

Original Article

Tracheostomy in Intensive Care Unit: Indications, Benefits and Complications

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Abstract

Objectives: To see the common indications of tracheostomy in ICU in this country, to compare the benefits over endotracheal intubation and to find out the pattern of complication of tracheostomy in the ICU to enrich the ideas for minimizing the complications.

Methods: This is a cross sectional study was carried out at the Department of Otolaryngology and Head-Neck Surgery and Intensive Care Unit of Bangabandhu Sheikh Mujib Medical University & Dhaka Medical college Hospital, Dhaka from October 2012 to march 2013. This study includes all ICU patients, irrespective of age and sex, whose tracheostomy has done after admission in Intensive Care Unit.

Results: The study revealed that the commonest indication of tracheostomy in the ICU was head injury with history of RTA (27.5%), followed by post operative case of Intracranial space occupying lesion (25%). Next common indications were Guillain-Barre syndrome (15%), cerebrovascular accident (12.5%), Maxillofacial trauma (5%), RTA with cervical spinal cord injury (5%), and post operative pneumonia (5%). Regarding benefits of tracheostomy over endotracheal intubation in ICU we found that 100% patient had greater comfort. The rate of complication of tracheostomy in ICU was 10% in this study. Surgical emphysema was the commonest complications (5%) followed by haemorrhage (2.5%) and tube displacement (2.5%).

Key words: Tracheostomy, Intensive Care Unit.

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Introduction

Tracheostomy is used to describe the creation of a stoma at the skin surface which leads into the trachea¹. Tracheostomy is one of the oldest surgical procedures and most widely used surgical procedure on critically ill patients requiring mechanical ventilation in the intensive care unit. Tracheostomy was performed in ancient times & the recoding of such events have been documented by Asclepiades, the Greek Physician in 100 BC².

It is performed in about 24% of all patients in intensive care units^{3,4}. Tracheostomy has several advantages over endotracheal intubation including lower airway resistances, and hence decreased work of breathing, which

may allow early extubation, smaller dead spaces, less movement of the tube within the trachea, allowing the patient to speak and to eat, greater patient comfort and nursing care is easier, especially with respect to suctioning. Moreover long-term intubation has a lot of disadvantages such as the need for adequate patient sedation in order to tolerate the tube, the possibility of accidental extubation or misplacement into main bronchus, laryngeal damage, which can be very serious and tracheal stenosis may rarely occur⁵.

Indication for tracheostomy are mainly prolonged weaning from assisted ventilation, acute or chronic neuromuscular conditions, poor cardio-respiratory reserve, bulbar dysfunction, brain injury, upper airway obstruction etc⁶.

It was suggested that if the anticipated need for mechanical ventilation is longer than 21 days than tracheostomy is preferable. 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.⁶

Although recent studies have suggested that tracheostomy can be a safe procedure 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 problems⁷⁻⁸.

In the recent years more and more airway problems are managed with endotracheal intubation or percutaneous endoscopically guided tracheostomy¹². But in many countries percutaneous endoscopically guided tracheostomy is not yet routinely practiced, conventional tracheostomy is practiced in vast majority of cases in ICU.

Methods

This is a cross sectional study done at department of Otolaryngology and Head-Neck Surgery and Intensive Care Unit of Bangabandhu Sheikh Mujib Medical University & Dhaka Medical college Hospital, Dhaka for six months, from October 2012 to march 2013 among the patients having tracheostomy in the ICU. A total of 40 subjects meeting the above criteria has been selected for this study. Data was collected in a prescribed data collection sheet. All data were compiled and analyzed.

Results

Table-I

Age distribution of the subject (n=40)

Age in years	Numbers	Percentage
0-10	1	2.5%
11-20	2	5%
21-30	6	15%
31-40	8	20%
41-50	13	32.5%
51-60	6	15%
61-70	2	5%
71-80	2	5%

Table I Showing distribution of the age where the lowest age was 8 years and the highest was 79 years. Number of patients in 5th decade was highest (32.5%) .

Table-II

Sex distribution of the subject (n=40)

Sex	Numbers	Percentage
Male	26	65%
Female	14	35%

Table II Showing sex distribution of the subjects. Among the 40 patients 26 were male (65%) and 14 were female (35%). Male to female ration was 1.85:1.

Table-III

Distribution of socio-economic condition (n=40)

Socio-economic status	Numbers	Percentage
Low	09	22.5%
Middle class	18	45%
Affluent	13	32.5%

Table-III Showing distribution of the socio-economic condition of the subjects. Among the 40 patients middle class group was seen to be the commonest group scoring to 18 (45%) and low group was affluent 9 (22.5%).

Table IV

Distribution of resident (n=40)

Residential area	Numbers	Percentage
Rural	5	12.5%
Urban	35	87.5%

Table IV Showing out of 40 cases most were resident in urban area.

Table-V

Indications of tracheostomy (n=40)

Indications	Numbers	Percentage
Head injury with history of RTA	11	27.5%
Post-operative case of I.C.S.O.L	10	25%
Guillain-Barre Syndrome	6	15%
Cerebrovascular accident	5	12.5%
Maxillo facial trauma	2	5%
RTA with cervical spinal cord injury	2	5%
Post-operative pneumonia	2	5%

RTA- Road traffic accident

I.C.S.O.L- Intracranial space occupying lesion

Table 5 Showing distribution of the indication of the tracheostomy; Out of 40 cases head injury with history of RTA was the most

frequent indication 11 (27.5%) and post-operative case of I.C.S.O.L was the 2nd most indication 10 (25%).

Table-VI

Complications of tracheostomy (n=40)

Complications of tracheostomy	Numbers	Percentage
Surgical emphysema	2	5%
Hemorrhage	1	2.5%
Tube displacement	1	2.5%
Total	4	10%

Table 6 Out of 40 cases overall complications was 10% and the most common complication was surgical emphysema 2 (5%). The other complications included hemorrhage 1 (2.5%), Tube displacement 1 (2.5%).

Discussion

Tracheostomy is one of the life saving operations. It is a common surgical procedure in the ICU, but not always without complications. In this study 40 cases of tracheostomy in the ICU were studied prospectively to see their various Socio-demographic characters, the indications of tracheostomy and its complications. The values were compared to some other published reports from country and abroad. The age range of the subjects varied from 8 years to 79 years. The mean age was found 44.30 years, with highest frequency in the age group 41-50 years. In a previous study in America the mean age was found 48.25 years with highest frequency in the age group 41-50 years which was similar to this study.⁹

Study of sex distribution among the 40 cases of tracheostomy in ICU showed that 26 cases were male and 14 cases were female. Male to female ratio was 1.85:1. In a Latin American study the male to female ratio was found 1.8:1 which was similar to our study⁹.

In this study 45% of the cases came from middle class groups. 2nd most common group was affluent group (32.5%). In a study in BSMMU patient were equal from all classes which was not similar to this study.¹⁰

87.5% cases come from urban area 12.5% came from rural area. Low percentage of patients from rural area may be due to poor infrastructure of health system, lack of awareness and low socioeconomic condition in rural area.

The study revealed that the commonest indication of tracheostomy in the ICU was head injury with history of RTA (27.5%), followed by post operative case of Intracranial space occupying lesion (25%). Next common indications were Guillain-Barre syndrome (15%), cerebrovascular accident (12.5%), Maxillofacial trauma (5%), RTA with cervical spinal cord injury (5%), and post operative pneumonia (5%). In a study in BSMMU and DMCH common indications were head injury with history of RTA (26.67%) and post operative case of intra cranial space occupying lesion (ICSOL)(26.67); followed of Guillain-Barre syndrome (10%) & cerebrovascular accident (10%) which are almost similar to this study.¹⁰ Head injury with history of road traffic accident was the commonest indication because the incidence of RTA is very high in this country due to overloaded or unroadworthy vehicles, lack of awareness of safe road use, poor traffic management and law enforcement and poor driver training¹².

In this study, regarding benefits of tracheostomy over endotracheal intubation in ICU we found that 100% patient had greater comfort. Nursing care was easier especially with respects to suctioning in 100% of patient, Reduction of the length of ICU stay found in all cases. Better oral and airway care was possible in all cases. This study is supported by a Latin American study⁹. In a African study

benefits were reduction in frequency of pneumonia, duration of mechanical ventilation, length of time in intensive care and mortality rate.¹³

The rate of complication of tracheostomy in ICU was 10% in this study. In an American study it was (8.7%)⁹ and in a study in BSMMU it was 10% which is similar to this study.¹⁰

In this study surgical emphysema was one of the commonest complications (5%). In the previous studies surgical emphysema was the commonest complication (3.33%)¹⁰ and (9.47%)⁹ which is similar to this study. Surgical emphysema can be alarming but is seldom fatal. It is mostly confined to the neck but can extend to the face and chest wall. It usually presents within the first day and is self-limiting but the seventh day, unless the precipitating factor persists. 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. The risk of tracheostomy tube being displaced is increased in cases of marked surgical emphysema due to local increase in the neck swelling.²

Hemorrhage was found intraoperatively in 2.5% cases. In a study in BSMMU 2nd common complication was hemorrhage (3.33%)¹⁰. Hemorrhage is most commonly arising from anterior jugular veins and thyroid gland.²

Tube displacement was found in 2.5% cases. In a study in BSMMU it was found in 3.33% case¹⁰. Length of the tube and thickness of the neck are clearly the most important factors; post operative oedema, haematoma and emphysema will cause a broadening of the distance between the skin surface and the anterior wall of the trachea.²

Although studies in BSMMU and DMCH showed incidence of dysphagia, aspiration, tracheo-oesophageal fistula, tracheo cutaneous fistula and cardiac arrest, we found no such complications¹⁰.

In this study no mortality was found. The fatality was due to cardiac arrest and pneumomediastinum and the rate varied from 0% to 5% in A Latin American study⁹.

The reason of complications in our study may be due to possibility of performing most of the tracheostomy by the junior doctors.

Conclusion

In this study 40 cases of tracheostomy had been analysed in ICU and department of Otolaryngology and Head-Neck surgery of Bangabandhu Sheikh Mujib Medical University & Dhaka Medical College Hospital, Dhaka. Tracheostomy was a life saving procedure and done in various indications in ICU. It has more benefits over endotracheal intubation. In this study there were few complications. Most of the complications were preventable and could have been avoided by careful operative technique and meticulous post operative management.

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