

# Neurotrauma at AIIMS Raipur: An Overview

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Indian J Neurotrauma 2019;16:117–119

## Abstract

### Keywords

- neurotrauma
- trauma audit
- traumatic spinal injury

All India Institute of Medical Sciences (AIIMS), Raipur was established by an act of Parliament in 2003 under PMSSY (Pradhan Mantri Swasthya Suraksha Yojna). The Department of Neurosurgery at AIIMS, Raipur, was started on September 4, 2017. In this article, we would like to highlight the resources (manpower, infrastructure) available for neurotrauma, the challenges ahead, and vision for future.

## Introduction

### History and Overview

All India Institute of Medical Sciences (AIIMS) Raipur was established by an act of Parliament in 2003 under PMSSY (Pradhan Mantri Swasthya Suraksha Yojna). The Department of Neurosurgery at AIIMS, Raipur, was started on September 4, 2017 with the appointment of Dr. Anil Kumar as assistant professor and now the department has grown to strength of six faculty members. Since then the department has come up with flying colors for the treatment of neurosurgical diseases that needed surgeries such as tumors, vascular neurosurgery, endoscopic skull base surgeries, pediatric neurosurgery, spine surgery, and brachial plexus injuries. In this article, we would like to highlight the resources (manpower, infrastructure) available for neurotrauma, the challenges ahead, and vision for future

### Infrastructure and Resources

The neurosurgery department literally started from scratch. Initially the department had no beds and other departments generously allowed sharing of their ward beds with neurosurgery. Soon after inception, department was allotted one operating day per week. Within 2 weeks of inception of department, first spinal surgery was performed with generous support of orthopaedic department who agreed to share equipment. Cranial surgery was started 2 months later when department got necessary and basic equipment for the same. Initially neurosurgical operations such as surgery for gliomas, meningiomas, vestibular schwannomas, and microvascular decompression were performed with assistance of

surgical loupe as operating microscope was not available. Six months later, endoscopic skull base surgeries were started with the support of ENT department.

Currently, the neurosurgery in-patient has 30 general ward beds and one daily operation theater (OT). Presently, there is no dedicated neurosurgery intensive care unit (ICU). There are five outpatient days and five operating days per week allocated to the department. Patients are admitted from the outpatient clinic and emergency services daily. Department is equipped with state-of-the-art neurosurgical equipment (► Fig. 1). No epilepsy surgery or stereotactic and functional neurosurgery is being performed because of lack of resources and equipment. For emergency cases, one theater has been allotted at present. Any emergency case from various departments are being done in these theaters.

### The Road Traveled So Far

The department was started from scratch with minimal resources. There are now 30 beds and additional private ward rooms. The demand for outpatient services and inpatient care has been progressively increasing over the period of 2 years. The department actively pursues clinical care and research activities in the subspecialties of skull base, vascular, endoscopic, complex spine, and peripheral nerve surgeries among others. The department specializes in all fields of neurosurgery that include neuroendoscopy, neurovascular surgery, minimally invasive neurosurgery, spine surgery, skull base surgery, pediatric neurosurgery, peripheral nerve and brachial plexus surgery, neurotrauma, neuro-oncology, and surgery for pain and spasticity. Currently, the department is conducting its work with six faculty members. The



Fig. 1 Neurosurgical operation theater.



Fig. 2 Glimpse of endoscopic skull base conference with live operative and cadaveric workshop (September 6–7, 2019).

department has an exemplary track record of organizing major academic activities, including national symposia, conferences, Continuing Medical Education (CME) programs besides participating actively, and making its presence felt at various forums. Department has organized endoscopic skull base conference with live operative and cadaveric workshop (September 6–7, 2019) and 1st Annual Brain Tumor Symposium (February 2019) (►Fig. 2). Public awareness programs on brain tumors were also undertaken.

### Trauma Audit

Within the spectrum of trauma-related injuries, traumatic brain injury and spinal cord injury are the largest causes of death and disability, leading to suffering by, and costs to, the individual, their family, and society. The comprehensive management of traumatic brain and spinal cord injury requires human resources, infrastructure, adequate emergency, and

neurointensive care aimed at enhancing capacity in all these components. Because resources are limited, the next elementary question is how to establish priorities so that these areas can advance in parallel.

Retrospective analysis was performed of all patients who were admitted for head injury. From the beginning, we had no beds specially dedicated to trauma and there was a lack of ICU facility and nonavailability of OT in emergency. Department was allotted four beds dedicated to trauma from September 2019 and availability of OT full time. In last 2 months, 62 patients were admitted for head injury, out of which 38 patients were operated upon. Distribution of trauma patients was male:female (6:1). Most of them belong to 20- to 30-years age group (40%). Most common mode of trauma was road traffic accident (75%). Most common indications for surgery were contusion—15 (40%) (including burst contusion) followed by posttraumatic chronic subdural hematoma—14 (37%), extradural hematoma—4 (10%), acute

**Table 1** Distribution of disease in operated cases

Diagnosis	Number of patients (%)
Contusion	15 (40)
Chronic SDH	14 (37)
EDH	4 (10)
Acute SDH	3 (8)
Depressed fracture	2 (5)

Abbreviations: EDH, extradural hematoma; SDH, subdural hematoma.

Note: Contusion includes burst contusion.

subdural hematoma—3 (8%), and two patients (5%) operated for depressed fracture (►Table 1). Out of these, three patients had expired, one patient had bifrontal contusion with preoperative Glasgow Coma Scale (GCS) E1M2vt, one patient had right burst temporal lobe with similar GCS, and one patient expired after evacuation of left frontal and temporal contusion with preoperative GCS E1M3V1. All patients had poor GCS. Long-term outcome is difficult to access due to short duration of follow-up.

## Traumatic Spinal Injury

Fourteen patients were admitted for traumatic spinal injury, out of which eight patients were operated. Most common diagnosis was cervical subluxation in five patients (62%) and lumbar fracture in three patients (38%). Most of spinal injury patients operated in routine OT.

## Peripheral Nerve Injury

Till now five patients were operated upon for posttraumatic brachial plexus injury; out of these three patients had complete brachial plexus injury and underwent nerve transfer with the use of sural nerve graft. In follow-up, four patients showed improvement. Two patients underwent microsurgical DREZotomy for posttraumatic brachial plexus injury

neuropathic pain, out of which one patient had complete pain relief on 8 months follow-up, while other reported only partial relief.

## Challenges Faced and Vision for Future

The challenges in trauma management in a new and developing center are centered on, but not limited to, inadequate prehospital trauma care protocol, lack of trained staff, inadequate healthcare infrastructure, limited manpower, and difficulty in applying approved guidelines due to limited resources. There are enormous challenges to significantly advance neurotrauma care, specifically in new and developing center. The determinants of favorable outcomes following neurotrauma include the immediate emergency care, the expertise of manpower, availability of adequate infrastructure, and appropriate facilities for specialized care. Robust intensive care and round the clock availability of OT are the major pillars for neurotrauma care. These deficiencies in neurotrauma care were mitigated to some extent and full-fledged neurotrauma care was started in September 2019. Rehabilitation of neurotrauma victims is another crucial factor and rehabilitation should start during the course of a hospital stay and carry on actively after discharge.

Training of manpower in acute neurotrauma care services should be a priority. We aim to deliver the best care for trauma patient with highly equipped emergency and critical care units with ample amount of man power. There is desperate need of 24 hours available neuroanesthetist, critical care experts, neuro nurses, neurosurgical ICU, and dedicated neurosurgery OT. The department is committed to the advancement and promotion of neurosciences in the country.

### Conflict of Interest

None declared.