

Neurotrauma Audit at Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh

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Abstract

Introduction For the prevention and better management of traumatic brain and spine injury patients, it is mandatory to understand the demographic and clinical profiles of cases of a particular region. This study was aimed at describing the epidemiology, pattern, and outcomes of head and spine injury patients at a tertiary care center in central India.

Materials and Methods All the patients with head and spine injury admitted to the Department of Neurosurgery between September 1, 2018, and August 31, 2019 were included in the study. Data of all these patients were collected from the medical record section and analyzed for age, sex, mode of injury, severity of injury, management, and outcomes.

Results During the study period, 932 patients with head injury and 241 patients with spine injury were admitted to our department. Around 65% of the patients in both head and spine injury categories fell in the age group of 26 to 55 years. Approximately 80% of all neurotrauma patients were male. The most common mode of injury was road traffic accident followed by fall from height. Mortality for severe head injury was 39% and that for ASIA A (American Spinal Injury Association grade A) cervical spine injury was 65%.

Conclusion Even after aggressive treatment strategies, morbidity and mortality are very high, and the ultimate outcome depends mainly on the clinical status immediately after trauma. The data from this study can be helpful in strategy-making for the prevention and management of head and spine injury patients, especially in the central Indian population.

Keywords

- ▶ neurotrauma audit
- ▶ head injury
- ▶ morbidity
- ▶ mortality
- ▶ neurotrauma
- ▶ spine injury

Introduction

Traumatic brain injury and spine trauma are usually devastating injuries with significantly high morbidity and mortality.¹ They constitute a significant proportion of global trauma burden and their incidence is expected to increase with time due to the increasing population and use of motor vehicles.² Middle-aged males are involved most commonly, adding to the magnitude of socioeconomic burden.^{3,4} As road traffic accident (RTA) is the most common cause, developing countries are more affected due to poor infrastructure

and noncompliance with traffic rules. The outcomes are also worse in developing and poor countries due to limited resources and financial constraints. For the prevention and better management of these patients, it is mandatory to understand the demographic and clinical profile of cases of a particular region. A few studies have been published from India describing the neurotrauma epidemiology and outcomes; however, there are no studies from central India.

This study was aimed to describe the epidemiology, pattern, and outcomes of head injury and spine injury

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patients at a tertiary care center in central India, which may prove helpful in improving the ultimate outcome of these patients through better research and strategy-making for prevention as well as treatment.

Materials and Methods

All the patients of head injury and spine injury admitted to the Department of Neurosurgery between September 1, 2018, and August 31, 2019, were included in the study. Data of all these patients were collected from the medical record section and analyzed for age, sex, mode of injury, severity of injury, management, and outcomes.

Results

During the study period, 932 patients with head injury and 241 patients with spine injury were admitted to our department. Around 65% of the patients in both head and spine injury categories fell in the age group of 26 to 55 years (►Table 1). Approximately 80% of all neurotrauma patients were male (►Table 2). The most common mode of injury was RTA followed by fall from height (►Table 3).

Among the head injury patients, around 47% were managed surgically (►Fig. 1). Mean hospital stay for minor, moderate, and severe head injury cases was 7.4, 14.9, and 22.7 days, respectively (►Fig. 2). Mean mortality for minor, moderate, and severe head injury cases was 2.3, 13.3, and 39%, respectively (►Fig. 3). In the spine injury group, 37% were managed surgically (►Table 4). Mean hospital stay varied with the ASIA (American Spinal Injury Association) grade (►Table 5). Mortality for ASIA grades A and B for cervical spine injury was 66.6 and 53.8%, respectively (►Table 6).

Discussion

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Neurosurgery in Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India, was started in 1992

Table 1 Age distribution in head and spine injury cases

Age (years)	Head injury (n = 932)	Spine injury (n = 241)
< 10	41 (4.4%)	05 (2%)
10–25	98 (10.5%)	27 (11.2%)
26–40	306 (32.8%)	72 (29.9%)
41–55	316 (33.9%)	74 (30.7%)
56–70	152 (16.3%)	55 (22.8%)
> 70	19 (2%)	08 (3.3%)

Table 2 Sex distribution in head and spine injury cases

Sex	Head injury (n = 932)	Spine injury (n = 241)
Male	727 (78%)	192 (79.6%)
Female	205 (22%)	49 (20.3%)

Table 3 Mode of injury and alcohol influence in neurotrauma

Mode of Injury	Head injury (n = 932)	Spine injury (n = 241)
Road traffic accident	Total = 690 (74%)	Total = 166 (68.8%)
Motorcycle rider	370 (39.7%)	76 (31.5%)
Four-wheeler driver	134 (14.4%)	42 (17.4%)
Four-wheeler passenger	54 (5.7%)	20 (8.2%)
Pedestrians	109 (11.7%)	15 (6.2%)
Train	23 (2.5%)	13 (5.3%)
Fall from height	149 (15.9%)	47 (19.5%)
Assault	Total = 70 (7.5%)	Total = 13 (5.3%)
Blunt	38 (4%)	08 (3.3%)
Sharp	25 (2.6%)	04 (1.6%)
Gunshot	07 (0.7%)	01 (0.4%)
Heavy object fall	15 (1.6%)	12 (4.9%)
Miscellaneous (animal attack, blast injury, electrocution, etc.)	06 (0.6%)	02 (0.8%)
Unknown	04 (0.4%)	01 (0.4%)
Alcohol influence	248 (26.6%)	44 (18.2%)

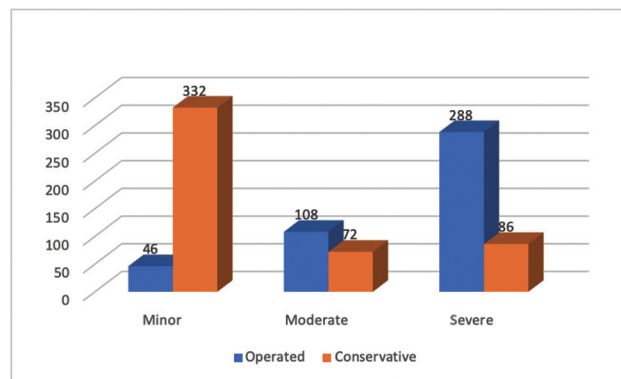


Fig. 1 Surgical versus conservative management for head injury patients.

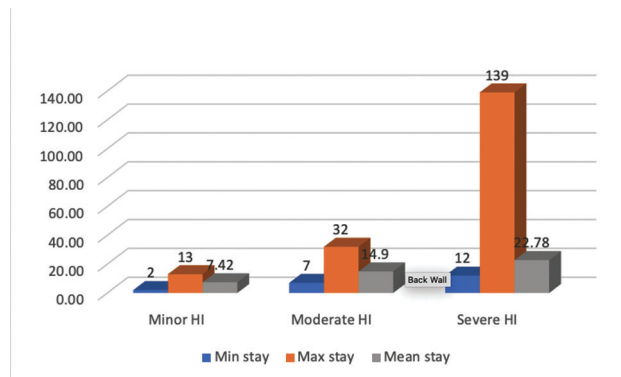


Fig. 2 Hospital stay for head injury patients. HI, head injury.

under the Department of General Surgery, when Dr. Y. R. Yadav joined as an assistant professor and later on established a separate Department of Neurosurgery in 2012. Since

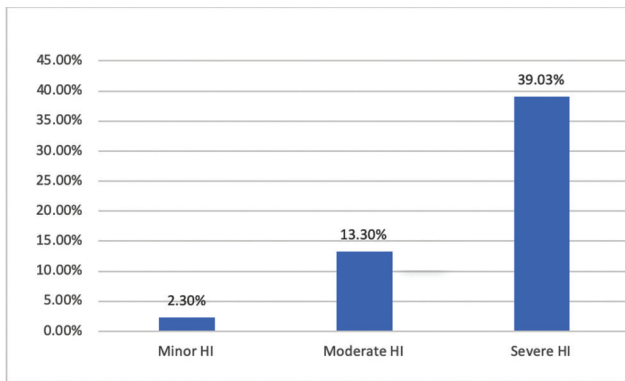


Fig. 3 Mortality in minor, moderate, and severe head injury patients. HI, head injury.

Table 4 Surgical versus conservative management of spine injury patients

	Operated	Conservative	Total
Cervical spine injury	52	81	133
Dorsolumbar spine injury	38	70	108

Table 5 Hospital stay for spine injury

Level	ASIA grade	Minimum stay	Maximum stay	Mean stay
Cervical spine	A	5	56	28.9
	B	9	52	27.2
	C	8	42	21.6
	D	6	28	15.6
	E	2	5	2.9
DL spine	A	8	22	15.6
	B	9	20	14.9
	C	8	19	15.2
	D	9	19	14.7
	E	2	8	2.8

Abbreviations: ASIA, American Spinal Injury Association; DL, dorsolumbar.

Table 6 Mortality in spine injury

Level	ASIA grade	Total	Mortality	Percentage
Cervical spine	A	42	28	66.6
	B	39	21	53.8
	C	22	2	9
	D	10	0	0
	E	20	0	0
DL spine	A	53	09	16.9
	B	33	02	6
	C	04	01	25
	D	07	00	0
	E	11	00	0

Abbreviations: ASIA, American Spinal Injury Association; DL, dorsolumbar.

then, this department is providing services to patients of Mahakaushal region. At present, the department has eight faculty members (two professors, two associate professors, and four assistant professors), two neuroendoscopy fellows, and MCh residents, and is well known nationally and internationally in the field of neurotrauma, microneurosurgery, and neuroendoscopy.

The department has more than 200 research publications in national and international journals. The department has developed innovations in the field of neurosurgery. Tubular retractor, made of silicone, is used in brain tumor surgeries and intracranial hematoma surgeries. Custom-made inexpensive indigenous models for neuroendoscopy training have also been developed by the department. Various novel neurosurgical techniques, especially in the field of neuroendoscopy, have been developed by the department, which were also published in reputed journals.

The department is running a neuroendoscopy certificate course of 11-month duration, which is affiliated to the Madhya Pradesh Medical Science University. This is the first fellowship course of neuroendoscopy in India. Superspecialty course (MCh) in neurosurgery has also been started from the academic session 2019 to 2020. Apart from this, the department conducts Neuroendoscopy Fellowship program and Oration twice a year beginning from 2010 and has trained around 600 neurosurgeons from all over India and 50 neurosurgeons from abroad in neuroendoscopy. Fellowship program comprises 3 days of live surgery including almost a complete spectrum of cranial and spinal endoscopy surgeries followed by 2 days of hands-on cadaveric workshop under supervision.

Neurotrauma Audit

In this study that was performed at a tertiary care center of central India, head and spine injury patients were retrospectively analyzed for the demographic profile, mode, and pattern of injury, severity of injury, duration of hospital stay, and outcomes.

Majority of the head and spine injury patients (around two-thirds) in our study were middle-aged earning members of the family, which is similar to other studies.^{1,3} Less than 5% of patients were under 10 years of age. Males were four times more commonly involved in injuries compared with females.^{1,5} The most common mode of injury was RTA, and around 50% of the patients were motorcycle riders. Fall from height was the second most common mode of injury. Mode of injury was found to be similar to those reported in other studies found in the literature.^{1,3,6} Few cases of trauma due to animal attack were also encountered in regions with dense forest areas in the vicinity. Around 25 and 18% of head and spine injury patients, respectively, were under alcohol influence at the time of injury, suggesting a need for strict implications of traffic rules as well as awareness in general population.

Approximately half and one-third of head and spine injury patients, respectively, were managed surgically. Spine injury

patients with ASIA grade A were managed conservatively most of the times in view of the poor expected outcome and limited facilities and resources at our center. Mean hospital stay was 7.4, 14.9, and 22.7 days for minor, moderate, and severe head injury patients, respectively. Mean stay for ASIA grade A cervical spine injury patients was around 30 days, whereas that for ASIA grade A dorsolumbar spine injury patients was 15 days on average. The higher mean stay for cervical spine injury patients was because of respiratory involvement, need of ventilatory support, and related complications. In consistency with the literature, mortality for severe head injury patients was around 40%. Similarly, mortality for ASIA grades A and B cervical spine injury patients was above 50%.

Conclusion

In this study, middle-aged males are found to be the most common sufferers of brain and spine injury, with RTA being the most common mode of injury. Around one-fourth of the patients were under alcohol influence. Even after aggressive treatment strategies, morbidity and mortality are very high, and the ultimate outcome depends mainly on the clinical status immediately after trauma. The data from this study can be helpful in strategy-making for the prevention and management of head and spine injury patients, especially in the central Indian population.

Conflict of Interest

None declared.

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