



## INDICATIONS AND COMPLICATIONS OF TRACHEOSTOMY AMONG PATIENTS ATTENDING A TERTIARY CARE CENTRE

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### ABSTRACT

**Background:** Tracheostomy is a surgical intervention that establishes an airway via creation of an opening into trachea. It is indicated in case of upper airway obstruction, secretions management, prolonged mechanical ventilation, and for the purpose of performing other interventions. It is necessary to provide postoperative care in order to avoid complications like bleeding, obstruction, infection, and tracheal stenosis.

**Materials and Methods:** It is a hospital based observational study that involves 90 patients, admitted at Assam Medical College & Hospital, Dibrugarh, in Department of Otorhinolaryngology suffering from respiratory problems or head-neck trauma and patients admitted in other departments needing tracheostomy.

**Results:** From the total number of 90 patients, majority were males (87.77%) with a mean age of  $50 \pm 17.18$  years. 70% of them undergone emergency tracheostomy due to difficulty in breathing, whereas 30% had elective tracheostomies. Upper airway obstruction was the main cause (62.23%), followed by prolonged ventilation in ICU patients (22.22%). This study found out that there are some differences regarding the anatomical site involved and some possible complications like bleeding, respiratory problems, and infections at the tracheostomy stoma site.

**Conclusion:** In summary, this study highlights the necessity for further development of tracheostomy through evidence-based practice and research for exceptional patient care.

**Keywords:** Tracheostomy, Upper Airway Obstruction, Prolonged Mechanical Ventilation, Bleeding.

### INTRODUCTION

Tracheostomy is a surgical procedure that creates an airway by making an opening in the front of the neck, connecting it to the windpipe (trachea), and inserting a tube to facilitate breathing.<sup>1</sup> Tracheostomy has ancient origins, with references in the Rigveda around 2000 BC and procedures performed by Sushruta between 1000–600 BC. The first documented successful tracheostomy is credited to Antonio Musa Brassavola in 1546 AD.

Fabricius introduced the use of a tube in the early 1600s AD, though the term “tracheostomy” was coined later by Heister in 1718. In 1730, George Martine developed a tube with an inner cannula to prevent obstruction. The procedure was standardized by Chevalier Jackson in 1932, and his principles still guide modern practice.<sup>2</sup>

Common indications for tracheostomy are - Upper respiratory tract obstruction, failure to wean off & to support mechanical ventilation, difficult intubation, pulmonary secretions, adjuvant procedure in major head & neck surgeries or trauma management.<sup>3</sup>

Using multidisciplinary teams and standardized tracheostomy protocols can lead to faster decannulation and better quality of life for patients with tracheostomies. Predicting potential complications and intervening early helps lower morbidity and mortality rates. Timing is critical: performing the tracheostomy before severe oxygen deprivation or permanent lung damage occurs makes post-operative management easier and reduces future complications.<sup>4</sup>



www.ajmrhs.com  
eISSN: 2583-7761

Date of Received: 08-05-2026  
Date Acceptance: 16-05-2026  
Date of Publication: 18-06-2026

This study aimed to evaluate indications and complications of tracheostomy in a tertiary care hospital.

**METHODS & MATERIALS**

**Type of Study:** Hospital based observational (prospective) study.

**Duration of Study:** One year ( November 2023–October 2024).

**Inclusion Criteria:** Participants included both genders who underwent tracheostomy.

**Exclusion Criteria:** Newborn cases, Patients not giving consent for tracheostomy.

**Methodology:** All patients presenting with Difficulty in breathing or head, neck trauma & patients admitted in ICU with prolonged intubation within inclusion criteria shall be included.

A comprehensive clinical history was obtained for all patients, documenting age, sex, and symptom duration. All patients were seen in the Department of ENT and ICU at Assam Medical College and

Hospital. A thorough clinical examination was performed. During local examination, particular emphasis was placed on indirect and direct laryngoscopic findings. Tracheostomy was performed in Department of Otorhinolaryngology as well as in ICU and various other departments.

**Ethical Clearance:** Ethical clearance was attained from Institutional Ethics Committee (H) of Assam Medical College & Hospital prior to the commencement of this study.

**Statistical Analysis:** Data were presented as frequencies and percentages. Statistical analysis was performed using SPSS version 20.0. Distributions were summarized using descriptive statistics and assessed with histograms. Statistical significance was set at  $p < 0.05$ .

**RESULTS**

The study was conducted in 90 patients who met the inclusion criteria. The results were analysed in following tables & figures.

Table 1: Showing Age Distribution

AGE (IN YEARS)	NO. OF CASES(n)	PERCENTAGE (%)
≤20	4	4.44
21-30	10	11.11
31-40	16	17.78
41-50	15	16.67
51-60	20	22.22
>60	25	27.78
<b>TOTAL</b>	<b>90</b>	<b>100</b>
<b>MEAN±SD</b>	<b>50.44±17.18</b>	

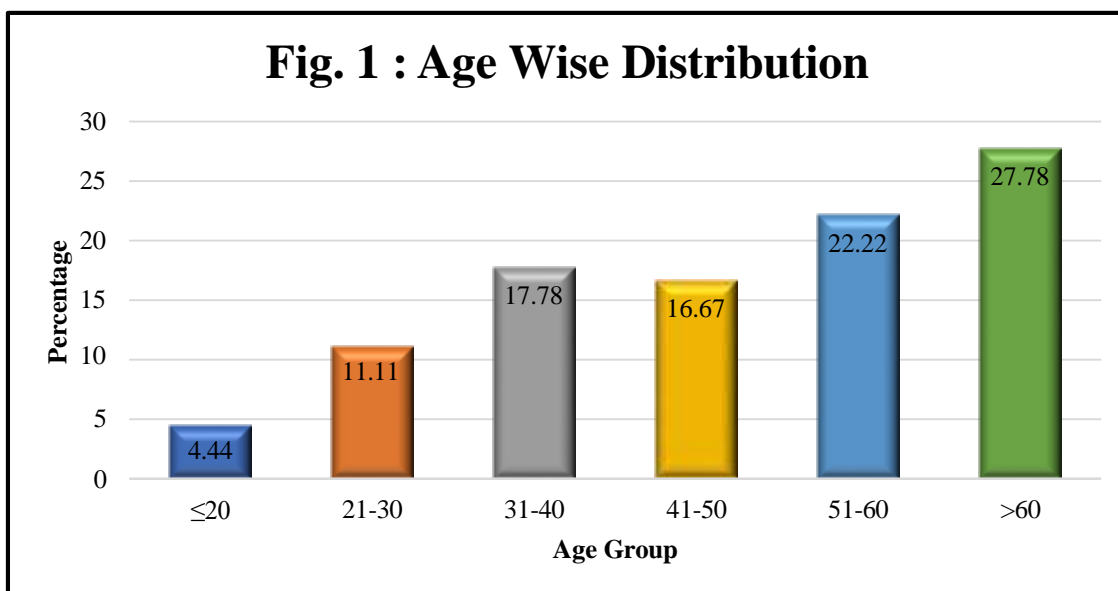
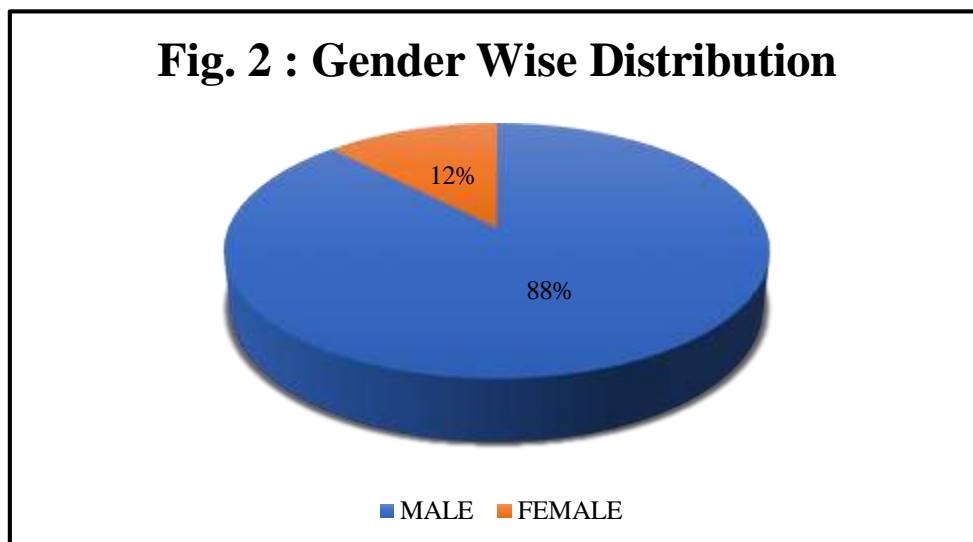


Fig. 1 reveals that individuals aged above 60 represented the largest group, with an overall mean age of  $50 \pm 17.18$  years. The 51–60 age bracket came in second. Following these, 16 participants fell

within the 31–40 range, while 15 were aged 41–50. Those between 21 and 30 years accounted for 10 participants, and the smallest group consisted of 4 individuals who were younger than 20.



In our study, the population was predominantly male, accounting for 87.77%, while females

comprised 12.22%, resulting in a male-to-female ratio of approximately 8:1.

Table 2: Showing Indications of Tracheostomy

Indications of Tracheostomy	Frequency	Percentage (%)
Upper Airway Obstruction	56	62.23
Prolonged Ventilation	20	22.22
Removal Of Secretions	3	3.33
Others	11	12.22
Total	90	100.00

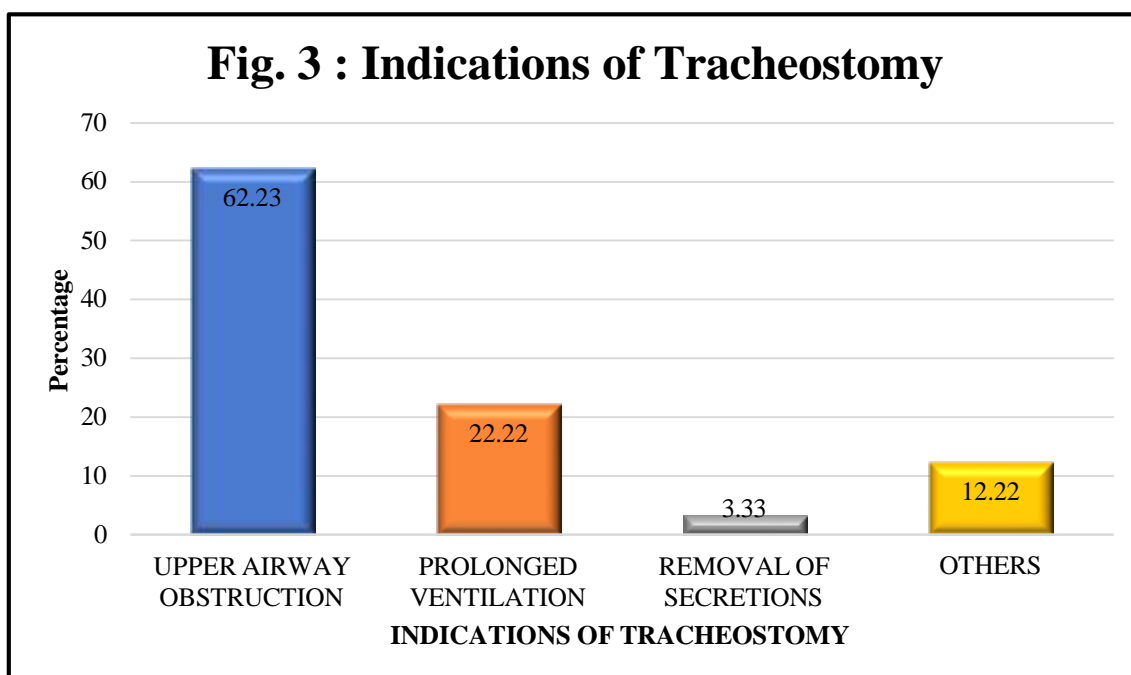
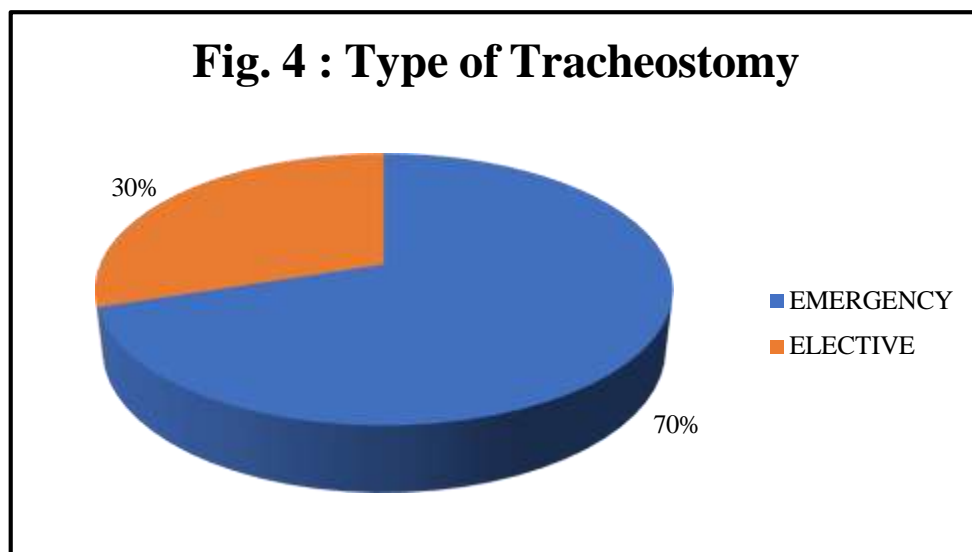


Fig. 3 showing upper airway obstruction was the leading indication for tracheostomy, accounting for

62.23% of cases, predominantly involving head and neck cancer patients with compromised airways.

The remaining cases were distributed among ICU patients requiring prolonged mechanical ventilation, which made up 22.22% (20 cases), followed by 3.33% (3 cases) where the procedure was performed to clear accumulated respiratory secretions in ICU

settings. Additional indications, such as difficulties encountered during oral or nasal intubation, were observed in 12.22% (11 patients) of the remaining cases.

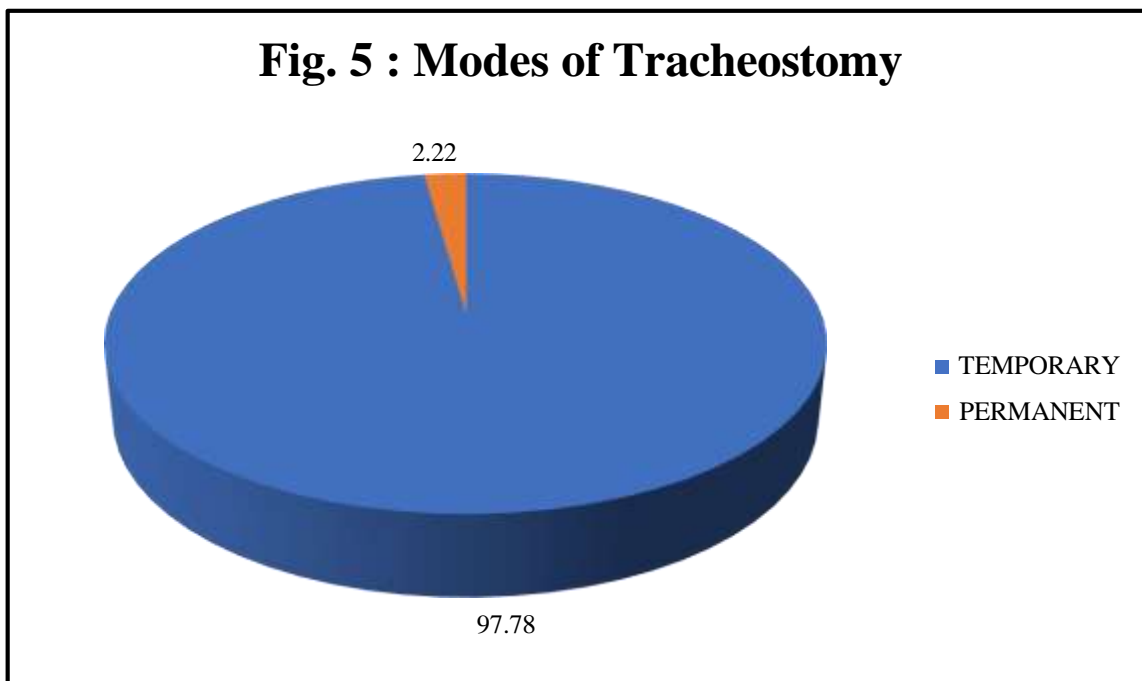


In our study as per fig.4, tracheostomy was predominantly performed under emergency conditions in 63 (70%) cases, most of whom were head and neck malignancy patients presenting with inspiratory or biphasic stridor. The remaining 27

(30%) underwent elective tracheostomy, primarily involving patients requiring prolonged ICU intubation and those with head and neck malignancies presenting with hoarseness or dysphagia.

Table 3: Showing Modes of Tracheostomy

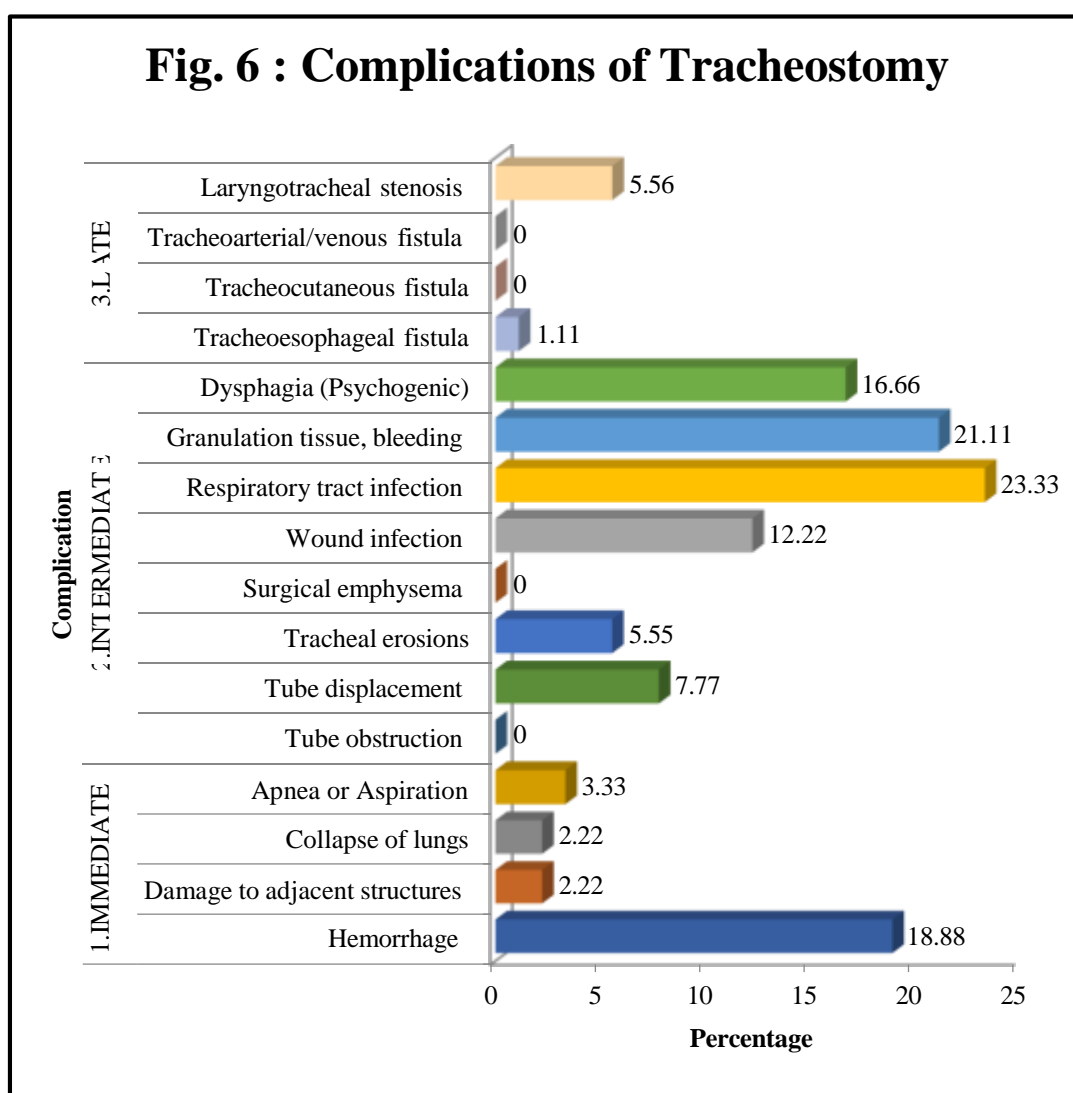
Mode of Tracheostomy	No. of Cases(N)	Percentage (%)
Temporary	88	97.78
Permanent	2	2.22
Total	90	



As per table 3 out of the 90 patients, 97.78% (n=88) underwent temporary tracheostomy and were subsequently managed with fenestration and decannulation following resolution of the underlying condition. Only 2 patient's required permanent tracheostomy, both presenting with severe neck trauma complicated by tracheal stenosis and referred to a higher centre for further management.

As per fig. 6 bleeding was the most frequent immediate complication (18.88%), with most episodes being minor. Less common immediate

complications included apnea/aspiration (3.33%), loss of airway (2.22%), and adjacent structure damage — notably thyroid tissue in two cut neck trauma cases (2.22%). Among intermediate complications, stoma site infection predominated (23.33%), followed by respiratory tract infection (21.11%), psychogenic dysphagia (16.66%), surgical emphysema (12.22%), tube obstruction (7.77%), and tube displacement (5.55%). Laryngotracheal stenosis was the primary late complication (5.55%), typically manifesting one to two months post-procedure.



**DISCUSSION**

A prospective study of 90 patients undergoing tracheostomy was conducted across the ENT, Critical Care, and Intensive Care Units at Assam Medical College and Hospital, aimed at evaluating the indications and complications associated with the procedure. In our study mean age of patients is  $50.44 \pm 17.18$  and has range of 17 – 88 years where as in a study by **L. Costa et al.**, mean age was 55

years in age group from 0 to 87 years<sup>5</sup> and In study by **Yuen et al.**, mean age was 61 years.<sup>6</sup> Male-to-female ratio in our study is of approximately 7.18:1. **Alidad et al.** also noted male predominance in their study with 66.1% male patients.<sup>7</sup> In study done by **Bamigboye et al.**, male : female were 2:1.<sup>8</sup> Gender distribution differences may reflect influences such as geographic, dietary, and lifestyle factors. The higher incidence of

laryngeal and hypopharyngeal malignancies in males is notably associated with habits like alcohol consumption and tobacco use.

As per our study tracheostomy was most commonly indicated for upper airway obstruction (62.23%), followed by prolonged ventilation in ICU patients (22.22%), secretion clearance (3.33%), and other causes including difficult intubation and cut neck injuries (12.22%). Evaluation was carried out via rigid endoscopy and radiological workup. In study by **Kaufman et al.**, upper airway cancers was primary indication for conscious tracheostomy (87.1%).<sup>9</sup> As per **Sagiv et al.** the major indication was head & neck cancers (70.3%).<sup>10</sup> In study by **J. Phookan et al.**, malignant lesions were the leading indication for tracheostomy (82.47%), followed by prolonged ICU ventilation (9.28%), throat lacerations (7.22%), and miscellaneous causes (1%).<sup>11</sup>

In our study immediate complications (within 24 hours) included hemorrhage (18.88%), apnea/aspiration (3.33%), airway loss (2.22%), and adjacent structure damage such as thyroid tissue injury (2.22%), predominantly in cut neck injury patients. Intermediate complications featured stoma site infection (23.33%), respiratory tract infection (21.11%), and psychogenic dysphagia (16.66%). Laryngotracheal stenosis (5.55%) was the principal late complication, observed mainly in patients with prolonged tube placement. **Fang et al.** reported postoperative bleeding in 7.4% of patients, with long-term complications including tracheitis (7.4%) and suprastomal granuloma (2.9%).<sup>12</sup> **Rashid et al.** reported hemorrhage as the most common early complication (8.33%), followed by surgical emphysema (5.83%), wound infection (5.43%), tube displacement (4.47% elective, 5.33% emergency), and tube blockage (2.67% emergency, 2.2% elective).<sup>13</sup>

**Limitations of the Study:** The study had certain limitations, including loss to follow-up of some patients and a relatively small sample size.

## CONCLUSION

Tracheostomy remains a vital lifesaving intervention. Upper airway obstruction was the primary indication, with hemorrhage, stoma infection, and laryngotracheal stenosis as key complications across respective timeframes. Electrocautery use and strict surgical protocols minimized bleeding. Early screening, timely intervention, and thorough postoperative education are essential to improving outcomes and reducing complication rates.

**Conflict of Interest:** None declared.

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**How to cite this article:** Dr. Prakash Patel, Dr. Rupanjita Sangma, Dr. Kum Kum Bora, Dr. SH Masud, INDICATIONS AND COMPLICATIONS OF TRACHEOSTOMY AMONG PATIENTS ATTENDING A TERTIARY CARE CENTRE, Asian J. Med. Res. Health Sci., 2026; 4 (2): 983-989.

**Source of Support:** Nil, Conflicts of Interest: None declared.