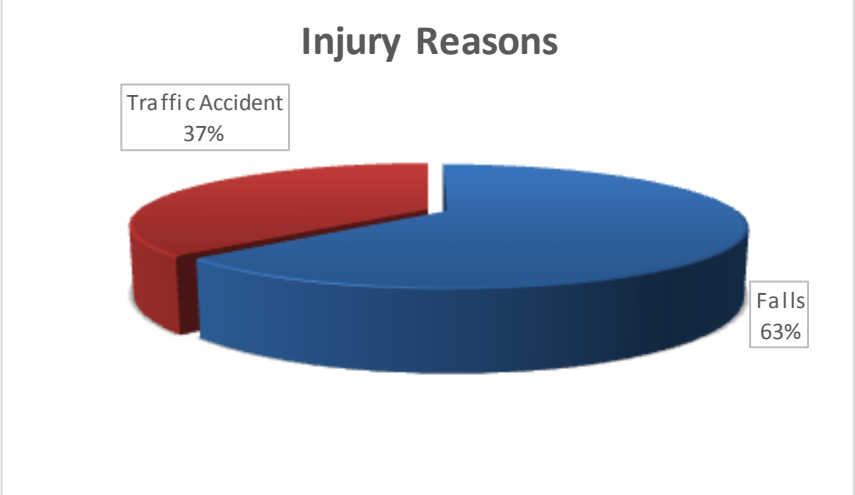
DECADES	Male	Female	Total
10-29 age	16	15	31
30-49 age	29	4	33
50-80 age	26	12	38
Total	71	31	102

The most common causes of traumatic spine fractures were high energy falls (64) and traffic accidents (38) (Graphic 2).

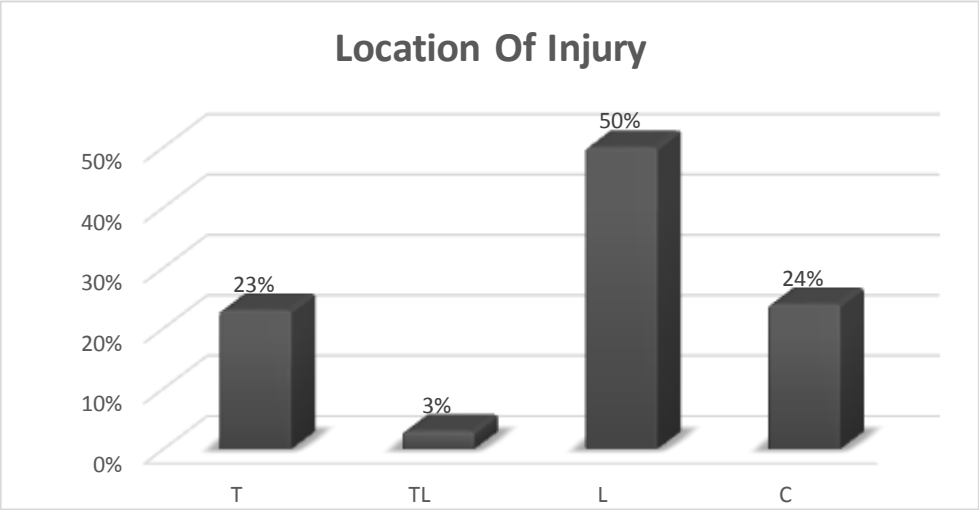
The distribution of the injuries by vertebral segments, there were 19 cervical, 4 thoracolumbar, 30 thoracic, 47 lumbar fractures. 21 of 102 patients hod multilevel fractures (Graphic 3).



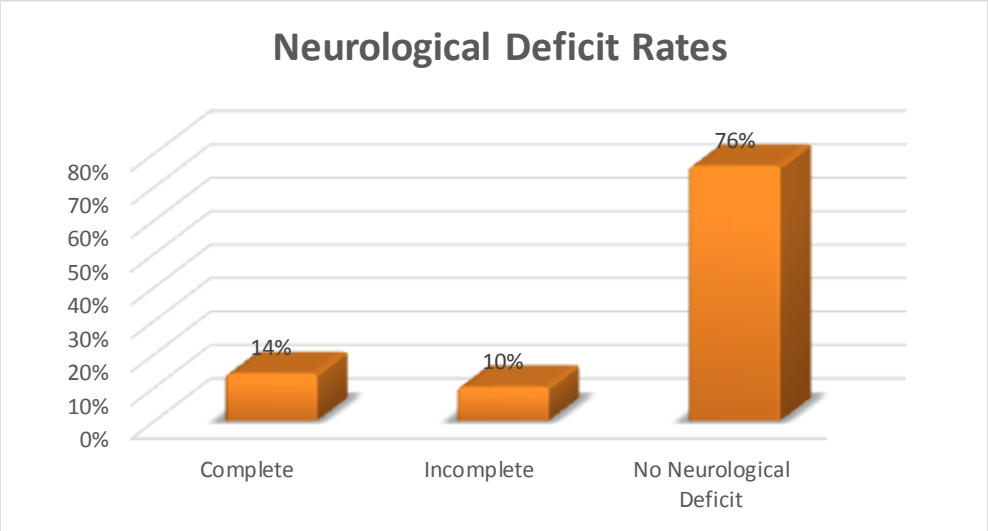
Graphic 1. The gender distribution of the patients with traumatic vertebral fracture.



Graphic 2. The injury reasons of the patients with traumatic vertebral fracture.



Graphic 3. The distribution of the injuries by vertebral segments.
(T: Thoracic, TL: Thoracolumbar, L: Lumbar, C: Cervical)



Graphic 4. Neurological deficit rates using the ASIA Impairment Scale (AIS).

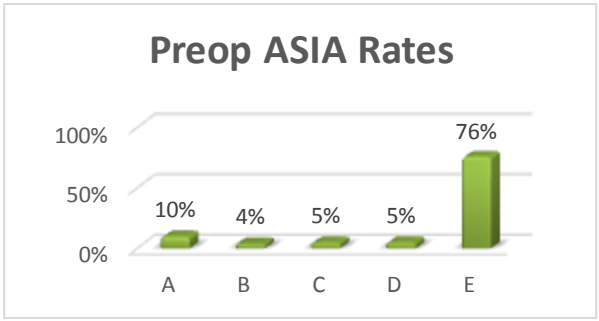
Using the ASIA Impairment Scale (AIS), the neurological deficits were categorized as complete, incomplete or normal. 14 patients suffered from complete neurological deficit, 10 patients suffered from incomplete neurological deficit, 78 patients had no neurological deficit (Graphic 4). The surgical interventions should include the fewest risks and most benefits to the patient so when there is no neurological deficit the surgery can be planned according to spine stability. If it is unstable, spinal fusion surgery would be performed, if it is not orthosis would be used for treatment (1).

Ten patients preop ASIA A, 4 patients preop ASIA B, 5 patients preop ASIA C, 5 patients preop ASIA D, 78 patients preop ASIA E was documented (Graphic 5).

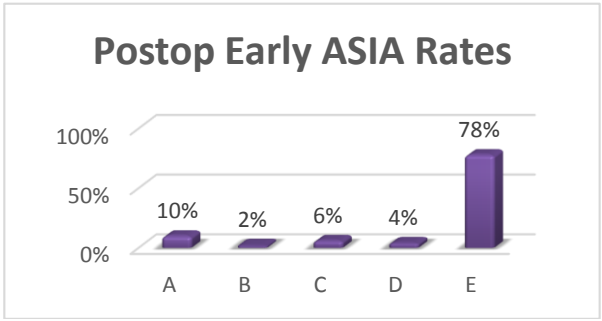
Ten patients postop ASIA A , 2 patients postop ASIA B, 6 patients postop ASIA C, 4 patients postop ASIA D, 80 patients postop ASIA E was documented (Graphic 6).

Seven patients postop 6th Month ASIA A, 2 patients postop 6th Month ASIA B, 2 patients postop 6th Month ASIA C, 2 patients postop 6th Month ASIA D, 83 patients postop 6th Month ASIA E was documented (Graphic 7).

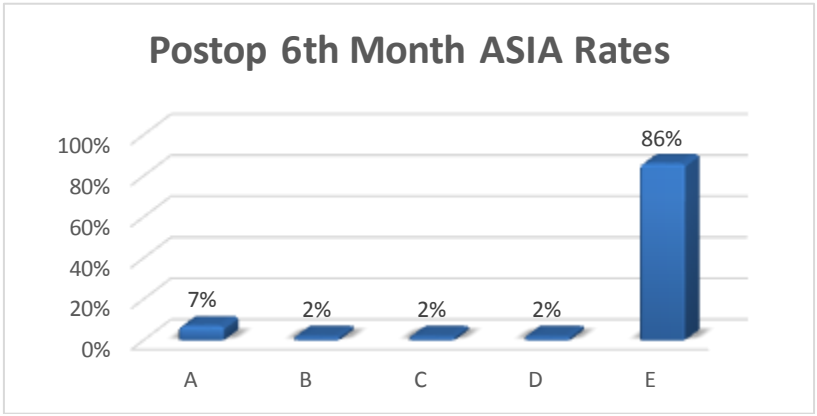
In conclusion in terms of the injury reasons, falls were the most common and were followed by traffic



Graphic 5. Preoperative ASIA rates of the patients with traumatic vertebral fracture.



Graphic 6. Postoperative early ASIA rates of the patients with traumatic vertebral fracture.



Graphic 7. Postoperative 6th month ASIA rates of the patients with traumatic vertebral fracture.

accidents. In terms of gender men were more than women, 70% to 30%. We can suggest that early stabilization did not also significantly improve the early preop ASIA score but improve the postop 6th Month ASIA score. Lumbar region is the most affected location (50%) of injury. The analysis of vertebral injuries by location showed that the most affected spinal region was the lumbar followed by the thoracic and the thoracolumbar, finally the cervical region.

Discussion

The cause of the lumbar injuries which are observedmore than the other region injuries in our study may be the fact that the leading cause of injuries was fall from height, which generally results in fractures of this region because of the affected people mostly consists of construction workers from low socioeconomic level. Another reason may be the fact that fastening seat belt in traffic accidents causes hyperflexion centered in upper and middle portion of the lumbar spine causes more fractures at this region. Thoracic spine has a natural stability because of the stabilizing effect of the attachment of the rib cage and there is less motion in thoracic spine than in the lumbar spine. The stress concentration is different in the two regions. As a result of this, most of the injuries occur near the thoracolumbar junction. The injuries at the thoracic and lumbar level needs more amount of energy released to produce damaged compared with cervical spine. Thus cervical spine has greater risk of injury from low energy traumas associated with traffic accidents. Whiplash injury can happen in traffic accidents, the head goes into flexion then into extension rapidly, the maximum injuring forces occurs in extension at the region of C6 and C7. The flexion component of whiplash injury also involved in the mechanism. In whiplash injury the harder seatback is considered as safer because allows less acceleration of the head. (1,4-6).

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