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Indications, Timing and Outcomes of Tracheostomy: a Hospital Based Descriptive Study of Head and Neck Surgery Division Dr. Soetomo Hospital Surabaya

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Abstrack
Tracheostomy is a surgical procedure that creates an opening in the anterior tracheal wall, performed either urgently or electively based on the severity of upper airway obstruction and underlying conditions. Over time, the indications and complications of tracheostomy have evolved, necessitating further evaluation of its use in clinical settings. This study aims to analyze the common indications, timing, and outcomes of tracheostomy in patients treated under the Head and Neck Surgery Division of Dr. Soetomo Hospital Surabaya. This retrospective descriptive study included all patients who underwent tracheostomy in the Head and Neck Surgery Division from January 2019 to December 2023. Data were obtained from medical records, processed, and analyzed descriptively using IBM SPSS Statistics. Over a five-year period, a total of 450 patients underwent tracheostomy, with the majority aged 51-60 years, and male patients predominating. The most common indication for tracheostomy was mechanical ventilation, followed by upper airway obstruction (146 cases). The most frequently encountered complication was stomal infection, along with bleeding. The most common diagnosis among tracheostomy patients included prolonged ventilator dependence, maxillofacial trauma, and cervical trauma. Mortality was attributed to underlying diseases rather than tracheostomy-related complications. These findings highlight the continued necessity of tracheostomy in managing upper airway obstruction and prolonged ventilation while emphasizing the importance of infection control measures to minimize complications. Future research should explore long-term functional outcomes, the impact of early versus late tracheostomy, and strategies to reduce postoperative complications. Additionally, studies investigating alternative airway management techniques and their effectiveness compared to traditional tracheostomy could provide valuable insights for optimizing patient care.
Keywords: tracheostomy, airway obstruction, ventilation

Introduction

Tracheostomy is one of the oldest surgical procedures on record, dating back as far as 3600 BC in Egypt.(Khan et al., 2024) Even though there are several methods for addressing airway obstruction, it is still a tried-and-true life-saving therapy.(Walker, 2021) Tracheotomy is the creation of a surgical opening into the anterior trachea wall.(Rosero et al., 2021) Patients who have had trouble weaning off a ventilator are the ones who undergo it the most frequently, followed by those who have experienced trauma or a catastrophic brain insult.(Salmani et al., 2022) The indications for tracheostomy have gradually expanded to include tracheobronchial toileting, intermittent positive pressure ventilation, protection against inhaling foreign bodies and reduction of dead space, and anesthetic indications.(Gurunathan et al., 2021) Previously, tracheostomy was only used for critically ill patients with acute respiratory obstruction. (Schmidt et al., 2021)

Percutaneous endoscopically guided tracheostomy or endotracheal intubation have been used to treat an increasing number of airway issues in recent years.(Zouk & Batra, 2021) However, in our nation, conventional tracheostomy is used in the great majority of instances to treat airway

issues, and percutaneous endoscopically guided tracheostomy is not yet often used.(Roy et al., 2023)

Tracheotomy can be performed urgently or electively, depending on the underlying condition and the extent of upper airway blockage.(Gumussoy & Çukurova, 2025a) When to perform a tracheostomy is crucial. The best time to perform a tracheostomy is when the attending physician first considers it in a given case.(Nageswaran et al., 2024) This is because it greatly simplifies post-operative care and helps to reduce the likelihood of future complications if the procedure can be completed before severe anoxia and irreversible lung damage have already occurred. Elective tracheostomy is significantly.(Volo et al., 2021)

Depending on the extent of upper airway blockage and underlying disease, tracheostomy might be performed electively or urgently.(Gumussoy & Çukurova, 2025b) The tracheostomy's timing is crucial. In fact, the best time to perform a tracheostomy is when the attending physician first considers it in a given case.(Liu et al., 2024) This greatly simplifies post-operative care and helps to reduce the upcoming complications if the procedure can be completed before severe anoxia and irreversible lung damage have set in. (Gaware & Babu, 2024) Waiting until an emergency arises is far less advantageous than elective tracheostomy.(Piazza et al., 2021)

Tracheotomy complications are separated into three categories based on when they occur: surgical complications, early postoperative difficulties, and late postoperative complications. (Jotic et al., 2021) Tracheostomy mortality is 2% and complications range from 5% to 40%. In critical patients, small children, and crises, complications increase two to five times. (Buttermore et al., 2021) Early postoperative problems, such as subcutaneous emphysema, hemorrhage, and death, are the complications that need to be investigated.(Tweedle, 2023) It is crucial to consider the tracheostomy profile, which includes the extent of airway blockage, underlying medical conditions, post-procedure operations, and complications.(Nyanzi et al., 2023) It is anticipated that this will increase motivation to lessen the likelihood of difficulties.(Rahiem, 2021) Research is required to complete the data because the Head and Neck Surgery Division of Dr. Soetomo Hospital does not currently have updated information on tracheostomy patients.(Toer et al., 2022)

Research Methods

This is a retrospective, descriptive study, including all patients who underwent tracheostomy under the Division of Head and Neck Surgery of the Dr. Soetomo Hospital from January 2019 to December 2023. The sample for this study was medical records that met the inclusion and exclusion criteria. The inclusion criteria were medical records of patients who underwent tracheostomy with the doctor in charge of Head and Neck Surgery at RSDS from January 2019 to December 2023. Exclusion criteria are incomplete medical record data. The variables examined in this study includes demographic profile, primary diagnosis, indication for tracheostomy and surgery outcome/complications, operation time. gender, age, degree of airway obstruction, diagnosis, procedures following tracheotomy, and types of complications. Data were collected and processed descriptively using the IBM SPSS Statistics version 23.0.

Results and Discussion

In our study, we analysed 450 patients who underwent tracheostomy during 5 years period from Januari 2019 to Desember 2023. The study was carried out in the Division of Head and Neck Surgery Dr. Soetomo Hospital Surabaya. Among the 450 patients, there were 291 (64,7%)

males and 159 (35,3%) females. The predominant age group was 51-60 years (20,4%). The youngest patient was 1 years old and the oldest was 88 years old. In our study, emegency tracheostomy was done for 345 patients (76,7%) whereas the remaining 105 cases (23,3%) underwent elective tracheostomy. The most common indication for tracheostomy in our study was mechanical ventilation 262 cases (58,2%), followed by upper airway obstruction 146 cases (32,4%). They were mainly due to maxillofacial and/or cervical trauma 36 (8,0). 9,3% of cases underwent tracheostomy for other causes like tracheal stenosis, myasthenia gravis or failed intubation.

Out of 450 patients, 67 patients (16,2 %) were noted to have complications. Stomal infection was the most common complication found in this research, experienced by 35 (8,0%) patients, followed by bleeding 22 (4,9%) patients and subcutaneous emphysema 10 (2,2%) patients. Tracheostomy decannulation wa susccessfully performed before patients disrcharged in 144 (32,0%) patients. The remaining 51 (11,3%) patients had difficulty in decannulation before being discharged and were followed up. The majority 255 (56,7%) patients was died during the study period due to worsening of their underlying systemic conditions.

Table 1. Percentage distribution of sample according to gender

Gender	Number of patients	Percentage (%)
Male	291	64.7
Female	159	35.3
Total	**450**	**100%**

Table 2. Percentage distribution of sample according to age

Age Distribution	Number of patients	Percentage (%)
0-10	44	9.8
11-20	39	8.7
21-30	31	6.9
31-40	43	9.6
41-50	61	13.6
51-60	92	20.4
61-70	83	18.4
71-80	49	10.9
>81	8	1.8
Total	**450**	**100%**

Table 3. Percentage distribution of sample according to tracheostomy timing

Timing	Number of patients	Percentage (%)
Emergensi	345	76.7
Elektif	105	23.3
Total	**450**	**100%**

Table 4. Percentage distribution of sample according to tracheostomy indication

Indication	Diagnosis	Number of patients	Percentage (%)
Upper Airway Obstruction		146	32.4
	Maxilofacial and/or cervical Trauma	36	8.0
	Thyroid Neoplasm	22	4.9
	Oral Cavity Neoplasm	18	4.0

Indication	Diagnosis	Number of patients	Percentage (%)
	Infection	28	6.2
Mechanical Ventilation	Prolonged Ventilator/ Mucus Retention	262	58.2
Others	Tracheal stenosis, Myasthenia gravis, Failed intubation	42	9.3

Table 5. Percentage distribution of sample according to complication

Complication	Number of patients	Percentage (%)
Yes	67	16.2
• Bleeding	22	4.9
• Subcutaneous emphysema	10	2.2
• Stomal infection	35	8.0
No complication	377	83.8
Total	**450**	**100%**

Table 6. Percentage distribution of sample according to outcome

Outcome	Number of patients	Percentage (%)
Death	255	56.7
Survive	195	43.3
Decanulation	144	32.0
Difficult in decanulation	51	11.3
Total	**450**	**100%**

Discussion

Tracheostomy is currently one of the most commonly performed operations in the critically ill patients. Out of 450 patients included in the study, 291 patients were males and 159 females. In most of the studies worldwide, the same findings show a male predominance among tracheostomized patients.[7,8] Male predominance seen in these and ours studies may be due to their poor lung compliance and the risk of malignancy as a result of their habits of smoking and alcohol consumption.

The patients in this study ranged from 1 to 88 years old, with the predominant age group from 51-60 years, similar to the study of Menon et al.[9] The most common indication for tracheostomy in our study was mechanical ventilation due to prolonged intubation or mucus retention, followed by upper airway obstruction 146 cases (32,4%). They were mainly due to maxillofacial and/or cervical trauma 36 (8,0). 9,3% of cases underwent tracheostomy for other causes like tracheal stenosis, myasthenia gravis or failed intubation.

In our study high incidence of traumatic causes of upper airway obstruction was seen in the third and fourth decades of life. These results are comparable with study by Crysalde et al. [10] Trauma to the head and neck was the leading indications in the 3rd decade of life in our study and interestingly the majority of these injuries were from road traffic accidents involving motorcycles. This could be due to the increase use of motor cycles by younger generation in this part of country and their noncompliance for using helmets.

The presence of postoperative complications has an impact on the final outcome of tracheostomized patients. The incidence of postoperative complication in our study was 14,9 %. Tracheostomy complication rates were found higher in emergency tracheostomy than in elective one. These findings were similar to studies by Chandrika et al. and Hamid et al. [10,11] High complication rate in patients who had emergency tracheostomy can be explained by the fact that the majority of patients with upper airway obstruction presented late to the Emergency Medicine Department in severe respiratory obstruction. Stomal infection was the most common complication found in this research, experienced by 35 (8,0%) patients, followed by bleeding 22 (4,9%) patients and subcutaneous emphysema 10 (2,2%) patients. The stoma infection have a higher rate in our center most likely due to the knowledge of the medical staff and patient's care taker about tracheostomy care. Bleeding in 22 patients were occurred during the first 24 hours was mainly from the wound edges which subsided completely with pressure dressing around the stoma and controlled by coagulating or ligating the bleeding source.

The overall mortality recorded in our study was 56,7% and these were from underlying diseases. There was no mortality attributed to tracheostomy or its complications in the present study. Tracheostomy decannulation wa susccessfully performed before patients disrcharged in 144 patients and the remaining 51 patients had difficulty in decannulation before being discharged and were followed up. The difficulty in decanulation mostly due to lack of swallowing/secretions/cough management during care.

Conclusion

The results of this study found that the patients who underwent tracheostomy by Head and Neck Surgery Division during the period January 2019 - December 2023 at RSUD Dr. Soetomo Surabaya were 450 people, the number of male more than female, with the largest age group being 51-60 years. The most common diagnosis in patients undergoing tracheostomy was prolonged ventilator followed by maxillofacial and/or cervical trauma. The most common complication is stomal infection and bleeding. The overall mortality were from underlying diseases.

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