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Clinical Profile, Indications, and Complications of Tracheostomy in A Tertiary Care Centre

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Abstract
Tracheostomy is a frequently performed airway procedure in both emergency and elective settings, particularly for patients with upper airway obstruction, prolonged mechanical ventilation, or requiring tracheobronchial toileting. The clinical profile, indications, and complications of tracheostomy vary depending on institutional practices and patient demographics. To evaluate the demographic distribution, clinical indications, and complications associated with tracheostomy in patients managed at a tertiary care teaching hospital with a full fledged oncology and cardiac centre over a two-year period. This retrospective observational study included 98 patients who underwent tracheostomy between January 2022 and December 2023. Data were collected on age, gender, indication for tracheostomy, type of anaesthesia used, and procedure-related complications. The majority of patients were males (57.1%), and most tracheostomies were performed under local anaesthesia (68.4%). The peak incidence was in the age group 51–60 years with a mean age 52 (39.8%). The most common indication was respiratory obstruction (60.2%), primarily due to carcinoma of the hypopharynx, glottis,or supraglottis. Prolonged ventilation (30.6%) and Tracheobronchial toileting (6.1%) were other significant indications. The most frequent complication was tube blockage (20.4%), followed by infection at the tracheostomy site (12.2%). Respiratory obstruction due to upper aerodigestive tract malignancies remains the most common indication for tracheostomy in our setting. While the procedure is generally safe, complications such as tube blockage and infection are not uncommon. Routine post-operative monitoring and early recognition of complications are essential to reduce morbidity.

INTRODUCTION

Tracheostomy is one of the oldest and most commonly performed surgical procedures in otolaryngology and critical care settings. It involves the creation of a direct airway through an incision in the anterior tracheal wall, providing a secure and long-term airway in patients with compromised upper respiratory pathways or prolonged ventilatory needs[1]. Though once considered a last-resort procedure, tracheostomy has evolved into a planned intervention for several elective and emergency indications.

The most common indications for tracheostomy include upper airway obstruction, need for prolonged mechanical ventilation, tracheobronchial toileting in neurologically compromised patients, and facilitation of surgical access in major head and neck procedures[2]. In developing countries, particularly in India, obstructive lesions due to malignancies of the upper aerodigestive tract continue to dominate as indication for tracheostomy, contrasting with the more ventilation-centered indications seen in intensive care units in the West[3].

The demographic profile of patients undergoing tracheostomy often reflects the underlying disease burden. Studies have reported that tracheostomies are more frequently performed in males and in older adults due to the higher incidence of malignancies and comorbid conditions such as cerebrovascular accidents or cardiac surgery complications[4]. Local or general anaesthesia may be used depending on the urgency, patient cooperation, and overall medical status.

Although considered relatively safe, tracheostomy is not without complications. Immediate complications include bleeding, surgical emphysema, pneumothorax, and accidental decannulation. Intermediate and late complications include tube blockage, tracheal stenosis, infection of the tracheostomy site, and false tract formation[5]. Tube-related issues such as blockage or dislodgement are often preventable with meticulous postoperative care, yet remain a significant source of morbidity, especially in poorly resourced settings.

The choice of anaesthesia for tracheostomy also influences perioperative risk. While general anaesthesia offers optimal airway control and patient comfort, sometimes only option of adapting local anaesthesia in patients with mass lesions where intubation cannot be done[6].

During emergency settings a significant number of tracheostomies are performed and are associated with malignancies of the larynx, hypopharynx, and trachea. In such settings, postoperative care and follow-up are critical in reducing complication rates and improving quality of life.

Despite the high frequency of this procedure, few institutional studies comprehensively analyze the demographic distribution, clinical indications, and outcomes of tracheostomy. Understanding these variables in the local context is essential for improving patient selection, surgical planning, and complication management.

This study was undertaken to evaluate the clinical profile, common indications, and complications of tracheostomy performed at a tertiary care hospital over a two-year period. It aims to contribute institution-specific data to the existing literature and identify gaps in perioperative care that may be addressed through improved protocols and training.

MATERIALS AND METHODS

Study Design and Setting: This was a retrospective observational study conducted in the Department of ENT at a tertiary care teaching hospital with a full fledged oncology and major cardiac centre. The study was conducted using medical hospital record over a two-year period, from January 2022 to December 2023, and aimed to evaluate the clinical profile, indications, and complications associated with tracheostomy.

Study Population: A total of 98 patients who underwent tracheostomy during the study period were included. Patients were identified through surgical and hospital records maintained in the ENT operating theatre and inpatient wards.

Inclusion Criteria:

- All patients who underwent tracheostomy (emergency or elective) during the study period
- Both genders and all age groups
- Patients with complete records of indication, intraoperative anaesthesia, and postoperative outcomes

Exclusion Criteria:

- Patients who lost to follow-up / no follow up visit post discharge

Data Collection: Data were extracted from inpatient case sheets, operative records, and follow-up notes using a structured proforma. The following variables were documented:

- **Demographic Details:** Age and gender
- **Clinical Indication:** for tracheostomy (categorized into respiratory obstruction, prolonged ventilation, tracheobronchial toileting, and elective surgical access)
- **Type of Anaesthesia:** used during the procedure (local vs general)
- **Detailed Indication Breakdown:** by diagnosis (e.g., carcinoma supraglottis, cut throat, head injury, etc.)

- Complications, both early and late (e.g., tube blockage, surgical emphysema, infection, difficult decannulation)

Outcome Measures:
The primary outcomes assessed were:
- Distribution of tracheostomy indications
- Association with demographic factors
- Frequency and type of complications

Data Analysis: Collected data were entered into Microsoft Excel and analyzed using SPSS version 26.0. Descriptive statistics including frequencies, percentages, and means were calculated. Results were presented in tabular form. No inferential statistics were used, as the study was descriptive in nature.

Ethical Considerations: Institutional Ethical Committee clearance was obtained before the commencement of the study. Patient confidentiality was maintained throughout the data collection and analysis process.

RESULTS AND DISCUSSIONS

A total of 98 patients underwent tracheostomy over a two-year period at the tertiary care teaching hospital with a full fledged oncology and major cardiac centre. The demographic characteristics, indications, distribution by pathology, and complications were systematically analyzed.

The majority of patients were male (57.1%), and local anaesthesia was the preferred choice in 68.4% of the tracheostomy procedures, reflecting its suitability in emergency or semi-emergency settings.

Most patients who underwent tracheostomy were in the 51–60 years age group (39.8%), followed by those aged 41–50 years (28.6%), indicating a higher prevalence of indications in middle-aged to older adults.

The leading indication for tracheostomy was respiratory obstruction (60.2%), followed by the need for prolonged ventilation in neurologically or post-surgically patients. A small proportion required tracheostomy during head and neck cancer surgeries.

Among patients with respiratory obstruction, carcinoma of the hypopharynx (n=27) was the most frequent underlying diagnosis. In the prolonged ventilation group, post-cardiac surgery patients (n=17) constituted the majority.

The most common complication was tube blockage (20.4%), followed by local site infection (12.2%). Serious complications such as trachealstenosis and Esophageal injury were rarereflecting safe surgical practices but underscoring the need for vigilant postoperative care.

Tracheostomy remains an essential airway procedure in both emergency and elective surgical

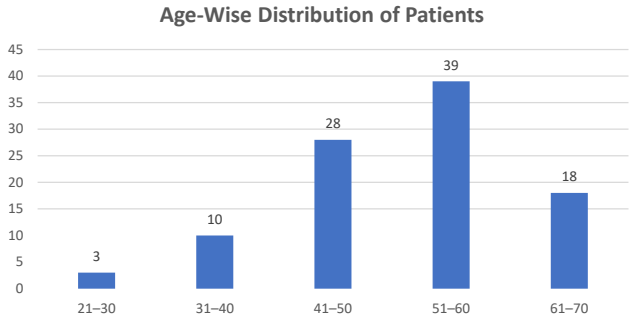

Fig.1: Age-Wise Distribution of Patients

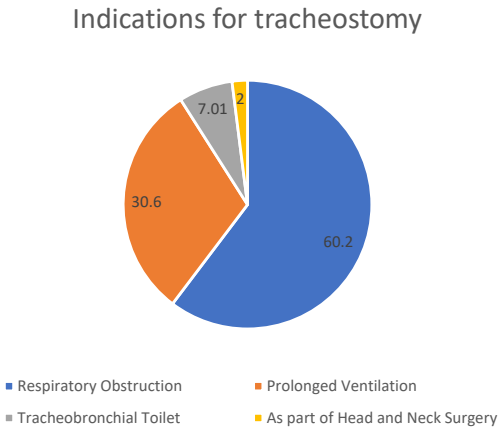

Fig.2: Indications for Tracheostomy

settings, especially in otolaryngology and intensive care. This retrospective study evaluated the clinical profile, major indications, and complications of tracheostomy over a two-year period at a tertiary care teaching hospital with a full fledged oncology and major cardiac centre with in south Tamilnadu. Our findings highlight key demographic patterns, underline malignancy-related obstruction as the predominant indication, and underscore tube-related complications as the most common postoperative concern.

In this study, males accounted for 57.1% of patients, a finding consistent with the male predominance reported in other Indian and international studies[1,2]. This gender disparity may be attributed to the higher incidence of upper aerodigestive tract cancers, chronic smoking, and occupational exposures in males, particularly in low- and middle-income countries.

The most frequent age group requiring tracheostomy was between 51–60 years, followed by the 41–50 year age bracket. This age distribution reflects the typical onset of laryngeal and hypopharyngeal cancers, which are most prevalent in the 5th to 6th decades of life. Moreover, with increasing life expectancy and coexisting medical comorbidities, older adults also tend to present more frequently with conditions like prolonged mechanical

Table 1: Demographic Profile and Type of Anaesthesia Used (n = 98)

Variable	Number of Patients	Percentage (%)
Gender		
Male	56	57.1%
Female	42	42.9%
Type of Anaesthesia		
Local Anaesthesia (LA)	67	68.4%
General Anaesthesia (GA)	31	31.6%

Table 2: Distribution by Specific Diagnoses Within Each Indication

Indication Subtype	Number of Patients
Respiratory Obstruction	
Carcinoma supraglottis	14
Carcinoma glottis	17
Carcinoma hypopharynx	27
Subglottic stenosis	1
Prolonged Ventilation	
Poisoning	4
Cut throat injury	3
Post cardiac surgery	17
Head injury	7
Tracheobronchial Toilet	
Cerebrovascular accident (CVA)	6
As part of Head and Neck Surgery	2

Table 3: Complications Following Tracheostomy (n = 98)

Complication	Number of Patients	Percentage (%)
Tube blockage	20	20.4
Infection at tracheostomy site	12	12.2
Failed decannulation	8	8.2
Surgical emphysema	5	5.1
Tracheal stenosis	2	2.0
Esophageal injury	1	1.0

ventilation and post-cardiac surgical complications requiring tracheobronchial toileting.

In our cohort, local anaesthesia (LA) was used in 68.4% of cases, especially in patients presenting with airway obstruction or those medically unfit for general anaesthesia. General anaesthesia (GA) was reserved for more controlled, elective procedures or for patients who were already intubated in the intensive care unit.

Prolonged ventilation was indicated in (30.6.%) of cases. Common scenarios included patients with organophosphate poisoning or cut-throat injuries, who required long-term airway support post-resuscitation. Early tracheostomy in patients requiring prolonged intubation is known to reduce ventilator-associated pneumonia and improve weaning success[7].

Tracheobronchial toileting was (7.1%). This was predominantly observed in patients with impaired cough reflexes or neurologic deficits, such as those recovering from or cerebrovascular accidents (CVAs) and some patients with head injury where we faced difficulty in decannuation and later achieved over a period of time. In such patients, tracheostomy facilitates suctioning and prevents aspiration, ultimately improving pulmonary outcomes and reducing ICU stay durations[8].

Tracheostomy was also performed in 2 patients as a planned adjunct to major head and neck surgeries, one patient with Anaplastic carcinoma of thyroid and other one with patient with papillary carcinoma of thyroid. While this constituted only a minor subset in our series, the role of elective tracheostomy in oncological procedures remains important for postoperative airway safety.

Complications following tracheostomy occurred in a significant number of patients. The most common was tube blockage (20.4%), often due to thick secretions or inadequate humidification. This preventable complication highlights the importance of proper tube care, regular suctioning, and humidified oxygen delivery[9].

Infection at the tracheostomy site was reported in 12.2% of cases. Most infections were local cellulitis and responded to antibiotics and local care. Surgical emphysema (5.1%), difficult decannulation (8.2%), tracheal stenosis (2%), Esophageal injury is was seen in a one patient who was diagnosed with carcinoma of Anaplastic thyroid esophageal injury (1%) were less frequent but clinically significant complications

The complication rates observed in our study are comparable to those reported in similar institutional series. Durbin et al. reported tube blockage and local infection among the top early complications of tracheostomy, reiterating the importance of standardizing tracheostomy care pathways[5]. Patient education and family training for tracheostomy maintenance-especially in the post-discharge phase-can significantly reduce the burden of preventable complications.

Our study also adds to the understanding of how institutional case mix affects tracheostomy practices. In contrast to western ICUs, where tracheostomies are predominantly done for ventilatory support, our centre continues to see a large proportion of patients with upper airway malignancies, reflecting regional epidemiology.

This study has a few limitations. Being retrospective, it depended on the accuracy and completeness of medical records. Data on long-term follow-up (beyond decannulation) were limited. Also, complications may have been under-reported if patients were lost to follow-up. Despite these limitations, the study provides a useful snapshot of real-world tracheostomy practices in a tertiary hospital and identifies areas for improved clinical and nursing protocols.

CONCLUSION

Tracheostomy continues to be a crucial intervention in the management of upper airway obstruction, prolonged ventilation, and pulmonary toileting. In our setting, head and neck malignancies remain the dominant indication, and complications such as tube blockage and infection are prevalent but largely preventable. Early identification of high-risk patients, protocol-based post-tracheostomy care, and regular training of caregivers can significantly improve patient outcomes and reduce morbidity.

Recommendations: Based on the findings of this study, it is recommended that all patients undergoing tracheostomy-especially those with head and neck malignancies or neurologically compromised status-receive structured preoperative counseling and standardized postoperative care protocols. Emphasis should be placed on intermit suctioning, humidified air and tube care to minimize complications like tube blockage and infection. Institutions should establish high dependency unit, dedicated tracheostomy care teams, good nursing care to be given with good suctioning and stoma care. and patient attender to be taught about tube removal and cleaning and to ensure consistent follow-up, especially in patients discharged with a tube in situ. Additionally, early identification and management of complications such as difficult decannulation or tracheal stenosis can improve outcomes and reduce long-term morbidity.

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