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Original Article

Epidemiology of Spinal Injury in North East India: A Retrospective Study

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Abstract

Aim: To find out the epidemiology of spinal injury in North East India. **Material and Methods:** This study is a retrospective hospital-based analysis of spine injury patients admitted to Central Referral Hospital, Sikkim Manipal University from July 2013 to June 2017July 2013 to June 2017. **Results:** During the study period 57 patients with spinal injury were admitted and treated. Out of the 57 patients, 46 (81%) were male and 11 (19%) were female. The most common mode of injury was fall from height (59.64%) followed by RTA (35.08%). Most common affected age group in this study was 20-39 years followed by 50-59 years age group. Cervical spine injury was the most common (52.63%) followed by thoracic (19.29%) spine. Most common injury found was fracture dislocation of C5-C6 level. Most common associated injury is head trauma (10.52 %) followed by chest injury and 82.45% cases had no associated trauma. Average period of hospital stay was 22.83 days with maximum period of stay was 111 days. During treatment period one patient died due to respiratory complications. **Conclusion:** The epidemiology of spinal injuries in Sikkim & North Eastern India is different from rest of the India and other developing countries. In present study most common cause of spine injury was fall from height followed by motor vehicle accidents. RTA was the main cause in younger age group and fall from height was more common in elderly group.

Keywords: *Epidemiology, North East India, spinal injury*

Introduction

Traumatic spinal injury (TSI, injury to spinal column, spinal cord, or both) commonly leads to significant impairment in the quality of life.[1] More than 10% of trauma patients sustain spinal injury and they have a higher mortality rate compared to other traumas.[2,3] The incidence of spinal fractures is reported to vary between 16 and 64/100,000 depending on the study area and population concerned.[4,5] Internationally, most of the injuries are caused by road traffic accidents (RTAs), together with low and high falls. Road traffic and high fall accidents are typical etiology in young patients, whereas the role of low falls and associated osteoporosis increases trauma in older population. Spinal fractures are often associated with other injuries as 30% to 55% of patients are reported to have at least one associated injury.[6,7] Spinal cord injury (SCI) is one of the severe consequences coexisting in one-tenth to one-fifth of those with spinal injury.[8,9] Epidemiological factors of SCI in Indian scenario are different from Western countries, with the major cause being fall. The low socioeconomic status and younger age group have a major financial, social, and psychological impact as majority of the patients are the primary earning members of the family.[10]

In the Indian setup, as in most developing countries, very little is known about the exact incidence of SCIs. Since there is no curative treatment for SCI, prevention of SCI is paramount. Investigating the epidemiological pattern of SCI is the first step in planning for preventive strategies.[11]

Northeastern state of India, Sikkim, is a state in Himalayan region; hence, majority of population lives in hills. It is crisscrossed by narrow valley and steep cliff. It has a fragile ecology being one of the steepest and the highest states in India. The state also experiences heavy monsoons. These geographical factors play a crucial role in incidence, prevalence, mortality, and morbidity of TSI patients in this part of the country. Moreover, this part of the country has very less number of tertiary level health-care facilities.

Materials and Methods

This study is a retrospective, hospital-based analysis of spine injury patients. The study

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sample included patients with TSI admitted to the Central Referral Hospital, Sikkim Manipal University, from July 2013 to June 2017. Patient records collected from the Medical Record Department included all inpatient and outpatient visits and surgical procedures. Permission from Ethics Committee of Sikkim Manipal University was taken. Online literature search was undertaken in PubMed library with the keywords "SCI, epidemiology, mechanism of injury." Journals with significant epidemiological information were selected. The patients admitted in other departments or institutions or those who expired before reaching the department were excluded from this study. Data are presented as number (%) or ratio.

Results and Observation

In the present study, the most common cause of spine injury was fall from height [Tables 1 and 2] including hills, roof, trees, electricity pole, and stairs (59.64%) followed by motor vehicle accidents (35.08%), which is comparable to other case series of India.[10]

The most common affected age group in this study was 20–39 years followed by 50–59 years. In Figure 1, it can be seen that 56.14% (n = 32) patients come under the 20–39 years' age group, signifying higher incidence in young, active, and productive population of the society. Injury in 50–59 years' age group (26.32%, n = 15) was mostly due to fall.

Like other studies of India [Table 3 and Figure 2], male sex is more prone to SCI.[12-16] Higher incidence in males can be explained by examination of etiological factors, with men being more exposed to risk factors since they are more active on account of occupations. Furthermore, this is probably due to household stay of females.

Cervical injuries were the most common spinal injuries with 52.63% (n = 30). No sacral injuries were found. Most common injuries found were fracture dislocations of C5–C6 level. There was no case of SCIWORA in the study.

SCI was found in 91.22% (n = 52) of spinal injury patients. On the basis of American Spinal Injury Association (ASIA) grading, severe neurological injuries (ASIA B and higher) were found in 48.07% (n = 25) of patients.

In 82.45% (n = 47) cases, no associated injury was identified. The most common associated injury was head injury (10.52%) followed by chest injury.

Seasonal distribution of SCI showed a marked increase during summer, followed by rainy season signifying increased movement of people in this season.

Table 1: Mode of Spinal Injury (n=57)

Mode of injury	No of patients (%)
Fall: Fall from hills, stairs/roof/tree/electric poles	34 (59.64)
RTA: RTA/RTA eventually leads to fall into deep gorge	20 (35.08)
Fall of heavy object/landslide	2 (3.5)
Assault	1 (1.7)
Total	57

RTA – Road traffic accident

Table 2: Comparison of mode of injury in different series

Series	Fall from height (%)	RTA (%)
Chacko *et al*. (India, 1986)[12]	55.2	12.8
Lan *et al*. (Taiwan, 1993)[13]	23.3	61.6
Shingu *et al*. (Japan, 1994)[14]	29.2	44.6
Karacan *et al*. (Turkey, 2000)[16]	36.5	48.8
Present study	59.42	35.08

RTA – Road traffic accident

Table 3: Comparison of sex ratio in different series

Series	Year	Male:female ratio
Chacko *et al*. (India, 1986)[12]	1986	13.5:1
Lan *et al*. (Taiwan, 1993)[13]	1993	4:1
Shingu *et al*. (Japan, 1994)[14]	1994	4.3:1
Chen (India, 1999)[15]	1999	3.7:1
Karacan *et al*. (Turkey, 2000)[16]	2000	2.5:1
Present study		4.18:1

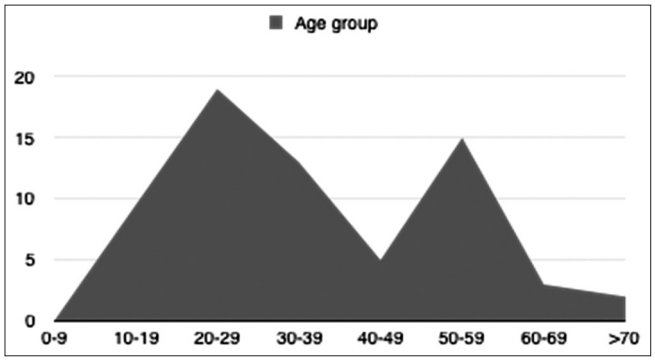

Figure 1: Age distribution of spinal cord injury

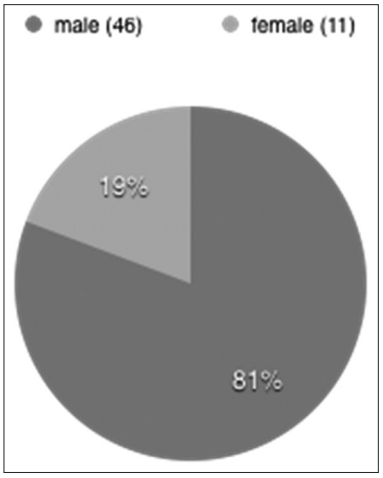

Figure 2: Sex-wise distribution of spinal cord injury (n = 57)

The average time of transportation of patients was 15.35 h. During transportation, >90% of patients were not accompanied by trained personnel, who were supposed to know how to handle patients with SCI. Less than 15% (n = 8) of patients were found to be transported with cervical immobilizer *in situ*.

The average period of hospital stay was 22.83 days, with the maximum period of stay being 111 days. During the treatment period, one patient died due to respiratory complications.

Conclusion

SCI has a major effect not only on individual but also on family and society by psychological and economical manner. Most of the studies in medical literatures are from developed nations, whose epidemiological data are different. Developing countries like India should have a proper national system of SCI reporting, which will be helpful in identifying risk factors, various epidemiological factors, their preventive measures, and rehabilitation. Public should also be educated and trained about SCI and importations of early and proper transportation of SCI patients. Incidence of RTAs can be decreased by implementing strict traffic rules; moreover, in the present study, alcohol was one of the most important causes of RTA and drink and drive has to be banned strictly.

Age group 50–59 years [Figure 1] is particularly vulnerable to fall from stairs, roof, bed, etc. Like other developing countries, India does not have national level policy for care of old-age people. Unlike other parts of the country, the northeast part of India does not have spinal rehabilitation centers, which also increases the morbidity of SCI patients. Although this study is restricted to one institution only, it may not be the true representation of epidemiology of this part of the country. However, it can be taken as a trend, as Sikkim is geographically similar to other northeastern states of India.

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Conflicts of interest

There are no conflicts of interest.

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