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EPIDEMIOLOGY OF TRAUMATIC SPINAL CORD INJURY: EXPERIENCE AT A TERTIARY CARE CENTER IN SOUTH INDIA

Neurosurgery

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ABSTRACT

Background: Traumatic spinal cord injury remains a major cause of morbidity and mortality worldwide. This study aimed to understand the epidemiology of this condition in southern India.

Methods: Data on Traumatic Spinal Cord Injury from March 2019 to March 2020 was collected from the hospital records and was analysed.

Results: Among 212 patients admitted with Traumatic Spinal Cord Injuries (SCI), the male to female ratio was 4.4:1. Young adults (20 - 39 years) were most affected (87 cases 41.03%) and cervical spine was found to be most commonly injured (107 cases (50.47%)). The average duration of hospital stay was 25.99 days.

Conclusion: Traumatic Spinal Cord Injury contributes to a significant proportion of the burden on the health care system. Further studies in this direction will provide us with insights on potential preventive measures and optimal management of the condition.

KEYWORDS

Spinal cord injury

INTRODUCTION:

Traumatic Spinal Cord Injury (SCI) is a serious life threatening condition with a very high rate of morbidity and mortality. Epidemiological studies on traumatic SCI have been conducted in various parts of the world but are grossly deficient in the developing countries like India, despite it being the second most populated country in the world. Worldwide the Incidence of SCI ranges from 9.2 to 56.1 per million population[1,2,3,4,5,6,7]. A retrospective observational study was conducted to analyse the incidence of traumatic SCI in a tertiary care hospital in Tamil Nadu, India.

MATERIALS AND METHODS:

A retrospective observational study was conducted at the Institute of Neurosurgery, Madras Medical College (MMC), Chennai, Tamil Nadu, India. Data was collected for a period of one year from March 2019 to March 2020 from the patient database registry maintained by the institute. The data collected included age, sex, diagnosis and nature of spine injury, presence of other injuries, duration of hospital stay and outcome.

RESULTS

In the study period there were total of 3941 admissions for various conditions in the Institute of Neurosurgery, MMC. Among them 212 (5.37% of total) patients were admitted with Traumatic Spinal Cord Injuries (SCI). Majority of the patients were male. The male to female ratio was 4.4:1 (173:39) as shown in Table 1.

Table 1: Gender distribution of patients with traumatic spinal cord injury

Gender	Number of cases(%)
Male	173(81.6)
Female	39(18.39)

Most of the patients who suffered from traumatic SCI were aged between 20-39 years, followed closely by patients in the age group 40-59 years. The age distribution of the patients involved in the study is as follows (Table 2): 12 (5.66%) patients were less than 20 years of age, 87 patients (41.03%) were 20 - 39 years of age, 83 (39.15%) patients were 40 - 59 years of age and 30 (14.15%) were >60 years of age.

Table 2: Age Distribution Of Patients With Traumatic Spinal Cord Injury

AGE	Numberofcases(%)
<20years	12(5.66)
20–39years	87(41.03)
40–59years	83(39.15)
>60years	30(14.15)

The distribution of patients based on the level of SCI is as follows: 107 (50.47%) patients had sustained cervical spinal cord injury, 44 (20.75%) patients had thoracic cord injury, 61 (28.77%) patients had lumbar region injuries. 47 (22.16%) of the 212 patients expired during the hospital admission. Traumatic Cervical SCI contributed to 78.72% (n=37) of the total mortality overall. The mortality rate based on the level of injury is as follows (Table 3). Out of 107 patients who had sustained cervical SCI, 37 patients succumbed to their injuries (34.58%), whereas 4 out of 44 patients with thoracic SCI expired (9.1%). Six out of 61 patients with lumbar region injuries also expired (9.8%).

Table 3: Distribution Of Traumatic Spinal Cord Injury Patients And Mortality - Based On Level Of Injury

LevelofInjury	Number of cases(%)	Mortality(number of cases(%))
Cervical	107(50.47)	37(34.58)
Thoracic	44(20.75)	4(9.1)
Lumbosacral	61(28.77)	6(9.8)

The data on the associated injuries and co-morbid conditions were not available for most of the cases and so the mortality could not be directly associated with the primary SCI alone and needs further analysis. 93 (56.35%) out of the 165 patients (excluding the mortality) required surgical management and the remaining patients were managed conservatively. The average duration of hospital stay was 25.99 days.

DISCUSSION:

The proper planning and resource allocation for the management and rehabilitation of SCI requires a thorough understanding of its epidemiology[8]. Most of the data on SCI is from the western countries and very few studies are available on developing countries like India. This study was conducted in a tertiary care hospital (Institute of Neurosurgery, MMC, Chennai, Tamil Nadu, India) with a high volume of traumatic SCI. 3941 patients were admitted from march 2019 to march 2020. Traumatic SCI contributed to 5.37% (n=212) of the total admissions. The male:female ratios in other studies ranged from 1.6:1 to 13.5:1 and in our study was 4.4:1[9,10,11]. This could be because in most Indian families males are the primary earning members and are more active. The data on the mode of injury was deficient in our study and could provide a better insight into the gender distribution of SCI. In most other studies, the predominant age group that suffered from SCI was 20-59 and in our study the age groups 20-39 years and 40-59 together contributed to 80.18% (n=170) of the total SCI[1,2,3,12] This age group forms the majority of the working population and could explain why SCI is

more among them. When the primary working population is affected with a condition with such high rates of morbidity and mortality, it poses a heavy burden on the families on the personal, psychological and socio-economic aspects of life. In the western countries and urban regions RTA was the main cause of SCI and cervical SCI was found to be the most common[11,13] In our study, the data regarding mode of injury was not fully available and could not be assessed. In a study by Martin et al., cervical SCI contributed to 51.2% of SCI which was in concordance with our study (50.47%) as well[9]. The presence of other injuries in other studies varied from 21.4 to 52.0%[7,9,14,15]. In our study, 34.43% of the patients had other associated injuries. Traumatic brain injury was the most frequently associated injury and contributed to 40% (n=28). The lower incidence of other associated injuries could be explained if the mode of injury was studied further. Other associated injuries identified in our study were haemothorax – 22.86% (n=16), pneumothorax – 5.71% (n=4), rib fractures – 11.43% (n=8) and other long bone/pelvic fracture -20% (n=14). Associated injuries, especially head injury, add to the morbidity and complications, and cause significant delay in recovery. Patients might require prolonged mechanical ventilation, prolonged urinary catheterisation, intercostal drainage etc. They also have increased risk of developing respiratory tract infections and pressure sores, all of which delay recovery. Associated head injuries or chest injuries add burden to the already compromised respiratory effort in patients with cervical SCI injury[10]. This poses a particularly difficult scenario and is a very important cause of mortality too. These patients require, apart from primary treatment of the SCI, multidisciplinary management for the other injuries and complications[10]. The overall mortality of SCI was 22.16% (n=47). Cervical SCI contributed to the majority of deaths. According to Lalwani et al. most of the deaths that occurred in SCI occurred after 1 week of the injury resulting from complications of the primary injury[16]. In our study, the average period to mortality was 11 days. The data in our study on associated comorbid conditions and severity of the primary/secondary injuries was lacking and as such the mortality could not be attributed only to SCI and would need further studies to refine it.

CONCLUSION:

This study gives an overall picture of the existing burden on the health system and the society due to SCI and points towards potential areas of improvement. Our study being a retrospective study using only the patient registry maintained by one institute has certain limitations and hence, would require further prospective studies with more resources to help us improve on our understanding of SCI.

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