

Profile of Traumatic Spinal Cord Injury Patients Admitted in Physical Medicine and Rehabilitation Department of a Tertiary Care Hospital: A North East India Experience

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Abstract

Study Design: Retrospective Descriptive Study.

Setting: Physical Medicine and Rehabilitation (PMR) Department, Regional Institute of Medical Sciences (RIMS), Imphal, a tertiary care teaching hospital in North East India

Study Duration: 1st November 2011 to 31st October 2012.

Objective: To study the profile of traumatic spinal cord injury (SCI) patients admitted in PMR Department, RIMS.

Materials and Methods: Neurological profile of traumatic SCI patients admitted in PMR Department, RIMS was recorded using a structured proforma and analysed. Demographic profile of the patients, time since injury, functional status and complications were also recorded.

Results: Among all 22 patients, 16(72.7%) were tetraplegics with C5 (59.09%) as the most common neurological level involved. Twelve (54.5%) were American Spinal Injury Association (ASIA) grade A. The mean motor and sensory scores were 45±24.97 and 157.50±69.53 respectively. The mean FIM score (at admission) was 71.50±23.40 and FIM (at discharge) was 82.35±20.72. Spasticity was present in 16 cases (72.7%) with gastrosoleus as most common site. There were 14 patients (63.6%) who had urinary tract infection (UTI). Only 5(22.7%) underwent urodynamic study and all had hyperactive detrusor. The most common mode of bladder management was clean intermittent catheterisation (CIC) which was done in 16 patients (72.7%). Pressure sore was seen in 14(63.6%) of patients with sacrum (78.57%) as the most common site.

Conclusion: Majority of traumatic SCI inpatients were of ASIA grade A and tetraplegics were commoner. Fall from height was the commonest cause of injury. Spasticity, UTI and pressure sores were common complications.

Key words: Traumatic Spinal cord injury, ASIA, Clean intermittent catheterisation, Functional independence measure, Pressure sore.

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Cite as:

Chanu A R, Zonunsanga C, Hmingthanmawii, Pertin M, Romi Singh N. Profile of traumatic spinal cord injury patients admitted in physical medicine and rehabilitation department of a tertiary care Hospital: A North East India Experience. *IJPMR* June 2013; Vol 24(2): 40-3.

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Received on 25/12/2012, Revised on 25/09/2013,

Accepted on 03/10/2013

Introduction:

Spinal cord injury (SCI) is a major debilitating disease which results in functional, economic, psychological and social disability. The developments in the management of SCI have led to decrease in morbidity and mortality rates, thereby increasing the prevalence of patients with varying degrees of functional limitations. Although patients with SCI have a great impact on healthcare system, there is a dearth of reliable statistics concerning spinal injury in India and more so in this part of the country. There is still a need for more insight into the characteristics of the populations affected with SCI. In this retrospective and descriptive study, we aimed to identify the neurological and demographic profile of patients with traumatic SCI admitted in PMR Department, Regional Institute of Medical Sciences (RIMS), Imphal.

Objective:

To study the profile of traumatic SCI patients admitted in PMR Department, RIMS.

Material and Methods:

Hospital files of traumatic SCI patients admitted for rehabilitation between 1st November 2011 and 31st October 2012 were reviewed retrospectively. Only the data of first admission to our hospital were included in the study. Demographics, aetiological factors, level of injury (ASIA impairment scale), and functional status (functional independence measure: FIM) at admission and discharge were recorded. Complications related with SCI were also noted. Statistical analysis was conducted using SPSS for Windows 17.0. Frequencies, percentages, median and mean values were calculated.

Results:

Demographic and neurological characteristics of patients are presented in Table 1. A total of 22 patients (mean age 40.41±15.18 years, 95.5% male) were included. There was a wide range among the patients in regards to the time of reporting since injury with median time being 34.5(range 9-132) days. Six patients (27.3%) had already undergone some form of surgery viz decompression ± internal fixation before being transferred or admitted to our ward.

Eleven (50%) of the cases were due to fall from height (FFH) and 8(36.4%) were due to road traffic accident (RTA) with the remaining 3(13.6%) resulting from direct hit on the spine as shown in Fig 1. Sixteen (72.7%) of the patients were tetraplegic with C5 (59.09%) as the

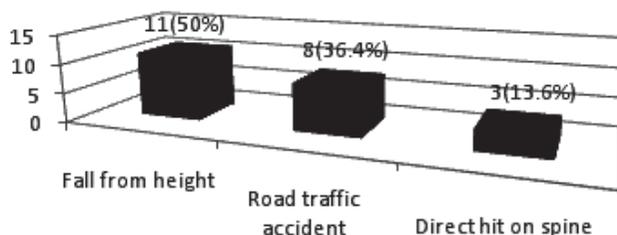


Fig 1- Bar Chart Showing Causes of Traumatic SCI

most commonest neurological level. The mean motor and sensory scores were 45±24.97 and 157.50±69.53 respectively. Twelve cases (54.5%) were of ASIA grade A (complete), 4 (18.2%) comprised ASIA grade C and 6 (27.3%) comprised of ASIA grade D. At the time of admission, cervical motor level (tetraplegic) was the most commonly found neurological level comprising 72.7% in our series as shown in Table 2. Different sensory levels were also shown at Table 2 with 45.5% of the patients having sacral sparing. The mean FIM score at admission and discharge were 71.50±23.40 and 82.35±20.72 respectively. Most of the patients had at least one form of complications during admission as being shown at Table 3. Spasticity was present in 16 cases (72.7%) with gastrosoleus as most common site. There were 14 patients (63.6%) each, who had UTI and pressure ulcer. Other complications observed during admission included orthostatic hypotension (8 patients), 1 case each with shoulder pain, bladder stone and fistula (penoscrotal). Of the 5 patients (22.7%) who underwent urodynamics study, all had hyperactive detrusor and symptoms of urinary leakage could be controlled with anticholinergic medications. Clean intermittent catheterisation (CIC) was the commonest mode of bladder emptying as performed in 16 patients. One patient had suprabubical catheterisation and 5 patients voided by Valsalva manoeuvre. CIC were performed by the care giver of the patients.

Table 1: Showing Demographic and Neurological Profile of Patients (n=22)

Profile	Value
Age (mean, years) ± SD	40.41±15.18
Sex (male:female)	21:1
Surgery before admission	6(27.3%)
Time since injury (days, median)	34.5 (range 9-132)
Complete: incomplete	12:10
Tetraplegic: paraplegic	16:6
Motor score (mean) ± SD	45±24.97
Sensory score (mean) ± SD	157.50±69.53
FIM at admission (mean) ± SD	71.50±23.40
FIM at discharge (mean) ± SD	82.35±20.72

Discussion:

SCI has a great social and economic burden on society. Often the spinal injured subject is in the prime of life and the family is called upon to bear the expenses of hospitalisation and ongoing care. Hence, it is very important that we understand the characteristics of the disability to ascertain modifiable factors. The trends seen in this study are discussed below.

As evident from the results of this study, the largest number of patients was in the age range of 20–39 years constituting 10 patients (45.5%) closely followed by

Table 2: Showing Motor and Sensory Levels

Motor level	No. of cases (%)	Sensory level	No. of cases (%)
Cervical	16 (72.7)	Upper thoracic up to T6	7 (31.8)
Upper thoracic up to T6	2 (9.1)	Lower thoracic (T7-T12)	4 (18.2)
Lower thoracic (T7-T12)	3 (13.6)	Lumbar	1 (4.5)
Lumbar	1 (4.5)	Sacral Sparing	10 (45.5)

Table 3: Showing Complications Observed at Admission

Complications	No. of cases (%)
Spasticity	16 (72.7%)
UTI	14 (63.6%)
Pressure ulcer	14 (63.6%)
Orthostatic hypotension	8 (36.4%)
Shoulder pain	1 (4.5%)
Bladder stone	1 (4.5%)
Fistula (penoscrotal)	1 (4.5%)

that of 40–59 years accounting for 8 patients (36.4%). This is comparable to the age range observed in the study carried out by Chacko *et al*¹ wherein most patients were in the third or fourth decades of life based on a rural south Indian hospital based study. Agarwal *et al*², in a hospital based study about demographic profile of SCI patients, also observed the age incidence of SCI in accordance. They also observed patients in 20-39 years age group comprising 41.5% while those in age group of 40-59 years constituting 35.3%.

Aetiology of SCI appears to have a major effect on the level and extent of neurological deficit as well as recovery³. Literature from developed countries reported that RTA accounts for the maximum number of spinal injuries⁴. Nogueira *et al*⁵ in their study found wound by fire weapon as the commonest cause of traumatic SCI, accounting for 44.7% of the cases and RTA accounting 23.4% while fall representing only 17% of SCI patients.

There has been different observations regarding the commonest cause of SCI in developed /western countries as compared to our country. In the present study, fall from a height was observed to be the leading cause of injury accounting for 50% of the cases with RTA coming as next commonest cause accounting 36.4% of cases. Agarwal *et al*² also observed fall from height as the commonest cause of injury (58.9%) with RTA making the second commonest cause of injury (21.3%). However, Chhabra and Arora⁶ observed RTA as the commonest cause of injury (45%) while fall from height accounted for 39.3%. This might be because of the

population of SCI patients were mainly from in and around Delhi metropolitan city. And fall from height accounting for the second commonest cause of injury might be possible as patients from neighbouring states (of the country) might have been attending for better SCI management.

Previous studies have reported that the percentage of men affected was found to be more than that of women^{3,7}. Comparable results were found in the present study.

Six patients (27.3%) in the present study underwent some form of surgery viz decompression ± internal fixation before admission in our ward. Reasons for undergoing surgery cited are ignorance, magnitude of the trauma including psychological as well as neurological impact following SCI, etc. Agarwal *et al*² also observed 25.6% of the patients underwent surgical intervention. However, the total number of patients in their series included non-traumatic SCI accounting for 12.6% and thus the % of patients of traumatic SCI who underwent surgical intervention should still be lower as compared to present study.

Kucukdeveci *et al*⁸ in their study found that majority of the patients were paraplegics(72%). Agarwal *et al*² also reported higher incidence of paraplegics (63.8%). Chhabra and Arora⁶ also reported 66.6% paraplegics among the SCI patients. This is quite contrast to the findings of our study where 16 cases (72.73%) were tetraplegics. The high incidence of tetraplegic may need attention of healthcare policy planners for more challenging rehabilitation strategy while framing rehabilitation intervention policy for SCI patients in the region.

Agarwal *et al*² reported ASIA impairment scale (AIS) grade A, 33.9%; grade B, 18.6%; grade C, 17.8%; grade D, 30.5% amongst their SCI patients. Vijayakumar and Singh⁹ reported 30% cases of AIS grade A, 25% cases of grade B, 10% cases of grade C and 35% cases of grade D. This is a bit in contrast to the findings of our study where there were (AIS) grade A, 54.55%; grade B, 0%; grade C, 18.18%; grade D, 27.27% cases. It

might be explained by the fact that the studies of Agarwal *et al*² and Vijayakumar and Singh⁹ included patients of non traumatic SCI in 13% and 40% patients respectively. However, Chhabra and Arora⁶ also observed 71% AIS grade A in their study. The high incidence of AIS grade A as observed by present study and Chhabra and Arora⁶ might probably be indicative of need of acute trauma care services including transport from site of accident, for better neurological outcome of SCI patients in the country.

Vijaykumar and Singh⁹ found 50% cases of traumatic SCI as modified dependence, 45% as no helper and 5% cases complete dependence as per FIM sub-grouping of the patients. However, the series, reported, consisted 60% traumatic SCI only out of the total 20 patients of SCI. In our study, the mean FIM score at time of admission was 71.50±23.40.

Kucukdeveci *et al*⁸ in their study reported the most common complications observed during the rehabilitation period as urinary tract infections (73%), pressure ulcers (32%), orthostatic hypotension (17%), deep venous thrombosis (10%), and heterotopic ossification (7%). This is similar to our findings of UTI and pressure ulcer in 14 cases (63.64%). But spasticity was the most commonest complication observed in our study encountered in 16 cases (72.73%). And we also observed orthostatic hypotension in 8 (36.4%) of the patients. This may be attributable to high number of tetraplegic and high level paraplegic patients, both comprising 18 patients (81.8%) in the present study. Nogueira *et al*⁵ also observed pressure sore complication in 42.5% patients. Vijaykumar and Singh⁹ reported the commonest complication as neurogenic bladder which was seen in 70% of cases followed by spasticity in 60% of cases and pain in 45% of cases.

The limitations of the study are : small sample size, retrospective study and short duration of study.

Conclusion:

Majority of the traumatic SCI patients comprised ASIA grade A and tetraplegics were commoner than

paraplegics. The commonest cause of injury observed was fall from height followed by those due to road traffic accident. The commonest complications encountered in these patients were spasticity, UTI and pressure ulcers.

Based on the above observations, a longitudinal future study with larger number of patients with traumatic spinal cord injury must be undertaken to investigate the long-term effects of the injury on functional status, community integration and quality of life measures. Other parameters, such as carers' stress and their quality of life might also be included.

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