

Neurotrauma at the All India Institute of Medical Sciences Bhubaneswar: An Overview

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Abstract

Background The All India Institute of Medical Sciences (AIIMS) Bhubaneswar was established as an Institution of National Importance through the All India Institute of Medical Sciences (Amendment) Ordinance passed on July 16, 2012. It is estimated that road traffic accidents lead to economic loss to the tune of approximately 3% of gross domestic product. Centers of excellence for neurotrauma are the need of the hour, and the Indian Government is focusing on preventive and curative aspects of road traffic accidents to a great extent in the recent years. In this article, we would like to highlight the resources (manpower, infrastructure, etc.) available for neurotrauma, challenges ahead, and vision for the future.

Trauma Audit A retrospective analysis of all the admitted patients of traumatic brain injury (TBI) was performed from November 2018 to October 2019. A total of 149 patients were admitted during this period. Of the 149 admitted patients, 88 had mild TBI, 39 had moderate TBI, and 22 had severe TBI. The mortality was highest in patients with severe TBI, with 45.45% mortality. A total of 29 patients with traumatic spine injury were admitted during this period. Of the 29 patients, 10 had cervical spine injury, 10 had dorsal spine injury, and 9 had lumbar spine injury. Of all these patients, two patients with cervical spine injury died of refractory shock.

Perceived Limitations and Challenges Lack of dedicated round-the-clock emergency operating rooms (ORs) for neurosurgical procedures, adequate number of intensive care unit (ICU) beds, various gadgets in the ICU for neurocritical care, lack of rehabilitation facilities/center, lack of various OR gadgets, and lack of manpower, especially trained nursing staff, are the limitations perceived by us.

Vision for the Future A trauma block has been approved, and work on it has begun. This shall greatly help in upgrading facilities for neurotrauma at AIIMS, Bhubaneswar.

Conclusion Facilities for neurotrauma at AIIMS Bhubaneswar are gradually being upgraded. With a core team, the services are improving gradually. However, the institution is in its early years, and a lot more needs to be done in terms of manpower, gadgets, and infrastructure to further improve neurotrauma care at AIIMS, Bhubaneswar. This article may help in formulating guidelines for strengthening neurotrauma facilities in AIIMS, Bhubaneswar and all the new AIIMS established in India.

Keywords

- trauma audit
- limitations
- neurotrauma
- AIIMS Bhubaneswar
- vision

Introduction

The All India Institute of Medical Sciences (AIIMS) Bhubaneswar is one of the apex health care institutes established by the Ministry of Health and Family Welfare,

Government of India, under the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) that was launched for the upgradation of medical facilities in underserved areas of the country besides providing quality medical education

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in superspecialty disciplines in these areas. Under this scheme, six new AIIMS hospitals have been established in Patna, Raipur, Bhopal, Bhubaneswar, Jaipur, and Rishikesh, respectively, apart from the one at New Delhi. The opening up of these six AIIMS hospitals was announced by the then prime minister Atal Bihari Vajpayee in his Independence Day Speech on August 15, 2003.

All India Institute of Medical Sciences Bhubaneswar was established as an autonomous institution and an Institute of National importance through the All India Institute of Medical Sciences (Amendment) Ordinance passed on July 16, 2012.

It is estimated that road traffic accidents lead to economic loss to the tune of approximately 3% of gross domestic product.¹ Centers of excellence for neurotrauma are the need of the hour, and the Indian Government is focusing on preventive and curative aspects of road traffic accidents to a great extent in the recent years.

Neurosurgical facilities began in the institute in 2014. The Department of Neurosurgery handles various cases of trauma including traumatic brain injury (TBI), traumatic spine injury, and peripheral nerve injury. In this article, we will highlight the resources (manpower, infrastructure, etc.) available for neurotrauma, challenges ahead, and vision for the future. ►Fig. 1A–D show some of the major milestones since the inception of neurosurgery facilities at AIIMS, Bhubaneswar.

Manpower

Faculty at AIIMS, Bhubaneswar

There are at present six faculty members at AIIMS Bhubaneswar. The on-call duty is divided among all these faculty members.

Residency Program

Neurosurgical residency program began in the year 2017. Till date, five batches of residents have joined the institute, with a total strength of nine residents. The admissions are held every 6 months based on all India entrance examination conducted by AIIMS, New Delhi.

Ward Beds

The ward of the Department of Neurosurgery has 30 beds. Patients of neurotrauma are admitted to either the neurosurgery ward, neurosurgery intensive care unit (ICU), or emergency ward. The emergency ward has 30 beds, where patients with trauma are admitted as per available vacancy.

Intensive Care Unit Beds

At present, seven ICU beds with five ventilators are available for neurosurgical patients. This is for both elective and emergency procedures.



Fig. 1 (A) Inauguration of the neurosurgery ward at the All India Institute of Medical Sciences (AIIMS) Bhubaneswar. (B) The neurosurgery ward receiving the “ideal ward” award for 2018. (C) Inauguration of modular operating rooms at AIIMS Bhubaneswar. (D) Professor William T. Couldwell, Chair Department of Neurosurgery, University of Utah, Salt Lake City, Utah, United States, delivering invited talk for faculty and residents.

Nursing Staff

There are 13 nursing staff officers for 30 beds in three shifts in the neurosurgery ward. In the emergency ward, there are 13 nursing officers for three shifts. The ICU has 13 nurses in three shifts in the ratio of two nurses for seven beds.

Operating Room

Neurosurgery has one operating room (OR) per day from Monday to Friday. Elective cases are performed there. For emergency cases, two ORs have been allotted at present. Any emergency case from any department is performed in these ORs.

Operating Room Equipment

The following items are available in the emergency OR:

- Neurodrill: one.
- Basic craniotomy set: one.
- Basic laminectomy set: one.
- C-arm: shared between the emergency OR and urology OR.

The following items are awaited for the emergency OR in the short term:

- Neuro drill (electric): one.
- C-arm: one.
- Craniotomy set: one.
- Laminectomy set: one.

The neurosurgery OR (elective) is equipped with the following equipment:

- Pentero 900 microscope (Zeiss): two.
- Craniotomy set: two.
- Laminectomy set: two.
- LOTTA (Karl Storz) endoscope: one set.
- Neuromonitoring set: one set.
- C-arm: shared between orthopaedics and neurosurgery.
- Destandau endoscopic spine set: one.

- CUSA system (SonaStar, Misonix): two.
- Endoscopic set for pituitary surgery: one.

Trauma Audit

Traumatic Brain Injury Audit

A retrospective analysis of all the admitted patients with TBI was performed from November 2018 to October 2019. A total of 149 patients were admitted in this period. Of the 149 patients admitted in this period, 88 had mild TBI, 39 had moderate TBI, and 22 had severe TBI (► **Table 1**, ► **Fig. 2**). The mortality was highest in patients with severe TBI, with 45.45% mortality. Agarwal et al reported a mortality of 2% in minor TBI, 12% in moderate TBI, and 36% in severe head injured patients² from a level 1 trauma center in India. The mortality at AIIMS, Bhubaneswar is higher when compared with the AIIMS Jai Prakash Narayan Apex Trauma Center at AIIMS, New Delhi.²

Table 1 Monthly distribution of TBI patients admitted at AIIMS Bhubaneswar

Month	Mild	Moderate	Severe
November 2018	7	4	4 (2)
December 2018	16	6 (1)	3
January 2019	12	4	3 (1)
February 2019	5	2	1 (1)
March 2019	7	0	2
April 2019	2	2	4 (3)
May 2019	7	1	2 (2)
June 2019	11	6	1
July 2019	5	2	0
August 2019	8	4	0
September 2019	2	7 (1)	2 (1)
October 2019	6	1	0

Abbreviation: TBI, traumatic brain injury.
 Note: The values in bold represent the number of patients in various categories who died.

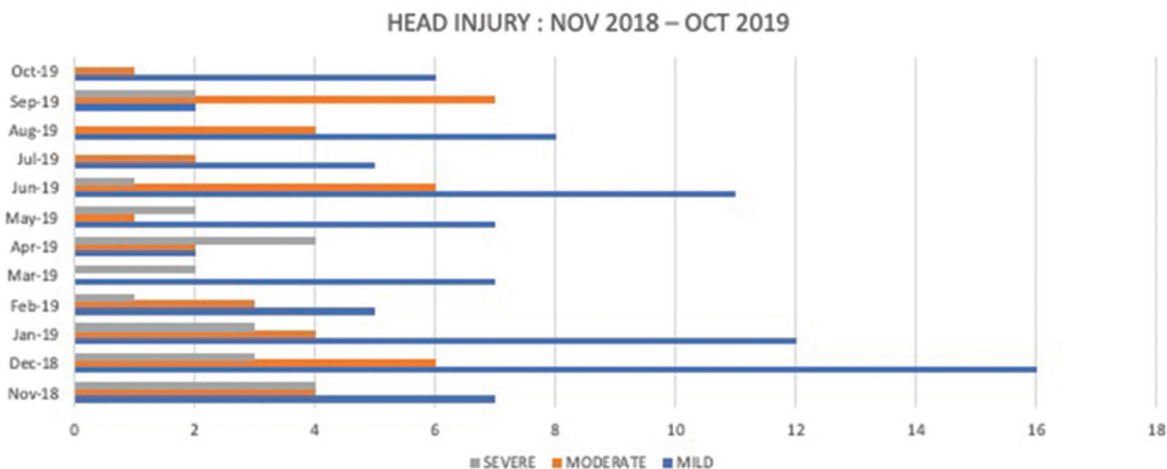


Fig. 2 Bar diagram showing the monthly distribution of traumatic brain injury from October 2018 to November 2019 (based on the severity of head injury).

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Table 2 Distribution of traumatic spine injury as per location (cervical, dorsal, and lumbar): from November 2018 to October 2019

Spine injury	Cervical	Dorsal	Lumbar
November 2018	–	1	1
December 2018	2 (1)	–	–
January 2019	2	–	1
February 2019	2 (1)	3	1
March 2019	–	2	1
April 2019	–	–	–
May 2019	–	2	–
June 2019	3	–	2
July 2019	1	–	1
August 2019	–	–	–
September 2019	–	1	–
October 2019	–	1	2

The mortality was 0% in patients with mild TBI, 5% in patients with moderate TBI, and 45.45% in patients with severe TBI. On analyzing all the cases, with mortality taken together ($n = 12$), there were 83% of patients ($n = 10$) with severe TBI and 17% with moderate TBI.

Traumatic Spine Injury

A total of 29 patients with traumatic spine injury were admitted from November 2018 to October 2019 (► **Table 2**). Of the 29 patients, 10 had cervical spine injury, 10 had dorsal spine injury, and 9 had lumbar spine injury. Of all these patients, two patients with cervical spine injury died of refractory shock. The distribution of traumatic spine injury has been summarized in ► **Table 2**.

Traumatic Peripheral Nerve Injuries

Four patients with brachial plexus injury were admitted and operated upon during the aforementioned period. Three patients had upper and middle trunk injury, and one had pan-brachial plexus injury.

Limitations and Challenges

The following are the limitations perceived by us in tackling neurotrauma at AIIMS Bhubaneswar:

- Lack of dedicated round-the-clock emergency ORs for neurosurgical procedures.
- Lack of an adequate number of ICU beds.

- Lack of various gadgets in the ICU, such as intracranial pressure monitor, portable CT (computed tomography) scanner, and brain tissue oxygen monitoring system for ICU management of TBI patients.³
- Lack of rehabilitation facilities/centers.
- Lack of OR gadgets.
- Limitation of manpower especially trained nursing staff.

Vision for the Future

A separate trauma block is already approved, and work is under way at AIIMS Bhubaneswar. This shall provide round-the-clock ORs and ICUs for neurosurgical procedures, as well as infrastructure for neurotrauma patients. However, this is likely to take time. A rehabilitation center with trained manpower and infrastructure shall go a long way in rehabilitating patients with TBIs and traumatic spine injuries. A dedicated ICU with all gadgets and manpower for managing patients with TBIs and traumatic spine injuries (especially cervical spine injury) shall help in reducing mortality.

Conclusion

Facilities for neurotrauma at AIIMS, Bhubaneswar are being gradually upgraded. With a core team, the services are improving gradually. However, the institution is in its early years, and a lot more needs to be done in terms of manpower, gadgets, and infrastructure to further improve neurotrauma care at AIIMS, Bhubaneswar. This article may help in formulating guidelines for strengthening neurotrauma facilities in AIIMS, Bhubaneswar and all the new AIIMS hospitals established in India.

Conflict of Interest

None declared.

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