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SPINE TRAUMA;

ETIOLOGY AND FRERQUENCY OF SPINE TRAUMA; PATIENTS PRESENTED IN A TERTIARY CARE HOSPITAL OF PAKISTAN

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ABSTRACT… Objectives: To determine the etiology and level of spine trauma in patients presenting in tertiary care hospital of Pakistan. **Study Design:** Descriptive, cross-sectional study. **Setting:** This study was conducted at the Department of Neurosurgery, Pakistan Institute of Medical Sciences (PIMS), Islamabad, from September 20th, 2014 to March 20th, 2015. **Subjects:** The patients in the study were of both genders, between 15 to 80 years of age (N=315, mean age 38.17 years, SD 17.31). **Materials and Methods:** All 315patientsbetween 15 to 80 years of age with spine trauma presenting to the Neurosurgery department of PIMS, Islamabad consented to participate in the study. All these patients had underwent thorough history and physical examination after stabilization and initial emergency management. X-ray spine was carefully reviewed and patient details, bio-data, etiology of trauma, spinal injury type, level, neurological status and diagnosis were recorded. **Results:** The most frequently affected age group presenting with spine trauma were young and between 15 to 30 years of age (17.1%). The most frequent etiologies seen for spine injury were falls; 158 (50.2%) followed by RTA's; 129 (41%). The most common level of spine trauma presentation was at the lumbar spine; 142 (45.1%) followed by thoracic spine fractures; 80 (25.4%). **Conclusion:** Lumbar spine and younger male people are more prone to spinal injuries in Pakistan. The most frequent reason for the trauma was due to falls followed by road traffic accidents.

Key words: Spine Trauma, Spinal Cord Injury, ASIA Impairment Scale.

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INTRODUCTION

Cervical spine injuries are best classified according to mechanisms of injury. These include flexion, flexion-rotation, extension, extension-rotation, vertical compression, lateral flexion, and imprecisely understood mechanisms that may result in odontoid fractures and atlanto-occipital dislocation.

Trauma accounts for one of the leading cause of hospitalization, death and short & long term disability in the first five decades of life.[1] Traumatic spinal cord injury accounts for an annual incidence of 40 cases per million population. In the US alone, approximately 11,000 new cases present each year. Recent statistics from Australia report an age-adjusted rate of 14.5 cases per million of the population.[2]Approximately, 183,000-230,000 patients with Spinal cord injury are alive in the United States and 94% of patients survive the initial hospitalization.[2]

Epidemiological patterns indicate that accidental falls (58.9%), road traffic accidents (20.9%), assaults (11.3%) and sports injuries (5.47%) are the common causes of spine trauma in China.[3] Using the American Spinal Injury Association (ASIA) impairment classification, 15.3% patients were classified as having ASIA-A injuries, 29% as ASIA-B, C and D, and 55.7% had ASIA-E.[3] The most common area of fracture was the thoraco-lumbar spine (54.9%).[3]

Data from Sao Paulo, Brazil on cervical spine trauma showed that 19.8% of the cases involved the cranio-cervical region and 80.2% had injuries in the cervical sub-axial region.[4] The high incidence of spinal injuries in recent times is attributed to road traffic accidents, urban violence, military conflicts and natural disasters in different parts

of the world.[5] Trauma to the spine can lead to cervical, dorsal and lumbar spine injuries. Spinal trauma constitutes a major public health issue in the developing world due to its devastating impact on life.[6] Basic life support along with spinal trauma evacuation protocols is crucial first step in the management of such patients. Immobilization of the spine is crucial so as to avoid inciting a secondary neurological damage.[7]

The epidemiology and neurological outcome of spinal cord injury (SCI) in a developing country such as Pakistan differs from that of developed countries and it needs consideration whilst devising a plan for SCI management and rehabilitation.

The rationale of conducting this study is to identify and highlight the epidemiological pattern (etiology and frequency) of traumatic spinal cord injuries and their outcome based on American Spinal Injury Association (ASIA) impairment classification, presenting at a tertiary care unit of a developing country like Pakistan. This study shall enable us to delineate the etiology of spinal trauma and bring into light the need to improve the spinal trauma management protocols so as to improve the morbidity it imposes. It may also help the district and town management authorities in better planning to avoid these injuries.

MATERIAL AND METHODS

Approval from the hospital ethical committee was sought. It was descriptive cross-sectional study carried out at the Department of Neurosurgery, Pakistan Institute of Medical Sciences, Islamabad (PIMS) from September 20th, 2014 to March 20th 2015. Patients were selected from the accident and emergency department and those admitted in the Neurosurgery ward. It was non-randomized convenience sampling. The sample size was calculated by WHO calculator.

Informed written consent was obtained from each patient or their attendants before enrollment in the study. History, general physical and neurological examination was carried out on all patients. The distribution of spinal injury in relation to the vertebral level was determined from Spinal X-ray. Severity of injury was based on ASIA impairment classification system. The data was analyzed through Statistical Package for Social Sciences (SPSS) version 20.

RESULTS

A total of 315 patients with different types and levels of spine trauma were included in the study. The most frequently affected age group presenting with spine trauma were young and between 15 to 30 years of age (17.1%) (Table-I). Out of 315 patients, 232 (74%) were of male gender and 83 (26%) were female. The most frequent etiologies seen for spine injury were falls; 158 (50.2%) patients, followed by RTA's; 129 (41%), miscellaneous causes were 22 (7%), assault; 4 (1.3%) and sports injuries 2 (0.6%) as depicted in Figure-1. The most common level of spine trauma presentation was at the lumbar spine; 142 (45.1%) patients, followed by thoracic spine fractures; 80 (25.4%) patients, followed by lower cervical spine; 73 (23.2%) patients and upper cervical spine trauma; 6 (1.9%) patients. Patients presenting with multi-level spine fractures were 14 (4.4%) presented graphically in Figure-2. Out of all these, 98 (31.1%) patients had stable spine fractures and 217 (68.9%) patients were having unstable fractures. Majority of the patients presented with ASIA Grade - A; 125 (39.7%), followed by Grade - E; 92 (29.2%) patients. 42 (13.3%) patients were in Grade - C, 37 (11.7%) patients in Grade - D and 19 (6%) patients in Grade – B.

Age (years)	Frequency	%
15-20	54	17.1
21-25	49	15.6
26-30	33	10.5
31-35	24	7.6
36-40	21	6.7
41-45	38	12.1
46-50	13	4.1
51-55	14	4.4
56-60	24	7.6
61-65	21	6.7
66-70	11	3.5
71-75	10	3.2
76-80	3	1.0
Total	315	100.0

Table-I. Age distribution of spine trauma patients

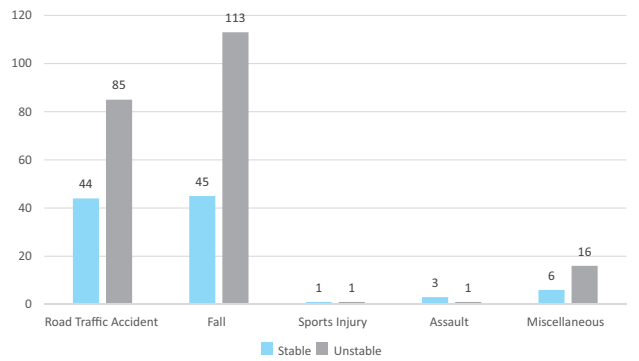

Figure-1. Fracture type & Etiology

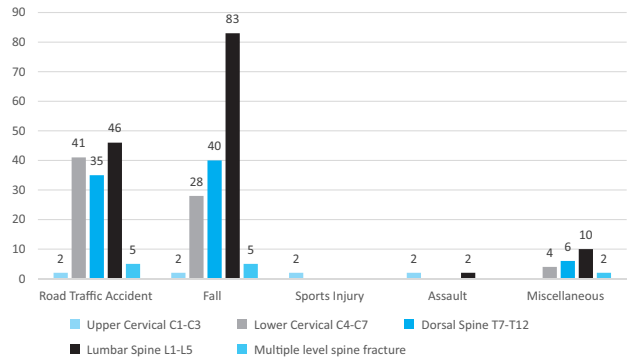

Figure-2. Fracture level & Etiology

DISCUSSION

Spine trauma all over the world has a significant impact on morbidity and mortality in patients with multiple or isolated injuries[8] This may be in terms of death, permanent or long-term disability and reduced productivity of individuals in society.[9] Spine trauma frequency, its etiology and associated neurological status of patients at presentation follow certain trends in a developing third world country such as Pakistan. These trends are clear indicators that can easily be seen by the results of this study. Of course, multi-center studies will give a clearer picture of the problem, but trends of spine injury will provide the impetus to plan for an effective implementation of primary prevention strategies, appropriate management programs and proper allocation of health resource in this area.[10]

In this study, it was seen that the most frequently presenting age group with spine trauma were young, between 15 and 25 years of age. This holds true because this age group is seen to be most active, involved in falls and RTAs.[11] The mean age of presentation was 37.5 years in which minimum age at presentation was 15 years and maximum age was 80 years. Males 232 (73.7%) were more commonly affected as compared to females 83 (26.3%). Lumbar spine fractures 142 (45.1%) were most frequently seen, followed by dorsal/thoracic spine 80 (25.4%), Lower cervical spine 73 (23.2%), Upper cervical spine 6 (1.9%) and multi-level spine fractures 14 (4.4%) in patients that presented during the study period. Variable trends of the level of spine trauma are seen in different parts of the world.[12]

Fracture type in this study was broadly classified as stable or unstable, based on radiological criteria combined with clinical absence or presence of neuro-deficit. The majority of spine fractures were of unstable type 217 (68.9%) whereas 98 (31.1%) patients had stable spine fractures. Unstable fractures of the spine required admission and surgical intervention. Associated neurological deficit at presentation and the corresponding ASIA grade were assessed for every patient that presented with spinal trauma in this study. It was seen that majority of the patients were categorized into ASIA grade – A. Other spinal injury severity grading systems have been used in clinical practice including Frankel grading method.[13] Prognosis is directly related to the severity of injury.[14] These statistics vary from the developed world where there are set standards of work related safety and traffic laws in place. The miscellaneous causes seen in this study included occupational and trade related hazards, notably injuries sustained by workers in coal mines and wood-cutters.[15] Another interesting and unusual observation was the 'dopatta' (scarf) ladies garment being a unique cause of cervical spine trauma in accidents and has also been reported in literature.[16] In today's day and age, warfare and acts of terrorism have also been implicated as a significant cause of spine injury.[17] The incidence of RTAs resulting in spine trauma is significant in other parts of the world as well.[18] Sports related injuries, especially contact sports such as rugby are commonly implicated in spinal trauma but are not very popular in Pakistan and in general there is a very low incidence of sport related spine injury

in our country probably due to under - reporting, however, sports and recreation related spine injury has been widely documented in other parts of the world.[19] Spine trauma due to assault and other miscellaneous causes (blunt force, firearm related, stabs, penetrating and non - penetrating) has also been reported and widespread but was not seen to be frequent in our study.[20]

The lumbar spine followed by the thoracic spine was the segment to be most frequently involved in trauma due to falls and miscellaneous causes. However, the frequency of lower cervical spine trauma was more in RTAs when compared to falls. In fact, lower cervical spine trauma in RTAs exceeded thoracic spine injury and almost equaled the frequency of lumbar spine injury in this etiological group. Patients having sustained spine injury due to falls and RTAs mostly had severe neuro-deficit (ASIA grade - A). Mild impairment (ASIA grade - D) was seen more frequently in RTAs as compared to falls. Varying degrees of impairment (ASIA grade B, C) were seen with various modes of trauma. Logically, in this study, it was seen that stable fractures of the spine frequently presented with no neurological impairment (ASIA grade - E) and unstable fractures with complete neurological damage (ASIA grade - A).

CONCLUSION

Patients presenting to a tertiary care hospital in Islamabad, Pakistan are mostly of younger age groups between 15 - 25 years and majority are of male gender. The most common level of spine injury sustained is of the lumbar spine and unstable type. Most of these patients had severe neurological deficit at presentation and were classified into ASIA Grade - A. The most frequent reason for the trauma was due to falls followed by road traffic accidents.

FUTURE PROSPECTS

A spine trauma registry with data collected from multiple tertiary care centers dealing with such cases will give a better picture of the trends of spine trauma in Pakistan.

RECOMMENDATION

It is evident that in a third world country such as Pakistan, stringent work related safety standards and implementation of traffic safety laws are needed to reduce the incidence of accidents and spinal trauma.

DISCLAIMER

The abstract has not been presented or published in a conference, or published in an abstract book.

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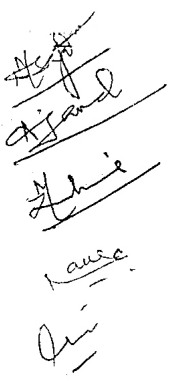
1	M. Sajid Mehmood	Concept design, article writing, data compilation and analysis.	
2	M. Asad Javed	Concept design, article proof reading, data collection compilation.	
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