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Frequency of Various Complications of Tracheostomy in Patients

Aqsa Sadaf[1], Murtaza Ahsan Ansari[1]

[1]Department of ENT / Head and Neck Surgery, Dow International Medical College, Dow University of Health Sciences, Karachi, Pakistan

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Correspondence to: Aqsa Sadaf, Postgraduate Resident, Department of ENT / Head and Neck Surgery, Dow International Medical College, Dow University of Health Sciences, Karachi, Pakistan.
Email: draqsamemon@yahoo.com

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ABSTRACT

Objective: To determine the frequency of various complication rate of tracheostomy and outlining the common indications and outcome of patients with tracheostomy in a tertiary care hospital of Karachi. **Study Design:** Descriptive longitudinal study. **Place and Duration of Study:** Department of Otorhinolaryngology (ENT) / Head and Neck Surgery, Dow International Medical College, Dow University of Health Sciences, Karachi, from January 2024 to June 2024. **Materials and Methods:** This study included A total of 97 patients of both genders underwent for either elective or emergency tracheostomy had age 18 – 65 years. All tracheostomies were performed by senior Otolaryngologist in the operation theater using open surgical technique under local or general anesthesia, transverse skin incision was given in elective cases and vertical skin incision in emergency cases. All patients were followed for 7 days to assess the complications. The data was analyzed with the help of SPSS version 26. Mean and standard deviation was calculated for quantitative variables and frequency and percentages were calculated for qualitative variables. **Results:** The different complications observed and were divided into immediate (occurring within 24 hours), early (within 7 days) and late (after 7 days). The immediate complications were tube obstruction 9 (9.3%), stomal and wound infection in 4 (4.1%) cases and emphysema 19 (19.6%) cases, early complications were bleeding 59 (60.8%) and apnea 10 (10.3%) and late complications were tracheal stenosis 1 (1.03%) and difficult decannulation 8 (8.2%). **Conclusion:** In the current study, emergency tracheostomies had a higher overall rate of complications. The most frequent consequence seen was bleeding.

INTRODUCTION

The development of a stoma at the skin's surface that leads into the trachea is referred to as a tracheostomy. One of the earliest surgical techniques, tracheostomy has a centuries-long history. Although it was not very successful, the treatment was first utilized to treat upper airway blockage in an emergency. Early in the 20th century, Chevalier Jackson improved surgical methods, lowering the death rate from 25% to 2%.[3]

Tracheostomy is often used as a therapeutic emergency operation. There are reportedly benefits to tracheostomy over translaryngeal intubation. Easy airway management, increased patient comfort, less sedation, oral feeding potential, better respiratory mechanics, avoidance of ventilator-associated pneumonia (VAP), and simpler weaning are the benefits. Nevertheless, even though tracheostomy is a safe treatment, difficulties may arise.[7] The literature cites tracheostomy complications ranging from 6 to 66 percent for surgical tracheostomy. There is a higher rate of complications in emergency settings, according to numerous research.[8]

The aim of this study was to determine the frequency of various complication rate of tracheostomy and outlining the common indications and outcome of patients with tracheostomy in tertiary care hospital. Going through the literature search, it was observed that, very little work has been done on this subject in our population; therefore, it was necessary to conduct this study to describe our own experiences with tracheostomy in our set up. Findings of this study would be helpful for clinicians so that better management strategies can be formed to minimize these complications.

METHODOLOGY

This study was carried out over a period of six months from January 2024 to June 2024 in the department of Otorhinolaryngology (E.N.T) / Head and Neck Surgery, Dow International Medical College, Dow University of Health Sciences, Ojha Campus, Karachi, after the approval of research protocol from Ethical Review Committee of the hospital. A total of 97 patients of both genders underwent for either elective or emergency tracheostomy had age 18 – 65 years were included via non-probability sampling

technique. "Patient with repeat tracheostomy, another procedure like total laryngectomy, tracheostomy tube removed within 24 hours after the procedure, performed as temporary procedure for administration of anesthesia like TMJ and other similar procedures were excluded. Patient with multiple systemic comorbidities including hypertension, blood disorders, chemotherapy recipients and on anti-coagulant therapy were also excluded". The sample was calculated by using OpenEpi calculator by taking the prevalence of disfiguring scar in tracheostomies patients i.e., 12.1% [11], margin of error = 6.5%, confidence interval = 95%, then calculated sample size was 97.

All tracheostomies were performed by senior Otolaryngologist in the Operation Theater using open surgical technique under local or general anesthesia, "transverse skin incision was given in elective cases and vertical skin incision in emergency cases". All patients will be followed for 7 days to assess the complications. Complications during and after surgical procedure of tracheostomy as immediate, early and late complications i.e. bleeding, apnea, tube obstruction, stomal infection, wound infection, emphysema, disfiguring scar and tracheal stenosis were noted.

"The data was analyzed with the help of SPSS version 26. Mean and standard deviation was calculated for quantitative variables and frequency and percentages were calculated for qualitative variables. Further, complications were compared between elective and emergency tracheostomies using chi-square/fisher exact test by taking p-value ≤ 0.05 as significant."

RESULTS

Ninety-Seven patients who underwent tracheostomy were included in this study. The mean age of the patients was 35.51 ± 3.19 years and mean BMI was 30.29 ± 18.59 kg/m^2. Male and female ratio was almost same 1:1.5. Most of the patients had monthly income between Rs. 21,000 to Rs. 50,000. Around 84 (86.6%) underwent for elective procedure. 91 (93.8%) had general anesthesia and only 6 (6.2%) had local anesthesia, as shown in Table 1.

The analysis of the presenting symptoms revealed that stridor was the commonest presenting complain and was present in 40 (41.20%) patients, 5 (5.1%) patients had stridor and dysphagia, 27 (28%) patients presented with dyspnoea and trismus was the mode of presentation in 25 (25.7%) patients.

The different complications observed and were divided into immediate (occurring within 24 hours), early (within 7 days) and late (after 7 days). The immediate complications were tube obstruction 9 (9.3%), stomal and wound infection in 4 (4.1%) and emphysema in 19 (19.6%) cases, early complications were bleeding in 59 (60.8%) and apnea in 10 (10.3%) cases and late complications were tracheal stenosis in 1 (1.03%) and difficult decannulation in 8 (8.2%) cases, as shown in Table 2.

Further, complications were compared between elective and emergency tracheostomies using chi-square/fisher exact test, the overall rate of complications in the present study has been found higher for emergency tracheostomies as compared to elective tracheostomies, as shown in Table 3.

Table 1

Baseline Data of the Patients

Demographic Data		n(%)/ (Mean + Sd)
Age (Years)		35.51 ± 3.19
BMI (kg/m^2)		29.93 ± 1.06
Gender	Male	52 (53.6%)
	Female	45 (46.4%)
Socio-economic Status	Less than and equal to Rs. 20,000	33 (34%)
	Between Rs. 21,000 to Rs. 50,000	64 (66%)
	Greater than Rs.50,000	0 (0%)
Type of Procedure	Elective	84 (86.6%)
	Emergency	13 (13.4%)
Type of Anesthesia	Local	06 (6.2%)
	General	91 (93.8%)

Figure 1

Presenting Symptoms of the Patients

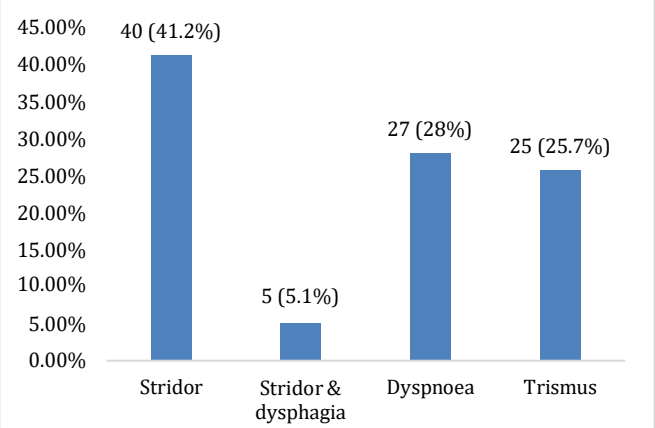

Table 2

Complications of Tracheostomy in Patients

Complications		n (%)
Immediate Complications	Tube Obstruction	9 (9.3%)
	Stomal and Wound infection	4 (4.1%)
	Emphysema	19 (19.6%)
Early Complications	Bleeding	59 (60.8%)
	Apnea	10 (10.3%)
Late Complications	Disfiguring scar	0
	Tracheal stenosis	1 (1.03%)
	Difficult decannulation	8 (8.2%)

Table 3

Comparison of the Complications of the Elective Versus Emergency Tracheostomies

Complications			Elective (n=84)	Emergency (n=13)	P-value
Immediate Complications	Tube Obstruction	Yes	06	03	0.009
		No	78	10	
	Stomal and Wound infection	Yes	02	02	0.02
		No	82	11	
	Emphysema	Yes	11	08	0.000
		No	73	05	
Early Complications	Bleeding	Yes	50	09	0.504
		No	34	04	
	Apnea	Yes	04	06	0.00
		No	80	07	
Late Complications	Tracheal stenosis	Yes	0	1	0.016
		No	84	12	
	Difficult decannulation	Yes	05	03	0.036
		No	79	10	

DISCUSSION

Making an incision in the trachea and exteriorizing it to the

cervical skin is known as tracheostomy, and it is frequently done on critically ill patients[7,8]. The patients in this study were 35.51 ± 3.19 years old on average. Additionally, 53.6% of cases were male, indicating a considerable gender preponderance. This may be because middle-aged and older guys are more likely to have laryngopharyngeal cancer with airway blockage, as well as cerebrovascular accidents and trauma that require protracted intubation with assisted ventilation and, ultimately, a tracheostomy. In other research, a comparable demographic picture was seen[11,12]. Additionally, compared to 86.6% in our series, elective tracheostomies were performed in 76% of instances in a retrospective investigation (n = 56).[13]

Tracheostomy is a technique that has rare but significant postoperative complications that affect the patient's outcome. Depending on the patient demographic, literature has found complication rates ranging from 6% to 66%.[14,15]

In our study, the different complications observed can be divided into immediate (occurring within 24 hours), early (within 7 days) and late (after 14 days). The immediate complications were tube obstruction 9 (9.3%), stomal and wound infection in 4 (4.1%) cases and emphysema 19 (19.6%) cases. The early complications were bleeding 59 (60.8%) and apnea 10 (10.3%), and late complications were tracheal stenosis 1 (1.03%) and difficult decannulation 8 (8.2%). This high complication rate may underscore the importance of careful monitoring and management post-tracheostomy. In our study, the commonest complication observed was bleeding.

"Complication may be immediate, early and late. Common complication has been excessive bleeding 6%, infection 4%, cardiac arrest 4%, surgical emphysema 2%, and tracheal stenosis 2% and scar disfuiguration 2%.[7] While complication rate remains low in elective procedure, it goes higher in emergency situations as 2 to 5 times".[8]

According to a different study, bleeding during the procedure is uncommon, but even little amounts might be fatal if they make it difficult to identify the trachea or open the airway. It is estimated that 5% of patients will experience both surgical and early bleeding. The most frequent cause of bleeding during a tracheostomy procedure is surgical technique errors[16].

Another study found that tracheal stenosis was the most common consequence, surpassing hemorrhage by a ratio of two to one.[17]Ligating the bleeding points stopped the bleeding, and diathermy was used to cauterize the area. By carefully retracting the veins in the operation field, hemorrhage during tracheostomy can be avoided.

Similar to other research conducted abroad, post-tracheostomy complication rates were found to be considerably greater in emergency tracheostomies than in elective ones.[18,19]Since emergency tracheostomy was always the norm and most UAO patients arrived late to the accident and emergency room with severe respiratory obstruction, the high prevalence of complications among these patients can be explained.

The single-centered study design and the small sample size of participants are among the study's weaknesses. The results of this study are further limited by the absence of a comparison group.

CONCLUSION

Tracheostomy can significantly improve the prognosis for patients in critical condition when it performed appropriately. However, there have been documented cases of severe and possibly lethal consequences. In the current study, emergency tracheostomies had a higher overall rate of complications. The most frequent consequence seen was bleeding. Careful attention to technique during surgery and proper after care can prevent all issues.

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