



Neurosurgery

IMPACT AND OUTCOMES OF INCEPTION OF DEPARTMENT OF NEUROSURGERY, A MONOCENTRIC RETROSPECTIVE TERTIARY CARE HOSPITAL BASED STUDY

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ABSTRACT **Background:** The establishment of the Neurosurgery Department at Rajindra Hospital in June 2023 addressed the pressing need for neurosurgical care in the Patiala region. Despite limited resources, the department aimed to alleviate the burden of traumatic head and spine injuries, which comprised a significant portion of neurosurgical cases in the area. **Objectives:** This retrospective study aimed to evaluate the impact and outcomes of neurosurgical interventions, focusing on traumatic head and spine injuries, within the first six months of the department's inception. **Materials And Methods:** A retrospective monocentric study involving 100 patients treated at the Neurosurgical Department at Rajindra Hospital was conducted. Data were collected from medical records of patients presenting with traumatic head and spine injuries over the six-month period following the department's establishment. **Results:** The majority of procedures conducted included craniotomies and craniotomies, accounting for 54% of cases. Other procedures included spinal surgeries (20%), tumor interventions (8%), bur hole procedures (7%), VP shunts (5%), and re-procedures (3%). The mean age of patients was 44.2 years, with a notable proportion of younger patients (25-45 years) presenting with traumatic head injuries. Additionally, the majority of patients were male, reflecting the higher incidence of traumatic injuries in this demographic group. **Outcomes:** Out of 100 patients, the median hospital stay was 15 days. Notably, 44% of patients were discharged without neurological deficits, indicating favorable outcomes. However, 43% of patients were discharged with focal neurological deficits, suggesting that some patients may require further rehabilitation or follow-up care. Additionally, 7% of patients expired during their hospitalization, highlighting the severity of some cases. **Conclusions:** Despite limitations in faculty, resources, and bed capacity, the Neurosurgery Department at Rajindra Hospital played a crucial role in reducing referrals to other centers, thereby improving local accessibility and affordability of neurosurgical services. The study underscores the department's transformative effect on patient care and highlights the need for further enhancements and optimization in the future.

KEYWORDS : Neurosurgery, Traumatic Brain Injury, Craniotomy, Spinal Cases, Tumors, Ventilator Associated Complications, Accessible Neurosurgical Care, Emergency Neurosurgical Care, Neurosurgical Complications.

INTRODUCTION:

Neurosurgery stands as a specialized field dedicated to diagnosing, treating, and rehabilitating conditions impacting the nervous system, encompassing the brain, spinal cord, and peripheral nerves. In India, the demand for neurosurgical care has surged, with a rising number of patients seeking treatment for ailments such as brain tumors, stroke, and traumatic brain injuries. However, the neurosurgical community grapples with numerous challenges, including inadequate infrastructure, restricted access to care, and a dearth of trained professionals. (1) In India, there has been a growing demand for neurosurgical care, with an increasing number of patients seeking treatment for conditions such as brain tumors, stroke, and traumatic brain injuries.

This deficiency in neurosurgical facilities across Indian hospitals and clinics poses a significant concern for patients and healthcare providers alike, leading to compromised patient care, prolonged wait times, and delayed treatments. The scarcity of skilled neurosurgeons, anesthesiologists, and support staff exacerbates the situation, hindering the delivery of essential neurosurgical procedures. The consequences of these shortcomings are particularly profound in regions like Patiala, Punjab, where the absence of a dedicated neurosurgery department at Rajindra Hospital has impeded timely access to critical care.

The absence of neurosurgical facilities in Patiala has left a substantial gap in addressing the region's neurosurgical needs, especially for those from economically disadvantaged backgrounds. Rajindra Hospital,

servicing as a tertiary care facility in Punjab, witnesses an influx of approximately 60 traumatic brain injury (TBI) cases weekly, with 41% (n=25) requiring neurosurgical intervention and 66% (n=40) intensive care. India has one of the highest TBI burdens due to road traffic accidents (RTAs), with 60% of head injuries being attributable to RTA and more than 150,000 lives being lost annually due to Traumatic brain injury (TBI).(2)

Predominantly comprising individuals from low socioeconomic backgrounds, these patients often face challenges accessing private healthcare and rely on public healthcare establishments like Rajindra Hospital.

The establishment of the Neurosurgery Department at Rajindra Hospital in June 2023 marked a pivotal moment in addressing the healthcare disparities faced by the region's underserved populations. Equipped with essential facilities, including an operation theatre, fourteen ICU beds, six ventilators and forty eight ward beds, the department aimed to bridge the gap in neurosurgical care accessibility. Led by a dedicated team of professionals, including a neurosurgeon, senior and junior residents, and support staff, the department embarked on a mission to provide timely, comprehensive, and compassionate care to all patients, regardless of their socioeconomic status, the department caters for about twenty emergency cases daily in addition to outpatient department of about sixty patients. Compared to this, the present sanctioned bed strength is 80 beds; however, the admitted patient number is nearly 200 at any given time in PGIMER Chandigarh and is operating 18 routine operation tables per week and 4 emergency

tables daily round the clock. Apart from the routine and emergency services during the daytime, there are 10 in-hospital Neurosurgery senior residents on night duty at different stations in the department(3)

The objective of this retrospective study seeks to evaluate the transformative impact of the newly established Neurosurgery Department at Rajindra Hospital on the local community, particularly emphasizing its role in providing quality care to the underserved population. By analyzing the department's performance and outcomes, we aim to assess its strengths and shortcomings, as well as the tangible difference it has made in the lives of patients from economically disadvantaged backgrounds.

Through this evaluation, we aim to underscore the critical importance of accessible and affordable neurosurgical care in addressing healthcare disparities and improving health outcomes for vulnerable populations in Punjab. By highlighting the positive impact of the Neurosurgery Department on the region's underserved communities, we hope to advocate for continued support and investment in similar initiatives to ensure equitable access to quality healthcare for all.



Figure 1 Neurosurgery OT at Rajindra Hospital, Patiala

MATERIALS AND METHODS:

This monocentric retrospective study of 100 patients was conducted at neurosurgical dept of Rajindra Hospital Patiala. Information was collected from the medical records of patients after due consent. Study includes patients presenting to neurosurgical outpatient and emergency department with traumatic head and spine injuries during the time span of 6 months since conception of the department.

DISCUSSION:

Among the 362 admitted to department, 100 patients were operated during the 6-month period of July 2023 to December 2023, strikingly small as compared to PGIMER Chandigarh, the Neurosurgery OPD attendance is approximately 30,000 patients every year. The number of neurosurgical procedures is close to 4500 major surgical procedures performed annually.(3).

Demography: in our study the mean age was 44.2 .It was observed in emergency patients, the majority of patients were young between 25-45 years of age and majority of them were males. This is mostly due to behavior and adventures tendencies of younger male, leading to more road side accidents. Among elective procedures most of patients were between 45-55 years. Among 100 cases 4 patients were pediatric age group and rest were adults.

Table 1: Age Group Of Patients

Age groups	No of patients
0-12 months	1
1-10 years	2
11-20	2
21-30	9
31-40	26
41-50	23
51-60	23
61-70	12
71-80	2

In our study 79% patients were males and 21% were females, among

the operated cases, the majority of patients were emergency patients with traumatic brain injury accounting for 88% of total and about 12% patients were electively operated for spinal cases, V-P shunting and tumors. Among the emergency patients 70.4% of patients were in RSA. 20.4% of patients had alleged history of assault and 9.2% presented with fall from height. Our findings were similar to a study by Kamal Vk et al. (4)The most common mode of injury was road traffic accidents (RTAs), which accounted for about 64.96% of the patients, followed by falls (26.52%), others mode of injury (5.70%), and assaults (2.82%). Rapid urbanism is probably the cause of These similarities.

Table 2: Distribution Of Cases

EMERGENCY	88%	88
RSA	70.4%	62
ASSAULT	20.4%	18
FALL FROM HEIGHT	9.2%	8
ELECTIVE	12%	12

Table 3: Procedures Performed

Craniectomies and craniotomy	54
• EDH (craniotomy and evacuation)	12
• SDH	31
• ICH/IVH	5
Depressed fracture elevation	3
Spinal cases:	20
• Cervical	12
• Anterior	8
• ACDF	3
• Corpectomy	5
• Posterior	4
• Thoracic	2
• Lumbar	6
Tumors:	8
• Meningioma	3
• Pituitarymacroadenoma	1
• Osteoma [frontal]	1
• Cp angle tumor	1
• Scalp tumor	2
Burr hole:	7
Bilateral	2
Left	3
Right	2
Ventricular peritoneal shunts	5
Re- procedures	3
External ventricular shunt	2
Cranioplasty	1

In our study, among 100 operated cases the majority of them were craniectomies accounting for 54% (n=54) of cases. There were about 20%[n=20] of spinal cases, 8% tumors[n=8],7% bur hole [n=7] , 5% VP shunts[n=5], 3% re-procedures[n=3], about 2% were external ventricular drainage[n=2] and 1% Cranioplasty [n=1]. In our study , 88 patients admitted through emergency ,direct result of traumatic brain injury including three cases of depressed fractures with foreign body in situ ,out of 100 patients 8 were operated due to neoplastic origin [benign and malignant], one was congenital , 5 were due to inflammatory causes.

Our findings were Similar to a study by Wicaksono AS et al most of the cases (60.2%) were trauma-related cases, followed by tumors (15.9%)[5] and The study by Martin SN et all total cases were 540 out of which 52% [n=281] were cranial , 41.6 % [n=225] were spinal cases ,87.9% were adult [n=475] and 9.07% were pediatric [n=49][6]. These findings were similar , as cranial surgeries were needed in trauma patients, which was the most common mode of presentation.

Outcome:

In our study out of 100 patients with a median stay of 14 days, 50 % patients were discharged with no neurological deficits and 43% were discharged with focal neurological deficits and 7% of patients expired. Similarly in a different study of outcome of neurosurgical procedures Discharge disposition included home in 86.2% of cases, rehabilitation center in 8.9%, and nursing home in 2.5%; 0.76% of patients died.(7)

The majority of existing reviews has suggested that publicly-funded health insurance has typically shown a positive impact on access to

care(8). In India due to high out of pocket expenditure annually, about 3.2% Indians fall below the poverty line and also three-fourth Indians spend their entire income on health care and purchasing drugs.(9) In a country like India cost is major limitation to access neurosurgery care, and hence, our department focused on insurance utilization. In our study we found that majority of patients, 73% of patients had some insurance as described in table 4 and 27% had no insurance coverage. This highlights more penetration of government schemes like Ayushman Bharat and recent awareness of patients towards insurance.

Table 4: Insurance Coverage

INSURANCE	NO. OF PATIENTS
ESIC	10
AYUSHMAN	57
PRIVATE	6
No insurance	27

In our study we found that majority of complications were associated with ventilator during ICU stay. Majority of Non neurological complications observed during the ICU stay were related to respiratory complications 50%, dyselectrolyemia 23%, cardiovascular 18%, sepsis 5%, MODS 3%, AKI 2%. a majority of neurosurgery related complications were surgical site infection 8%, epilepsy 5%, re – procedure required 3%, neurological deficits 43% and CSF leak 2%. In a different study by , Khandelwal A et al. Non–neurological complications were frequent in neurotrauma ICU patients. We observed respiratory complications to be of highest occurrence (60.5%). Other complications in decreasing order included dyselectrolytemia (40%), cardiovascular (33.5%), coagulopathy (32%), sepsis (24%), abdominal (16.5%) and AKI (3.5%). [10].

In another study containing 279 cases by Venkatapura RJ et al. The total number of neurological complications was 53 (19%). There were 28 patients with new postoperative ND (10.04%), 24 patients had SD (8.6%), and 17 patients had seizures (6.1%). [11]

Table5: Complications

NEUROSURGERY:	
SSI	8%
Seizure	5%
RE- PROCEDURE	3%
NEUROLOGICAL DEFICIT	44%
CSF LEAKAGE	2%
ICU	
RESPIRATORY	50%
DYSELECTROLEMIA	23%
CARDIOVASCULAR	18%
SEPSIS	5%
MODS	3%
AKI	2%

Mean age-in our study was 44.2 years and 79% patients were male. 88% were admitted through the emergency department and rest through the out patient department. RSA was the most common cause of presentation. among 100 operated cases the majority of them were craniectomies accounting for 54% (n=54) of cases. In our study out of 100 patients with a median stay of 14 days, 50 % patients were discharged with no neurological deficits and 43% were discharged with focal neurological deficits and 7% of patients expired. 73% of patients had insurance and 27% had no insurance coverage. Before July 2023 on an average 57/week cases were referred from the RHP, after conception of department the no. has significantly decreased to 4 /week. Providing timely care and intervention to needful patients and at the same decreasing the burden at referral centers.

Strength Of The Study:

The establishment of a Neurosurgery Department at Rajindra Hospital in June 2023 addressed the growing demand for neurosurgical care in the Patiala region, marking a significant milestone in healthcare. This study provides a comprehensive overview of neurosurgical care and insight into changes a new, even small neurosurgical department can bring in trauma care.

The study explains the demography of neurosurgical patients along with type of operative interventions and complications encountered. This study also looks into insurance accessibility , through which neurosurgical care can be made accessible and affordable.

Limitations Of Study :

This study also had limitations including its small sample size and being a mono centric study. Using a larger sample size and designing a multicentric study might provide more valuable and reliable results.

CONCLUSION:

Over the span of 6 months there has been a drastic increase in the no. of patients in both inpatient and outpatient setting. And no. of patients being referred has decreased. These patients are being operated on and treated conservatively over a period of time.

At the present time, faculty, resources and the number of beds is still lacking compared to the number of patients being addressed in our neurosurgery department. This has brought accessible and affordable neurosurgical care closer to region and also decreased burden on nearby referral centers like PGIMER.

Ethics Approval:

The study has been approved by institutional ethical committee

Conflict Of Interest: Nil

Acknowledgement: nil

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