



EARLY VERSUS LATE TRACHEOSTOMY AND ITS EFFECT ON WITHDRAWAL OF MECHANICAL VENTILATION IN SEVERE HEAD INJURY PATIENTS-A RETROSPECTIVE STUDY

Ajeet Jyotipurkar Senior resident, E6 PG resident boys hostel GMC Bhopal

Sandeep Rathore* Assistant professor, 9b janki nagar chuna bhatti kolar road Bhopal *Corresponding Author

ABSTRACT **Introduction:** Effect of withdrawal of ventilatory support in severely head injured patients and its outcomes regarding duration of mechanical ventilation, ICU stay, incidence of pneumonia and mortality.

Method: 60 patients with severe head injury with GCS<8 admitted to SICU for mechanical ventilation divided into early and late tracheostomy group according to timing of tracheostomy (early <5 and late >5 days) and patients outcome were studied retrospectively.

Result: There was no significant difference in terms of age, sex, Glasgow Coma Scale score, incidence of pneumonia and mortality. In early tracheostomy group the duration of mechanical ventilation was significantly shorter 8.03±4.60 (3 – 18 days) with a shorter length of ICU stay 10.03±4.42 (5-20 days).

Conclusion: Early tracheostomy significantly decreases the duration of mechanical ventilation and ICU stay but no significant effect on incidence of Pneumonia, GOS (Glasgow Outcome Scale) patients mortality or operative outcomes.

KEYWORDS : Head injury patients, Early tracheostomy, Late tracheostomy

INTRODUCTION :

Now a days one of the most common cause of morbidity and mortality in younger age group is trauma^{1,2}

Early intubation and mechanical ventilation is needed in these patients for various reasons, such as upper airway obstruction relief secondary to severe laryngeal or facial trauma to clear secretions and prevent aspiration, maintenance of patent airway and airway access for prolonged mechanical ventilation³ but it has been clear that tracheal intubation for prolonged duration in these patients is associated with pneumonia⁴. The occurrence of ventilator associated pneumonia (VAP) is associated directly to the duration of mechanical ventilation⁵ and carries significant morbidity & mortality^{6,7,8}. Also, long term intubation is associated with laryngo-tracheal trauma, subglottic stenosis and patient discomfort with increased requirement of systemic sedatives.

According to American Consensus Conference on Artificial Airways tracheostomy is preferred if the need for an artificial airway is anticipated to be greater than 21 days⁹. In patients with severe head injury main aspect of management is prevention of secondary insults from hypoxia and hypotension. Indeed, the majority of these patients ultimately require a tracheostomy, not only for ventilator support, but also for airway management, easier nursing care improved patients comfort, more secure tube with increased patient mobility, allowance of speech, oral nutrition and in some studies early weaning from mechanical ventilation^{10,11}.

Our study was conducted to show effect of early versus late tracheostomy on duration of mechanical ventilation, ICU stay incidence of pneumonia and mortality in patients with severe head injury.

METHOD:

This study included 60 patients with severe head injury with GCS<8 admitted to SICU for mechanical ventilation. The patients were managed as per ATLS protocol and mechanically ventilated before a tracheostomy procedure decision.

Patients GCS <8 for > 48 hours and needing prolonged ventilation undergone randomly either early (<5 days) or late tracheostomy (> 5 days of initiation of mechanical ventilation). Patients 18 years and above, GCS<8 upon admission to SICU, severe head injury, needed ventilatory support for ≥ 7 days, included in study while Age <18 years, needed ventilation < 7 days. Anatomical neck deformities, platelet count <50,000, uncontrolled coagulopathy, Previous tracheostomy, Infection and surgical procedure at the site of tracheostomy, Pregnancy were excluded from study.

60 patients were enrolled in this retrospective study. Data was obtained from ICU database containing information on all head injury patients

who received tracheostomy over a three year period as demographic and clinical characteristics, Glasgow Outcome Score (GOS), duration of mechanical ventilation, ICU stay, pneumonia incidence were noted. GOS was used for evaluating functional outcome.

According to the timing of early or late tracheostomy, patients were grouped ET (≤5 days; n=30) or LT (>5 days; n=30) respectively.

Data collected were expressed as either the mean±standard deviation (SD), median, or percentage. An unpaired t-test was used to compare continuous variables, and Fisher exact test for proportions and a p value ≤0.05 was Statistical significant.

RESULTS :

A total of 60 Patients presented with severe head injury were involved in this study.

Between the 2 groups, there was no significant difference in terms of age, sex, Glasgow Coma Scale score on admission. (Table 1)

TABLE 1. Demographic data

	ET (≤7 days)	LT (>7 days)	p-value
Patient no.	30	30	
Age	40.1±13.7	43.57±12.8	0.3147
Male: Female	27:3	25:5	0.69
GCS score	6.0±1.31	6.23±1.38	0.5105

ET: Early tracheostomy group, LT: Late tracheostomy group, GCS: Glasgow Coma Scale, mean ± SD; p>0.05 not significant statistically

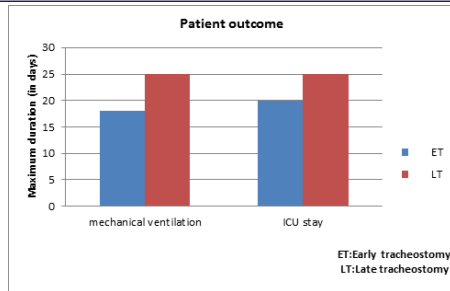
TABLE 2. Outcome of Patient

	ET (≤7 days)	LT (>7 days)	p-value
On ventilator (days)	8.03±4.60	15.87±6.64	<0.0001
In ICU (days)	10.03±4.42	18.16±5.10	0.0001
GOS	3.2±1.0	3.5±0.5	0.1470
Patients with pneumonia	12	13	

ET: Early tracheostomy group, LT: Late tracheostomy group, ICU: Intensive care unit, GOS: Glasgow Outcome Scale, mean ± SD

Total mechanical ventilation duration in group ET was significantly shorter 8.03±4.60 (3 – 18 days) compared to 15.87±6.64 (8 – 25 days) in group LT. This difference was highly statistically significant (<0.0001).

In group ET the length of ICU stay varied between 5-20 days (10.03±4.42) and it was shorter compared to group LT which varied between 10-25 days (18.16±5.10) And was highly statistically significant (p=0.000)



There was no statistically significant difference between both the groups in terms of Glasgow Outcome Scale and incidence of pneumonia (25 of 60 patients (41.6%) developed pneumonia during the peri and post tracheostomy periods). Morbidity and mortality in our study had no statistically significant difference between both the groups.

DISCUSSION :

Our study was conducted with retrospective clinical data reviews and surgical records of a recent 3-year patients admitted with severe head injury. And in our study there was no significant difference in terms of age, sex, Glasgow Coma Scale score.

Although tracheostomy is often indicated in head injury patients, there has been a little obligation on its optimal timing in mechanically ventilated patients^{13,15}. Majority of patients with severe head injury, requires intubation for at least 7 days (mainly for airway protection) but not certainly mechanically ventilation for a prolong duration. Tracheostomy not only provides an early alternative for protection of airway but also it decreases the need for prolonged mechanical ventilatory support and therefore, reduces the ICU and hospital stay.

A study conducted by Pena et al¹⁵ showed 86% of all patients with subglottic stenosis had a tracheal intubation history with a 17 days mean duration of ventilator support. Ely and coworkers¹⁶ demonstrated that prolonged intubation with mechanical ventilation is associated with increased hospital mortality and impaired post ICU discharge¹⁷. Therefore tracheostomy has been found to be vital in the management of such patients.

Rodriguez¹⁰ et al. proposed that there was a decrease in the duration of mechanical ventilation, ICU and hospital stay. Dunham et al¹⁸ found no difference with respect to important clinical outcomes. A retrospective study conducted by Blot et al¹⁹, compared early (< 48 h) versus late (7days) tracheostomy in 53 neutropenic patients and concluded that the death in ICU and hospital were not significantly different but the length of the hospital stay and of the mechanical ventilation were significantly longer in early tracheostomy group (p 0.05).

From our study it is noted that tracheostomy should be performed prior to laryngotracheal injury that may become a problem, based on experience from other studies^{20,21,22} of neurosurgical patients.

A study in homogenous population including all of ICU patients conducted by Kollef²³ concluded that patient with respiratory failure who had a tracheostomy had more favourable outcome compared to patients who did not have a tracheostomy. Both groups in present study did not differ regarding mortality.

A study conducted by Namen and coworkers²⁴ also concluded that a GCS score <8 was associated with an increased chances of extubation failure in neurosurgical patients. Also a retrospective review done by Lanza et al²⁵ in head injury patients with GCS score \leq 7 found that chances of tracheostomy is significantly greater.

CONCLUSION:

Severe head injury patient patients who underwent early tracheostomy (<5 days) had incidence of decreases duration of mechanical ventilation and ICU stay with earlier discharge. Tracheostomy timing did not alter the incidence of Pneumonia, GOS(Glasgow Outcome Scale) patients mortality or operative outcomes.

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