

## Original Research Article

# Indications and outcomes of tracheostomy in intensive care unit

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### ABSTRACT

**Background:** Tracheostomy is a commonly performed surgical procedure in the intensive care unit (ICU) in which creation of a stoma between the skin and the anterior wall of the trachea where there is need for prolong mechanical ventilation. Tracheostomy has considered a safe procedure in ICU but has been found to lead to life threatening complications intra and post operatively.

**Methods:** This is a cross sectional study, was carried out in ICU, Chittagong Medical College Hospital, Chattogram from January 2018 to December 2019. A total of 120 patients irrespective of age and sex whose tracheostomy has done after admission in ICU by ENT surgeons.

**Results:** Out of 120 patients maximum 34 (28.33%) were from 21-30 years age group and male to female ratio was 1.79:1, male patients were 77 (64.16%) and female patients were 43 (35.83%). The most common indication for tracheostomy in ICU was head injury and history of RTA 34 (28.33%) followed by post-operative case of intracranial space occupying lesion 30 (25%). Post tracheostomy complication was surgical emphysema 4 (3.33%). The rate of complication of tracheostomy in ICU was 10.83% in this study. Regarding benefits of tracheostomy over endotracheal tube in ICU, we found that 100% patients had greater comfort.

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

**Keywords:** Tracheostomy, Intensive care unit, Outcome

### INTRODUCTION

Tracheostomy is a surgical procedure in which creation of a stoma between the skin and the anterior wall of the trachea. It is one of the oldest surgical procedures known.<sup>1</sup> Tracheostomy is performed in about 24% of all patients in intensive care unit (ICU).<sup>2,3</sup> Tracheostomy is a commonly performed surgical procedure in the intensive care unit. Indications for tracheostomy are mainly four folds namely airway obstruction, aspiration of secretions, airway protection from aspiration and provision of mechanical ventilation<sup>4</sup>. Indication are mainly prolonged intubation for various conditions, acute or chronic neuromuscular disease, poor cardiorespiratory reserve, brain

injury and upper airway obstruction.<sup>5</sup> While the timing of tracheostomy differs for these indications and it recommended for consideration only if extubation did occur by 21 days in prolonged cases.<sup>5</sup> For mechanical ventilation that is anticipated to last between 10 and 21 days, the decision was left to the physician and daily assessment was recommended. But in selected patients with severe multi-trauma and/or head injury and low Glasgow coma score, tracheostomy at the earliest, within 3-4 days of intubation is advocated.<sup>6</sup> Tracheostomy has been considered a safe procedure in ICU but has been found to lead to life threatening complications intra and post operatively like surgical emphysema, tube displacement, hypoxia, cardiac arrest, injury to structures

immediately adjacent to the trachea, pneumothorax, haemothorax, incision site bleeding and stoma infection.<sup>7</sup>

Surgical emphysema due to, too tight closure of the skin or subcutaneous tissue, to large incision in the trachea, improperly fitting tracheostomy tube and excessive coughing are the causative factors. Haemorrhage is most commonly arising from ant jugular veins or thyroid gland. Tubal displacement is due to post-operative oedema, haematoma and emphysema will cause a broadening of the distance the skin surface and ant wall of the trachea. Wound infection is due to bacterial contamination in the neck wound was found.<sup>8</sup> Tracheostomy can be associated with numerous complication rate ranges from 6 to 66%.<sup>9</sup> Tracheostomy has many advantages over endotracheal tube intubation in ICU setting including protection of the larynx and the upper airway from the prolonged intubation which may lead to tracheal stenosis, improved patient comfort, less requirement for sedation, faster weaning leading to reduce ICU and hospital stay and reduced incidence of ventilation associated pneumonia if done early.<sup>10-12</sup>

**Aims and objective**

The objective of the present study was to determine the various underlying disease aspects of indications, complications and the outcomes of tracheostomy in ICU.

**METHODS**

This cross-sectional study was done in ICU, Chittagong Medical College Hospital, Chattogram from January 2018 to December 2019, among the patients having tracheostomy. Data was collected in a prescribed data collection sheet. A total of 120 patients who underwent elective open tracheostomy in ICU by ENT surgeons for various indications were the study subject. Patients details (age and sex), complete clinical history pertaining to the cause of prolonged intubation/ indication of tracheostomy, timing and complications was compiled and analyzed.

**Inclusion criteria**

Inclusion criteria were all patients who underwent tracheostomy during the study period, willing to be included in the study. 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**

Exclusion criteria were patents below 2 years and above 80 years. Patients not willing for the study and not available for follow up. Patients who have undergone tracheostomy at other hospital are excluded.

All the patients were performed with standard surgical procedure in operation theater under L/A depending on the indication situation.

**RESULTS**

The age range of 120 patients was 8 to 75 years, maximum 34 (28.33%) were from 21-30 years which is shown in (Table 1). Out of 120 patients 77 (64.16%) were male and 43 (35.83%) were female and male to female ratio was 1.79:1 (Table 2). Out of 120 cases head injury with h/o road traffic accident (RTA) was the frequent indication 34 (28.33%) and postoperative case of intracranial space occupying lesion (ICSOL) was the second most indication 30 (25%) (Table 3).

**Table 1: Age distribution of the subjects (n=120).**

Age group in years	Number of cases	Percentage
0-10	2	1.66
11-20	8	6.66
21-30	34	28.33
31-40	18	15
41-50	25	20.83
51-60	14	11.66
61-70	16	13.33
71-80	3	2.50
<b>Total</b>	<b>120</b>	<b>100</b>

**Table 2: Sex distribution of the subjects (n=120).**

Sex	Number of cases	Percentage
Male	77	64.16
Female	43	35.83
<b>Total</b>	<b>120</b>	<b>100</b>

**Table 3: Indications of tracheostomy (n=120).**

Indications	Number of cases	Percentage
Head injury with h/o RTA	34	28.33
Post-operative case of ICSOL	30	25
Guillain-Barre syndrome	24	20
CVA	12	10
Maxillo-facial trauma	6	5
RTA with spinal cord injury	8	6.66
Post-operative pneumonia	6	5
<b>Total</b>	<b>120</b>	<b>100</b>

Out of 120 cases over all complications was 13 (10.83%) and most common complication was surgical emphysema

4 (3.33%) followed by hemorrhage 3 (2.5%), tube displacement 3 (2.5%) and wound infection 3 (2.5%) (Table 4).

**Table 4: Complications of tracheostomy (n=120).**

Complications of tracheostomy	Number of cases	Percentage
<b>Surgical emphysema</b>	4	3.33
<b>Haemorrhage</b>	3	2.5
<b>Tube displacement</b>	3	2.5
<b>Wound infection</b>	3	2.5
<b>Total</b>	13	10.83

## DISCUSSION

Tracheostomy is a common procedure done in ICU having its own merit and demerits but not always without complications. It is one of the life-saving operations.<sup>13</sup> In this study 120 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 8-75 years and highest frequency were 21-30 years age group 34 (28.33%) followed by 25 (20.83%) were from 41-50 years age group. One study done by Chandra et al showed maximum age group between 21-30 years age group 28% followed by 21% were from 41-50 years age group which is similar to our study.<sup>14</sup> In our study sex distribution among the 120 cases of tracheostomy in ICU showed 77 (64.16%) were male patients and 43 (35.83%) were female, male to female ratio was 1.79:1. 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.<sup>13</sup> Another study done by Chandra et al male patients were 61% and female patients were 39% which nearer to our study.<sup>14</sup> Study done by Perfeito et al showed male to female ratio was found 1.8:1 which is similar to our study.<sup>15</sup>

In this study, the commonest indications of tracheostomy in ICU were head injury with h/o RTA was the frequent indication 34 (28.33%) followed by post-operative case of ICSOL was 30 (25%). 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.<sup>9</sup> 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.<sup>13</sup> 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.<sup>16</sup> In our study, the rate of complications of tracheostomy in ICU was 13 (10.83%). Study done by Mahmud et al was 10%, Perfeito et al was 8.7% and Chowdhury et al was 10% which is nearer to our study.<sup>9,13,15</sup> In our study, the most

common complication of tracheostomy in ICU was surgical emphysema 4 (3.33%) followed by hemorrhage 3 (2.5%), tube displacement 3 (2.5%), wound infection 3 (2.5%). Study done by Mahmud et al and Chowdhury et al showed similar result.<sup>9,13</sup> 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.<sup>15</sup> Another study done by Datta et al showed 2% cases had wound infection which is nearer to our study.<sup>17</sup> Study done by Rahman et al and Ahmed et al showed similar study about our complications.<sup>18,19</sup> In our study most common complication was surgical emphysema 4 (3.33%) managed by removal of tight suture, hemorrhage 3 (2.5%) control by intraoperative pressure over bleeders and ligation, wound infection 3 (2.5%) was treated by regular dressing of wound and appropriate antibiotics. Study done Mahmud et al and Chandra et al showed similar result.<sup>13,14</sup>

Complications of tracheostomy has been extensively studied and found to be decreased with improvements in operative skill and advancements in ICU.<sup>20</sup>

Patients 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.<sup>21</sup> 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.<sup>9,13</sup> No death of patient was reported during tracheostomy in our study which is accordance to study done by Chandra et al.<sup>14</sup> 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.<sup>13</sup>

In this study, regarding benefits of tracheostomy over endotracheal intubation in ICU we found that 100% patients 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 Perfeito et al.<sup>13,15</sup>

## CONCLUSION

Tracheostomy in ICU is a safe lifesaving procedure in patients who needs prolonged endotracheal intubation. An otolaryngologist should familiar with the complications of tracheostomy and its management. However, the results of the present study may not be the representative of overall situation as it was carried out

with a limited number of patients in a limited span of time.

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