

COMPARATIVE STUDY BETWEEN HAEMORRHAGE AND SURGICAL EMPHYSEMA AS COMPLICATION OF EMERGENCY TRACHEOSTOMY

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Abstract

Background: Emergency tracheostomy is the commonest surgical intervention performed as lifesaving procedure by ENT surgeons on patients in emergency room of ENT and ICU. Several operative and postoperative complications have been reported after tracheostomy including fatal hemorrhage. Massive subcutaneous neck emphysema occurred because ventilation started at the time when the hemorrhage was not completely managed and the tracheal tube was not fully secured.

Objective: This study was conducted to compare haemorrhage and surgical emphysema as complication of emergency tracheostomy among patients admitted in Department of ENT and Head-Neck Surgery in Dhaka Medical College & Hospital

Methods and Materials: This was a Cross Sectional Study conducted in the ENT and Head-Neck Surgery Department, Dhaka Medical College Hospital from July 2015 to June 2016. A total of 90 patients were included who fulfilled the selection criteria. Non probability convenient sampling was used to collect data. Statistical analysis was done by SPSS version 21.

Results: Mean± SD of the study subjects was 49.84±17.4 years with most patients belonged to 40-79 years age group. 28.9% patients had habit of smoking and betel nut chewing. (48.9%) patients suffered from Ca larynx. Out of 90 tracheostomy patients, 40(44.4%) patients had had different complications including haemorrhage (13.3%), surgical emphysema (10%), haemorrhage with surgical emphysema (6.7%), tube blockage (3.3%), wound infection (3.3%) and injury to local tissue (2.2%). Haemorrhage occurs from anterior jugular vein, middle thyroid veins and thyroid gland and included peroperative haemorrhage (7.8%), immediate post-operative haemorrhage, <24 hours, (4.43%) and late post-operative haemorrhage (1.2%).

Conclusion: In this study, haemorrhage followed by surgical emphysema and haemorrhage with surgical emphysema were found as major complications following emergency tracheostomy,

Key Words: Tracheostomy, Complication, Hemorrhage, Surgical Emphysema.

J Dhaka Med Coll. 2019; 28(2) : 159-163

Introduction

Tracheostomy is a life-saving procedure performed surgically.¹ As with any procedure, a tracheostomy can result in complications. Some of them are more likely to occur shortly after the surgery is done. Other complications are more likely to occur later.² Numerous studies suggests that as with any invasive procedure, there are numerous potential complications of tracheostomy. In general, these complications can be categorized as peroperative, postoperative, procedural, those that occur or are identified after decannulation,

as well as those that are temporally considered to be early (e. g., immediate) or late.³⁻⁵ Complications that can occur shortly after surgery include haemorrhage, pneumothorax, and surgical emphysema.⁶⁻⁷ Complications rate quoted in the literature ranges 6% to 66% for surgical tracheostomy.⁸ The complications following tracheostomy differ on its types and nature, condition of the patient, indications of it, place of procedure, management facilities and the experience of the performer. Greater complication and mortality rate has been reported in emergency situations, in severely

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Received: 06-11-2019

Revision: 20-12-2019

Accepted: 02-02-2020

ill patients and in small children.⁹ Many critically ill patient’s families have been hesitant in authorizing tracheostomy because of cosmetic issues and speech problems.¹⁰⁻¹¹ Considering present context in our country it is necessary to find out the prevalence of and associated factors of haemorrhage and surgical emphysema as complications of emergency tracheostomy among patients attending Dhaka Medical College Hospital.

Methods and materials

This cross sectional study was conducted in the Ear, Nose, Throat (ENT) Department, Dhaka Medical College Hospital from January to July 2015 to June 2016 among conveniently selected 90 patients who attended the Out Patient Department (OPD), Emergency Room (ER) and admitted into ENT Department of Dhaka Medical College Hospital (DMCH), and fulfilled the inclusion criteria of the study. The purpose and procedure of the study were properly explained to the patient and or their guardian and informed written consent was taken. After taking informed written consent, proper history, clinical examination and complete assessment of respiratory difficulty were performed. Further examination and investigation regarding complications were done and data sheet which was designed for the purpose of this study has been fulfilled. To analyze the data Statistical Package for Social Science (SPSS) version 22.0 was used. Statistical analysis was done by using descriptive statistics and inferential statistics. Continuous variables were presented as mean ± SD (standard deviation), and categorical variables were presented as frequency and percentages and compared by chi-square test. The study was approved by the ethical review committee (ERC) of DMC.

Results

Mean age of the patients was 49.84±17.40 years. Most of the patients belonged to 40-79 years age group (Table I). Most of the patients were lower class (38.90) and middle class (38.90) (Figure 1). Most of the patients (71.1%) did not have any personal habit (Table II). Nearly half of the patients (48.9%) suffered from Ca larynx followed by Ca hypopharynx 12.2% (Table III).

Out of 90 tracheostomy patients, 40(44.4%) patients had complications (Figure 2). Among them 40 patients (44.4%) different complications included haemorrhage (13.3%), surgical emphysema (10%), haemorrhage and surgical emphysema (6.7%), tube blockage (3.3%), wound infection (3.3%) and injury to local tissue (2.2%) (Table IV). As complications of tracheostomy, haemorrhage is more common in preoperative stage (Table V). Major complications of the study subjects were haemorrhage (44%), surgical emphysema (33%) and haemorrhage with surgical emphysema (23%) (Figure 3).

Table-I

Age distribution of the study subjects (N=90)

Age group in years ³	Frequency	Percentage
<10	4	4.4
10-19	2	2.2
20-29	8	8.9
30-39	8	8.9
40-49	18	20.0
50-59	20	22.2
60-69	19	21.1
70-79	11	12.2
Mean±SD		49.84±17.40

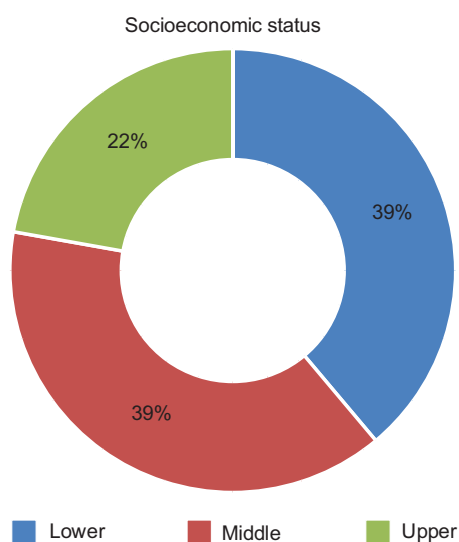


Fig.-1: Socioeconomic condition of the study subjects (N=90)

Table-II

Personal habit of the study subjects (N=90)

Habit	Frequency	Percentage
Smoking	14	15.6
Betel nut chewing	9	10.0
Smoking+betel nut chewing	3	3.3
None/Others	64	71.1

Table-III

Indications of tracheostomy of the study subjects (N=90)

Indication of tracheostomy	Frequency	Percentage
Ca larynx	44	48.9
Laryngeal papilloma	3	3.3
Ca hypopharynx	11	12.2
Vocal cord palsy	4	4.4
Burn	2	2.2
Head injury	6	6.7
Foreign body in larynx	2	2.2
Cut throat	2	2.2
Fracture mandible	2	2.2
Neck abscess	4	4.4
Ca oropharynx	2	2.2
Ca thyroid	2	2.2
Neck injury	2	2.2
Laryngeal edema	2	2.2
Other	2	2.2
Total	90	100

Table-IV

Complications of tracheostomy of the study subjects (n=40)

Complication of tracheostomy	Frequency	Percentage
Haemorrhage	12	13.3
Surgical emphysema	9	10.0
Haemorrhage+ Surgical emphysema	6	6.7
Injury to local tissue	2	2.2
Tube blockage	3	3.3
Subglotting stenosis	1	1.1
Formation of granulation tissue	1	1.1
Pneumothorax	1	1.1
Wound infection	3	3.3
Tube displacement	2	2.2
Total	40	44.4

Table-IV

Haemorrhage in different stages of tracheostomy of the study subjects (n=12)

Different stage	Frequency	Percentage
Preoperative	7	7.75
Immediate post-operative (<24 hours)	4	4.43
Late post-operative (>24 hours)	1	1.12
Total	12	13.3

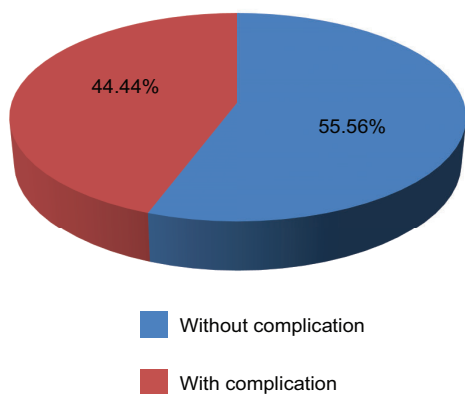


Fig.-2: Outcome of the study subjects following tracheostomy (N=90)

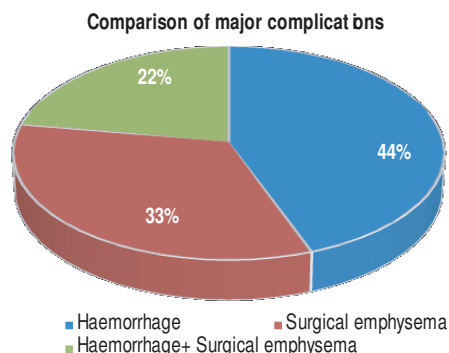


Fig.-3: Comparison of major complications of the study subjects (n=40)

Discussion

Tracheostomy is a commonly performed procedure and is intended to provide an alternative airway. Due to its invasive and physiologically critical nature, tracheostomy could be associated with significant morbidity and even mortality. Common complications of tracheostomy include haemorrhage, damage to adjacent structures, emphysema, airway loss, apnea etc. This study was basically focused on haemorrhage and surgical emphysema.

In the present study, mean age of the patients was 49.84 ± 17 years. Although this finding is inconsistent with the findings of study by Hamid et al.¹² (mean age 39.2 years) but fairly consistent with the studies of Choudhury et al.⁸ and Rahman et al.¹³. In term of socioeconomic condition, most of the patients were from lower class (39.9%) and middle class (39.9%). Majority of the patients of emergency tracheostomy by the studies of Rahman et al.¹³ and Ahmed et al.¹⁴ were also from poor socio-economic condition. Regarding personal habit, about 15.6% patients were smoker in this study. Recent literature suggests that smoking status was independent risk factor.¹⁵

Regarding indication of emergency tracheostomy in the present study, we found that nearly half of the patients (48.9%) suffered from carcinoma of the larynx, followed by carcinoma of hypopharynx (12.2%) and head injury (6.7%) respectively. A prospective study suggested that most common indication of emergency tracheostomy was laryngeal malignancy followed by poisoning and head injury.¹⁶ Studies conducted in Bangladesh by Choudhury et al.⁸ reported that the commonest indication for emergency tracheostomy was laryngeal carcinoma (53.3%) followed by hypopharyngeal carcinoma (13.3%) and that by Ahmed et al.¹⁴ were carcinoma of larynx (47%) and hypopharyngeal carcinoma (12%). In another study, laryngeal carcinoma and other head-neck malignancy were the common (67.34%) indications for emergency tracheostomy.¹⁷

Among them 40 patients (44.4%) suffered from different complications including haemorrhage (13.3%), surgical emphysema (10%),

haemorrhage with surgical emphysema (6.7%), tube blockage (3.3%), wound infection (3.3%) and injury to local tissue (2.2%). Among all haemorrhage, peroperative haemorrhage was 7.8%, immediate post-operative haemorrhage (<24 hours) 4.43% and late post-operative haemorrhage 1.2%. Haemorrhage occurs from anterior jugular vein, middle thyroid veins and thyroid gland. Haemorrhage followed by surgical emphysema as the most common complications of emergency tracheostomy were also reported by the studies of Amarnath et al.¹⁶, and Harun-or-Rashid & Taous¹⁷. However, in the study of Mahmud et al.¹⁸ surgical emphysema was the commonest complications (5%) followed by haemorrhage (2.5%) and tube displacement (2.5%). In another study Al-Azzawi et al.¹⁹ observed that haemorrhage, pneumothorax and subcutaneous emphysema were important early complications of emergency tracheostomy. Asmatullah et al.²⁰ mentioned surgical emphysema as the commonest complication of emergency tracheostomy and excessive bleeding (6%) as an important per-operative complications.

Conclusion

Among the different complications of emergency tracheostomy, haemorrhage was the most common, followed by surgical emphysema and haemorrhage with surgical emphysema. Haemorrhage occurred in different stages of tracheostomy procedure as peroperative haemorrhage, immediate postoperative (within 24 hours) haemorrhage, late postoperative (after 24 hours) haemorrhage.

Conflict of interest

There is no conflict of interest because of self-funding research.

References

1. Walts PA, Murthy SC, De Camp MM. Techniques of surgical tracheostomy. *Clin Chest Med* 2003;24:413-22.
2. Buglass E. Tracheostomy care: tracheal suctioning and humidification. *Br J Nurs* 1999; 8(8):500-4.
3. Dulguerov P, Gysin C, Perneger TV, Chevrolet JC. Percutaneous or surgical tracheostomy: A meta analysis. *Crit Care Med* 1999;27:1617-25.
4. Durbin CG Jr. Early complications of tracheostomy. *Respir Care* 2005;50:511-5.

5. McClelland RM. Complications of tracheostomy. *Br Med J* 2017;2:567-9.
6. Ali A, Jaafar W. A comparative study of the complications of surgical tracheostomy in morbidly obese critically ill patients. *Crit Care* 2007;11(1):3.
7. David I, Astrachan J, Kirchner C and Goodwin WJ. Prolonged intubation vs. tracheotomy: Complications, practical and psychological considerations. *The Laryngoscope* 2009;98 (11): 1165-69.
8. Choudhury AA, Sultana T, Joarder AH, Tarafder KH. A comparative study of elective and emergency tracheostomy. *Bangladesh J of Otorhinolaryngology* 2008;14(2):57-62.
9. Chew JY, Cantrell RW. Tracheostomy, complications and their management. *Arch Otolaryngol* 2016;96:538-45.
10. Zeitouni AG, Kost KM. Tracheostomy: a retrospective review of 281 cases. *J Otolaryngol* 2012; 23:61-66.
11. Stock MC, Woodward CG, Shapiro BA. Perioperative complications of elective tracheostomy in critically ill patients. *Crit Care Med* 2016;14:861-863.
12. Hamid AA, Sattar F, Shahedin M, Khan NS, Zakirullah. Complications of tracheostomy. *Journal of Pak Med Inst* 2003;18(3):388-391.
13. Rahman SH, Ahmed K, Khan AFM, Ahmed SU, Hanif MA., Haroon AA. Islam MA. Study of tracheostomy in Dhaka Medical College Hospital. *Bangladesh Journal of Otorhinolaryngology* 2008;7(2):34-40.
14. Ahmed K, Rahinan MA, Rahman SH. Complications of tracheostomy. *Bangladesh Journal of otorhinolaryngology* 1998;4(1):3-6.
15. Lee ST, Kim MG, Jeon JH, Jeong JH, Min SK, Park JY, Weon SC. Analysis of morbidity, mortality, and risk factors of tracheostomy-related complications in patients with oral and maxillofacial cancer. *Maxillofac Plast Reconstr Surg* 2016;38(1):32.
16. Amarnath SB, Chandrasekhar V, Sreenivas G, Deviprasad S, Ravindranath V, Priyanka G. Emergency Tracheostomy: Our Experience. *J of Evolution of Med and Dent Sci* 2015;4(44):7652-57.
17. Harun-or-Rashid M, Taous A. Comparative study on complications of emergency and elective tracheostomy. *Bangladesh J Otorhinolaryngol* 2015;21(2):69-75.
18. Mahmud M, Hossain MA, Sarkar MZ, Hossain HSM, Islam MO, Ahmed MU, Sattar MA. Tracheostomy in Intensive Care Unit: Indications, Benefits and Complications. *Bangladesh J Otorhinolaryngol* 2015;21(1):28-32.
19. Al-Azzawi AHS, Amer WKA, Al-Baidhani AKS. Management of Thyroid Isthmus During Tracheostomy. *Medical Journal of Babylon* 2016;13(2):388-391.
20. Asmatullah, Inayatullah, Rasool G, Billah M. Complication of emergency tracheostomy. *J Postgrad Med Inst* 2004;18(2):225-9.