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ORIGINAL ARTICLE

# Indications and outcomes of tracheostomy in intensive care unit

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***ABSTRACT:***

**Aim:** The objective of present study is to study the various underlying disease aspects of indications and the outcomes of tracheostomy in ICU. **Material and methods:** This cross-sectional study was done in ICU, Department of ENT. Total 50 patients who underwent elective open tracheostomy in ICU by ENT surgeons for various indications were include in this study. Patients details (age and sex), complete clinical history pertaining to the cause of prolong intubation/ indication of tracheostomy, timing and complications was compiled and analyzed. **Results:**Out of 50 patients 30` (60%) were male and 20 (40%) were female and male to female ratio was 1.5:1.The age ranges of patients from 12-72 years and highest frequency were 40-50 years age group 13 (26%) followed by 11(22%) were from 20-30 years age group. Out of 50 cases Head injury with h/o RTA was the frequent indication 17 (34%) and Post-operative case of intracranial space occupying lesion (ICSOL) was the second most indication 12 (24%). Out of 50 cases over all complications was 16 (32%) and most common complication was surgical emphysema 5 (10%) followed by haemorrhage 4 (8%), wound infection 4 (8%) and tube displacement 3(6%). **Conclusion:** Tracheostomy in ICU is an important and safe procedure if prolonged endotracheal intubation is advised for varying underlying causes.

**Keywords:**Tracheostomy, Intensive care unit

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## INTRODUCTION

Tracheostomy is described as the creation of a stoma at the skin surface which leads into the trachea[1] which was at the earliest performed in ancient Egypt and is also included in many ancient medical texts like The Rig Veda (2000 to 1000 BCE).[2] Tracheostomy is performed in about 24% of all patients in intensive care units (ICU).[3,4]Tracheostomy has many advantages over endotracheal intubation in ICU setting including protection of the larynx and the upper airway from prolonged intubation which may lead to tracheal stenosis[5] [5], improved patient comfort, less requirement for sedation[6] , faster weaning leading to reduce ICU and hospital stay and reduced incidence of ventilator associated pneumonia if done early.[7] Indications are mainly prolonged intubation for various conditions, acute or chronic neuromuscular diseases, poor cardio- respiratory reserve, brain injury and upper airway obstruction.[8] While the timing of tracheostomy differs for these indications and its recommended for consideration only if extubation did not occur by 21 days in prolonged cases[8] but in selected patients with severe multi-trauma and/or head injury with low Glasgow coma score, tracheostomy at the earliest, within 3–4 days of intubation is advocated.[9] Tracheostomy has been considered a safe procedure in ICU but has been found to lead to life-threatening complications intra and post operatively like hypoxia, cardiac arrest, injury to structures immediately adjacent to the trachea, pneumothorax, haemothorax, incision site bleeding and stoma infection.[10] Techniques of tracheostomy include open surgical technique, earlier performed routinely and percutaneous dilatational tracheostomy (PDT) advocated by Ciaglia[11] , which is commonly performed in recent days in ICU because of its various advantages over the former, but PDT is not routinely practiced in our institution. Although recent studies have suggested that tracheostomy can be a safe procdure in the ICU, tracheostomy has also been found to lead to life-threatening complications like hypoxia, cardiac arrest, injury to structures immediately adjacent to the trachea, pneumothorax and haemothorax. Many critically ill patient's families have been hesitant in authorizing tracheostomy because of cosmetic issues and speech problems[12-13]In the recent years more and more airway problems are managed with endotracheal intubation or percutaneous endoscopically guided tracheostomy. But in many countries percutaneous endoscopically guided tracheostomy is not yet routinely practiced, conventional tracheostomy is practiced in vast majority of cases in ICU.The objective of present study is to study the various underlying disease aspects of indications and the outcomes of tracheostomy in ICU at Nalanda Medical College and Hospital, Patna, Bihar, India.

## MATERIAL AND METHODS

This cross-sectional study was done in ICU, Department of ENT, among the patients having tracheostomy after taking the approval of the protocol review committee and institutional ethics committee.

An informed consent detailed history was taken from the patient.

**INCLUSION CRITERIA**

- All patients who underwent tracheostomy
- Patient already intubated in ICU assumed to require prolonged intubation period.
- Patient with pre-operative planned tracheostomy and post operatively stay in ICU.

**EXCLUSION CRITERIA**

- Patients not willing for the study
- Not available for follow up.
- Patients who have undergone tracheostomy at other hospital

Total 50 patients who underwent elective open tracheostomy in ICU by ENT surgeons for various indications were include in this study. Patients details (age and sex), complete clinical history pertaining to the cause of prolong intubation/ indication of tracheostomy, timing and complications was compiled andanalyzed.

**RESULTS**

Out of 50 patients 30 (60%) were male and 20 (40%) were female and male to female ratio was 1.5:1 (Table 1). The age ranges of patients from 12-72 years and highest frequency were 40-50 years age group 13(26%) followed by 11(22%) were from 20-30 years age group. (table 1).Out of 50 cases Head injury with h/o RTA was the frequent indication 17 (34%) andPost-operative case of intracranial space occupying lesion (ICSOL) was the second most indication 12 (24%) (Table 2).

**Table 1: Demographic Profile of Patients**

| Gender | Number of patients=50 | % |
|---|---|---|
| Male | 30 | 60 |
| Female | 20 | 40 |
| **Age in years** | | |
| Below 20 year | 3 | 6 |
| 20-30 | 11 | 22 |
| 30-40 | 9 | 18 |
| 40-50 | 13 | 26 |
| 50-60 | 6 | 12 |
| Above 60 | 8 | 16 |

**Table 2: Indications of tracheostomy (n=50).**

| Indications | Number of patients=50 | % |
|---|---|---|
| Head injury with h/o RTA | 17 | 34 |
| Post-operative case of ICSOL | 12 | 24 |
| Guillain-Barre syndrome | 9 | 18 |
| CVA | 8 | 16 |
| Maxillo-facial trauma | 1 | 2 |
| RTA with spinal cord injury | 2 | 4 |
| Post-operative pneumonia | 1 | 2 |

Out of 50 cases over all complications was 16 (32%) and most common complication was surgical emphysema 5 (10%) followed by haemorrhage4 (8%), wound infection 4 (8%) and tube displacement 3(6%) (Table 3).

**Table 3: Complications of tracheostomy.**

| Complications of tracheostomy | Number of patients=16 | % |
|---|---|---|
| Surgical emphysema | 5 | 10 |
| Haemorrhage | 4 | 8 |
| Tube displacement | 3 | 6 |
| Wound infection | 4 | 8 |

**DISCUSSION**

Tracheostomy is a common procedure done in ICU having its own merit and demerits but not alwayswithout complications. It is one of the life-saving operations. In this study 50 cases of tracheostomy in the ICU were studied and the patient demographics, indications, complications and outcomes were analyzed and compare with similar study.In this study age ranges of patients from 12-72 years and highest frequency were 40-50 years age group 13(26%) followed by 11(22%) were from 20-30 years age group. One study done by Garner et al showed maximum age group between 21-30 years age group 28% followed by 21% were from 41-50 years age group.[14]In our study sex distribution among the 50 cases of tracheostomy in ICU showed 30 (60%) were male and 20 (40%) were female and male to female ratio was 1.5:1.Study done by Mahmud et al male patient were 65% and female patients were 35%, male to female ratio 1.8:1 which is similar to our

study.[15]Another study done by Garneret al male patients were 61% and female patients were 39% which nearer to our study.[14]Study done by Perfeito et al showed male to female ratio was found 1.8:1 which is similar to ourstudy.[16]In this study, the commonest indications of tracheostomy in ICU were head injury with h/o RTA was the frequent indication 17(34%) followed by post-operative case of ICSOL was 12(24%). One study done by Chowdhury et al showed head injury with H/O RTA 26.67% followed by post-operative case of ICSOL 26.67% which is similar to our study.[17]Another study done by Mahmud et al showed head injury with RTA 27.5% followed by post- operative case of ICSOL were 25% which is nearer to our study.[15]The incidence of RTA is very high in our country due to overloaded or unroadworthy vehicles, lack of awareness of safe road use, poor traffic management and law enforcement and poor driver training.[18]In our study, the rate of complications of tracheostomy in ICU was 16 (32%). Study done by Mahmud et al was 10%, Perfeito et al was 8.7% and Chowdhury et al was 10% whichisnearertoourstudy.[15-17]Inourstudy,themostcommon complication of tracheostomy in ICU was surgical emphysema 5 (10%) followed by hemorrhage4 (8%), wound infection 4 (8%) and tube displacement 3(6%). Study done by Mahmud et al and Chowdhury et al showed similar result.[15,17] Another study done by Perfeito et al showed early complication was bleeding while late complication was wound infection in 2.73% which is near to our study.[16] Another study done by Garneret al showed 2% cases had wound infection which is nearer to our study.[19] Study done by Rahman et al and Ahmed et al showed similar study about our complications.[20,21] In our study most common complication was surgical emphysema 5 (10%) managed by removal of tight suture, hemorrhage 4 (8%) control by intraoperative pressure over bleeders and ligation, wound infection 4 (8%) was treated by regular dressing of wound and appropriate antibiotics. Study done Mahmud et al and Garneret al showed similar result.[14,15] Complications of tracheostomy has been extensively studied and found to be decreased with improvements in operative skill and advancements in ICU.[22] Patents and caregiver education prior to performing elective tracheostomy and during discharge will help to improve patient outcomes and decrease complications related to tracheostomy tube. Complication rates associate with tracheostomy can be prevented by use of non-metallic tube, good surgical technique and meticulous post-operative care.[23] In our study, incidence of dysphagia, aspiration, trachea-esophageal fistula, tracheo-cutaneous fistula and cardiac arrest, we found no such complications which is accordance to study done by Chowdhury et al, study done by Mahmud et al.[15,17] No death of patient was reported during tracheostomy in our study which is accordance to study done by Garner et al.[14] The reason of complication in our study may be due to possibility of performing most of tracheostomy by the junior doctors which is accordance to study done by Mahmud et al.[15] In this study, regarding benefits of tracheostomy over endotracheal intubation in ICU we found that 100% patents had greater comfort. Nursing care was easier especially with respects to suctioning in 100% of patient, reduction of the length of ICU study found in all cases. Better oral and airway care was possible in all cases. This study was accordance to study done by Mahmud et al and Perfeilo et al.[15,16]

## CONCLUSION

Tracheostomy in ICU is an important and safe procedure if prolonged endotracheal intubation is advised for varying underlying causes.

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