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Original Research Paper

Orthopaedics

EPIDEMIOLOGY AND MANAGEMENT OF TRAUMATIC SPINE INJURIES AT TERTIARY CARE HOSPITAL OF INDIA

Ghanshyam Kakadiya	Assistant Professor, Department of Orthopaedics, T.N.M.C & Nair Hospital,
Akash Shakya*	Senior Resident, Department of Orthopaedics, ESI Hospital, Mumbai *Corresponding Author
Viraj Gandbhir	Senior Resident, Department of Orthopaedics, T.N.M.C & Nair Hospital, Mumbai
Yogesh Soni	Assistant Professor, Department of Orthopaedics, SSIMS, Bhilai
Kushal Gohil	Spine Fellow, Park Clinic, Kolkata

ABSTRACT

Purpose: To provide valuable resource for future in treating Spinal cord injury (SCI) in developing Countries. There is a paucity of literature on epidemiology on current clinical practices for SCI in India. **Methods:** The SCI patients those were admitted from June 2014 to June 2018, included in retrospective study. Demographics, cause of spinal injury, spinal level of injury, management techniques, complications, and American Spinal Injury Association (ASIA) grades noted and analyzed. **Results:** 340 (276 male and 64 female) patients of mean age 34.8±3.3years included in study. The most frequent age group were 31–45 years. Road traffic accident (RTA) (188, 55.3%) was the most common cause of SCI. 160 patients with ASIA grade A injury and 180 patients had various ASIA grade of incomplete injury. Total 272 patients were managed surgically; 140 of them improved with neurology, 92 remained the same, 36 worsened and while 4 patients died. Out of 68 conservatively managed patients 36 improved in neurology, 20 remained the same, 8 worsened and 4 died. Sacral decubitus ulcers were the most common complication. **Conclusions:** Despite limited sources, outcomes of SCI patients in India appear favorable with evidence of clinical improvement and low mortality.

KEYWORDS : Spinal injuries; Epidemiology; Surgical procedures; India

INTRODUCTION

Trauma is a major cause of spine cord injury (SCI) with significant financial burdens in India [1-3]. In country like India, government Hospital has limited resources to manage SCI patients as latest practice guidelines developed in developed countries. There is a paucity of information regarding the epidemiology or the surgical techniques currently being utilized to treat SCI patients in India. There is a need for clinical data that reflects the socioeconomic conditions of a developing country to suggest practice guidelines in specific needs with limited resources. To better understand these, we performed a retrospective study at BYL Nair Hospital [4], a tertiary care municipality hospital in Mumbai, India. This study aimed to characterize the epidemiology of SCI patients, elucidate any pattern of SCIs concerning causes of trauma, describe the surgical management and determine outcomes of the patients.

MATERIALS AND METHODS

After approval of institutional ethics committee, this retrospective study was conducted. 340 (276 male and 64 female) traumatic SCI patients who were treated from June 2014 to June 2018 at our tertiary care government hospital included in this study.

Inclusion criteria:

1. Having complete hospital records
2. Acute traumatic spinal cord injury

Exclusion Criteria:

1. Chronic SCI patients - Who were presented very late,
2. Previously treated/operated patients
3. Patients with multiple severe co-morbidity,
4 Chest or abdominal injury
5. SCI due to penetrating injuries with foreign bodies.

The demographic data were recorded. Levels of injuries were identified and categorized as cervical (C1–C7), cervicothoracic (injuries involving both C7 and T12), thoracic (T1–T12), thoracolumbar (injuries involving both T12 and L1), lumbar (L1–L5), lumbosacral (injuries involving both L5 and S1), and sacral (S1–S2). The cause, period, mechanism, neurological level and severity of the injury, associated injuries, radiological/MRI findings, complications, treatment and outcome data were acquired and analyzed. Conservative management given in form of Skull traction for reduction and initial immobilization for cervical spine fracture, braces for thoracic and lumbar traumatic SCI. Surgical procedures performed included laminectomy for canal decompression, anterior cervical discectomy and fusion (ACDF), Corpectomy, Lateral mass fixation, Pedicle screw fixation, Sublaminar wires. The American Spinal Injury Association (ASIA) impairment scale was used in assessment both on admission and at discharge. Any improvement or deterioration in spinal injury grade during treatment and follow-up was documented. All data analyzed using SPSS version 15 (SPSS Inc., Chicago, IL, USA).

RESULTS

340 patients included in the study. There were 276 male and 64 female individuals (4.3:1). Road traffic accident (RTA) (in 188 cases (55.3%) and fall from heights (in 80 (23.5%)) were the most common causes of trauma. [Table 1 & 2]

Table 1 Age distribution

Age Group	Number	%
1-15	28	8.3
16-30	112	32.9
31-45	128	37.7
45-60	48	14.1
61-75	24	7.1
Total	**340**	**100**
Mean age 34.8±3.3years		

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Cervical spine injury occurred in 150 (44.11%) patients, thoracic spine injury in 86 (25.29%), and lumbar spine injury in 104 (30.58%). At admission, 160 patients (47.1%) had ASIA grade A injury, 40 (11.76%) ASIA B, 76 (17.64%) ASIA C, 60 (17.64%) ASIA D, and 4 (1.17%) patient ASIA E. [Table 3]

Table 3 Injury severity at admission versus site of injury

ASIA Grade	Cervical	Thoracic	Lumbar	Number	%
A	70	52	38	160	47.05
B	20	8	12	40	11.76
C	34	17	25	76	22.35
D	22	9	29	60	17.64
E	4	0	0	4	1.17
Total	**150**	**86**	**104**	**340**	**100%**

Out of 340 patients 68 (20%) were managed conservatively while 272 (80%) patients were managed surgically with regard to their spine level. Surgical treatment of the spinal lesion included laminectomy, cord decompression and spinal fusion. There were 116 cases of cervical spine, 64 cases of thoracic injury and 92 cases of lumbar spine injury. [Table 4]

Table 4. Surgical Procedures

Cervical Spine n=116	ACDF	80
	Posterior spinal fusion with interspinous wiring	16
	Posterior Lateral Mass Fixation with Fusion	20
Dorsal Spine (n=64)	Posterior spinal fusion with pedicle screw fixation	64
Lumbar Spine (n=92)	Posterior spinal fusion with pedicles screw fixation	92

In Surgically managed group (n=272): 152 had ASIA grade A, 32 cases with ASIA B, 48 cases with ASIA C and 40 cases with ASIA D. For this category of 152 patients with ASIA A, 116 improved after surgery, 12 cases remained the same,24 cases worsen. Of the 32 patients with ASIA B grade, 16 had improved, eight patients remained the same, while 8 worsen; 48 patients with ASIA C grade, no one improved, 40 remained the same, while 4 worsen and 4 died. 40 patients with ASIA D grade, 8 improved and 32 remained the same. In Conservative Group (n=68): Eight patients had ASIA grade A injury (complete injury) and 60 had the incomplete injury. Of the eight patients in ASIA grade A, four patients died and the others remained in the same grade. Out of the 60 patients who had the incomplete injury, 36 improved their grades, 16 remained in their grades, but 8 worsened and moved a grade backwards. [Table 5]

Table 5 Relationship between ASIA grade, treatment modality and outcome

ASIA SCALE	Improved	Same Condition	Worse	Death
Conservative				
ASIA A (n=8)	0	4	0	4
ASIA B (n=8)	4	0	4	0
ASIA C (n=28)	20	4	4	0
ASIA D (n=20)	12	8	0	0
ASIA E (n=4)	0	4	0	0
Total= 68	**36**	**20**	**8**	**4**
Operative				
ASIA A (n=152)	116	12	24	0
ASIA B (n=32)	16	8	8	0
ASIA C (n=48)	0	40	4	4
ASIA D (n=40)	8	32	0	0
ASIA E (n=0)	0	0	0	0
Total= 272	**140**	**92**	**36**	**4**

Table 6. Complications

Complications	Number	%
Sacral Decubitus Ulcer	56	49.55
Superficial wound infection	8	7.07
Urinary tract infection	20	17.69
Respiratory Tract infection	15	13.27
Deep Vein Thrombosis	12	10.61
Aspiration	2	1.76
Total	**113**	**100**

Complications were recorded in 113 cases during treatment and these included pressure ulcer in 56 (16.5%), urinary tract infection in 40 (11.8%), respiratory tract infection in 24 (7.1%), deep vein thrombosis in 20 (5.9%), aspiration in 16 (4.7%) and wound infection in 8 (2.4%) patients. Among the 8 patients who died, 6 had a cervical injury and 2 had a thoracic injury. [Table 6]

DISCUSSION

Spine patients and their family have to face mentally, physically and financially challenges for complete treatment of SCI [5,6]. Therefore, factors that contribute to the cause of the injury need to identified and modified to help in adopting the proper prevention strategies and treatment strategies to avoid the spinal cord injury and disability. In this study we try to understand and manage SCI in the right direction. The management of SCI is controversial. The literature shows the complete or incomplete SCI status did not determine management of patients, whether a patient was treated surgically or conservatively. Although most of the spine surgeons advocate early fusion of patients with complete SCI to enable maximal participation in physical rehabilitation. The previous studies related to spine trauma showed young age group has high SCI. In this study 31–45 age group had maximum (37.7%) SCI. The male to female ratio was 4.3:1. Road traffic accident (55.3%) was the most common cause of SCI, followed by fall from height (23.5%). Indian people have poor traffic rules knowledge and bad quality of road in the region are the major cause high rate of RTA in the world. Proper public education required to control RTA, this has been achieved in other countries of the world [7,8]. Lalwani S, Singh V, Trikha V, et al [9] and Shamim et al [10] concluded that cervical spine was a common site for spinal injury. In our study we also find same results. Conventional spinal implants and hardware are very costly, we used Indian local implants and iliac crest as a bone graft to decrease cost of the surgery due to low income status of our patients. In our study, 68 patients managed conservatively and 272 managed surgically. In Surgically managed group (n=272): 152 had ASIA Grade A, 32 cases with ASIA B, 48 patients with ASIA C and 40 patients with ASIA Grade D. For this surgically managed patients, 152 patients with ASIA grade A, 116 improved after surgery, 12 cases remained the same and 24 cases worsen. Of the 32 patients with ASIA B grade, 16 had improved, eight patients remained the same, while 8 worsen; 48 patients with ASIA C grade, no one improved, 40 remained the same, while 4 worsen and 4 died. 40 patients with ASIA D grade, 8 improved and 32 remained the same. In Conservative Group (n=68): Eight patients had ASIA grade A injury (complete injury) and 60 had an incomplete injury. Of the eight patients in ASIA grade A, four patients died and the others remained in the same grade. Out of the 60 patients who had an incomplete injury, 36 improved their grades, 16 remained in their grades, but 8 worsened and moved a grade backwards. In our study we found good results in Surgically managed patients with complete SCI than conservative management. In incomplete neurology better results found in conservatively managed patients. Shamim MS et al [10] in series of 54 patients with complete SCI, in which 50% received surgical treatment, they found the operated group spent a longer period in rehabilitation (P-value 1 4 0.002). They also had a longer hospital stay (P-value 1 4 0.006), were associated with more

complications, especially those related to infections (p-value = 0.002) and also had a significantly higher cost of treatment (P-value o0.001) when compared with the group treated conservatively. Pandey Vk et al [11] concluded in his study with 23-month average follow-up revealed that 17% of patients who underwent surgery for spine fractures died, all after discharge [11]. In our study complications were recorded in 113 cases during treatment and these included pressure ulcer in 56 (16.5%), urinary tract infection in 40 (11.8%), respiratory tract infection in 24 (7.1%), deep vein thrombosis in 20 (5.9%), aspiration in 16 (4.7%) and wound infection in 8 (2.4%) patients. Improvements were seen in patients admitted with all grades of SCI even though the average delay to surgery was 5 days. The timing of decompressive surgery following SCI has been controversial with some reviews recommending consideration of early intervention 8 to 24 hours following acute spinal cord injury [12-15].

CONCLUSION

Despite limited sources, outcomes of SCI patients in India appear favourable with evidence of clinical improvement and low mortality. In-country like India Road traffic accident in young population is the most common cause of SCI. Adequate traffic education and public awareness, in implementing traffic rules and road safety measures may reduce RTAs. Establishment of physical rehabilitation programmes is needed to maximize functional outcomes and minimize secondary complications, and efforts should be made to improve the follow-up of SCI patients.

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