



Research Article

ROLE OF PRE REFERRAL INTUBATION IN CASES OF TRAUMATIC BRAIN INJURY: A HOSPITAL BASED STUDY IN THE SUB HIMALAYAN REGION

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ABSTRACT

Background: Traumatic Brain Injury is a major public health problem in India. It is the leading cause of mortality, morbidity, disability and socioeconomic losses in the Indian subcontinent. In order to prevent secondary brain injury from hypoxia and hypercapnia, aggressive pre-hospital airway control has been advocated. The objective of this study was to find out the association of pre-referral intubation and various outcomes in patients of traumatic brain injury.

Materials & Methods: It was an observational descriptive study conducted in the Departments of General Surgery and Neurosurgery Indira Gandhi Medical College, Shimla. Data was collected, entered and cleaned using Microsoft excel sheet. Chi-square test was used as the test of significance to find out the association between the different categorical variables. P value less than 0.05 was considered to be statistically significant.

Results & Discussion: There were 264 patients of traumatic brain injury with the mean age of 32.80 years (SD=15.64). The association of pre hospital intubation and different outcomes like death, fully recovered, no recovery and referred was not found to be statistically significant (p = 0.223). The medical and paramedical staff should be regularly provided with hands on training of Advanced Traumatic Life Support (ATLS) course.

Conclusion: This will significantly help reduce the morbidity and mortality of patients with traumatic brain injury.

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INTRODUCTION

Traumatic brain injury (TBI) is a devastating injury. The World Health Organization (WHO) estimates that each year more than 10 million people in the world sustain TBIs resulting in death or extensive hospitalization¹ with the survivors often acquiring a permanent disability.² India is the second most populous country in the world with an estimated population of 1.27 billion.³

TBI is a major public health problem in India. It is the leading cause of mortality, morbidity, disability and socioeconomic losses in the Indian subcontinent.⁴ The increase in economic growth in India coupled with a rise in population, motorization, and industrialization has contributed to a significant increase in road traffic accidents annually, of which TBI can rarely be ignored. Hypoxia in TBI patients has shown to be significantly associated with increased morbidity and

mortality and is also a strong predictor of poor neurological outcomes.⁵⁻⁹ In order to prevent secondary brain injury from hypoxia and hypercapnia, aggressive pre-hospital airway control has been advocated.⁵⁻⁹

Tracheal intubation (TI) is a critical intervention regularly conducted by emergency medical service (EMS) providers to secure the airway of severely ill or injured patients worldwide.¹⁰ However, despite multiple studies, the benefit of pre-hospital intubation (PHI) remains unproven.¹¹

To our knowledge, the role of pre referral intubation (PRI) has not been evaluated in our setting where transport times remain relatively long compared with those in other parts of the country. The objective of this study was to find out the association of pre-referral intubation and various outcomes in patients of traumatic brain injury.

MATERIALS AND METHODS

It was an observational descriptive study conducted in the Departments of General Surgery and Neurosurgery Indira Gandhi Medical College, Shimla. The study was carried out for one year. We included all patients with traumatic brain

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injury (TBI) in the study irrespective of age and sex. Patients with non traumatic neurosurgical insults were excluded from the study. After obtaining the informed consent, the detailed history of the patient was taken which included the mode of injury, delay from the time of the accident to time of admission, mode of transport for referral and associated injuries. The data from the referral slips was also documented which mentioned about pre-referral management of the patients referred.

Data was collected, entered and cleaned using Microsoft excel sheet. The quantitative variables were expressed in means and standard deviation whereas the qualitative variables were presented in frequencies, percentages and proportions. Chi-square test was used as the test of significance to find out the association between the different categorical variables. P value less than 0.05 was considered to be statistically significant. Statistical analysis was performed using SPSS trial version 21.

RESULTS

There were 264 patients of traumatic brain injury with the mean age of 32.80 years (SD=15.64). The male patients (n=205) outnumbered female patients. A majority of the patients were in the age category of the adults (60.22%). Fall was the most common cause of TBI followed by road side accident, assault and occupational injuries. TBI was also associated with other injuries out of which the most common were facial injuries followed by musculoskeletal injuries and chest injuries. The modes of transport used commonly were ambulances and private vehicles. Table 1 describes the general characteristics of the patients with traumatic brain injury.

Table 1 descriptive profile of patients with traumatic brain injury

Variables	N=264	Percentage (%)
Age	32.80 ±15.64 years	
Gender		
1. Males	205	(77.7%)
2. Females	59	(22.3%)
Mode of injury		
1. Assault	17	(6.5%)
2. Fall	174	(65.9%)
3. Occupational	3	(1.1%)
4. Road Side Accidents	70	(26.5%)
Associated injuries (n=64)		
1. Facial injury	22	(34.4%)
2. Musculoskeletal injury	19	(29.7%)
3. Chest injury	10	(15.6%)
4. Others	13	(20.3%)
Time to reach IGMC	12.25 ± 3.54 hours	
GCS		
1. Mild (13-15)	193	(73.1%)
2. Moderate (9-12)	31	(11.7%)
3. Severe (<8)	40	(15.2%)

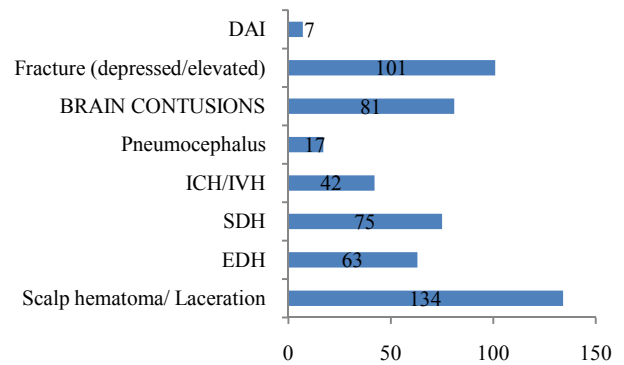


Figure 1 Types of Traumatic Brain Injury

It was observed that 52 patients were the candidates for intubation before reaching IGMC, Shimla. Out of these 52 patients, only 12 received intubation. Of those who were intubated before reaching IGMC, only 3 patients expired, while out of 40 patients who were not intubated, 21 patients expired. (Table 2). The association of pre hospital intubation and different outcomes like death, fully recovered, no recovery and referred was not found to be statistically significant (p = 0.223).

Abbreviations: DAI - Diffuse Axonal Injury, ICH - Intra Cerebral Hemorrhage, IVH - Intra Ventricular Hemorrhage, SDH- Sub Dural Hematoma, EDH- Extra Dural Hematoma. Scalp hematoma/Laceration was found to be the most common type of Traumatic Brain Injury followed by skull fractures. The diffuse axonal injury was found to be the least common type of TBI.

Table 2 patients with traumatic brain injury requiring intubation and expected outcomes

outcome	pre hospital intubation (n=52)		P value
1. Died	YES(n=12)	NO(n=40)	P = 0.223
2. Fully Recovered	3 (25%)	21(52.5%)	
3. No Recovery	7 (58.33)	11(27.5%)	
4. Referred	0 (0.0%)	1 (2.5%)	
	2 (16.67%)	7 (17.5%)	

DISCUSSION

Traumatic brain injury (TBI), a significant public health problem, is a leading cause of disability and mortality in all regions of the globe despite advancements in prevention and treatment. Its global incidence is rising and it is predicted to surpass many diseases as a major cause of death and disability by the year 2020.¹²

The priority in the emergency care of trauma patients is the assertion of a clear airway to guarantee adequate oxygenation and ventilation. The ABCs of trauma resuscitation begin with the airway evaluation, and effective airway management is imperative in the care of a patient with critical injury.¹³ We observed that on the basis of the patients' condition, 19.7% patients required intubation before reaching IGMC, Shimla. Out of those requiring intubation, only 23.07% patients received intubation. However there was very weak evidence to support the alternative hypothesis that there was a difference in

outcomes if the patients were intubated before being referred to the tertiary care hospital.

Chmayssani *et al* in their study mentioned that although the evidence linking hypoxemia to the poor outcome is very well established, the timing as to when to institute mechanical ventilation is controversial. The current guidelines recommend aggressive airway management in hypoventilated or hypoxemia TBI patients, either by endotracheal intubation or by mask ventilation.¹⁴

In a report of the National Confidential Enquiry into Patient Outcome and Death in London (2007) it was noted that the current structure of pre hospital management is insufficient to meet the needs of the severely injured patient.¹⁵ Lack of adequate experience and training of paramedics and emergency medical staff could be related to an adverse outcome for pre referral intubations.

Although in our study the mortality of the patients who received pre-referral intubation was low, still a weak strength of association between pre referral intubation and a higher death rate does not necessarily reduce the importance of the intervention. However more documented evidence needs to be gathered to support the fact that the pre referral intubation does reduce the mortality provided that the procedure is done through skillful hands and an efficient technique.

CONCLUSION

Considering the enormity of the problem of Traumatic Brain Injury in our state there is an urgent need for the provision of better health care facilities in our peripheral hospitals. The medical and paramedical staff should be regularly provided with hands on training of Advanced Traumatic Life Support (ATLS) course. A Pre hospital Trauma course should also be designed for emergency medical technicians (EMT) staffed in the ambulances to identify the need, intubate and care of endotracheal tube after intubating the trauma patients. This will significantly help reduce the morbidity and mortality of patients with traumatic brain injury. Furthermore, studies are warranted to determine the reasons for incapability of conducting intubation before referring the severely injured patients in our peripheral set up.

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