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Original Research Article

Travails of tracheostomy

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ABSTRACT

Background: Tracheostomy is a surgical procedure which consists of making an incision on the anterior aspect of the neck and opening a direct airway through an incision in the trachea.
Methods: This was a prospective study which included 50 patients who underwent tracheostomy between September 2020 to April 2022. Our study was aimed to report the most common indications, complications, outcomes in tracheostomised patients. For evaluation of patients undergoing tracheostomy, a database was created which included demographic profile of the patient such as age, gender, diagnosis as well as indication, complications which were divided into early, intermediate and late complications and day of decannulation.
Results: Among 50 patients, 41 (82%) were males and 9(18%) patients were females. The age of the patients included in this study ranged from 20 to 80 years. Majority were in age group between 40 to 60 years (48%). Out of 50 patients, 39 (78%) patients underwent tracheostomy due to prolonged intubation (CVA, head injury, organophosphorus poisoning, respiratory failure), 11 (22%) for upper airway obstruction due to malignancy.
Conclusions: In this study 40 to 60 years was the most common age group for which tracheostomy was done. It was done more in males. Most common indication for tracheostomy was prolonged ventilation followed by malignancy. Incidence of complications was 76%. Most common early complication observed was haemorrhage, most common intermediate complication was tube blockage and most common late complication was tracheoesophageal fistula. Mortality occurred in 6 patients. To conclude even today tracheostomy remains the lifesaving procedure and complications of tracheostomy are largely preventable.

Keywords: Tracheostomy, Indications, ICU, Complications, Decannulatiom

INTRODUCTION

Tracheostomy is a surgical procedure which consists of making an incision on the anterior aspect of the neck and opening a direct airway through an incision in the trachea. Despite being one of the most common surgical procedures it is the most challenging because of the medical complexities presented by many patients requiring it.[1]

The first successful tracheostomy was performed by Antonio Moussa Brasavola for a patient who was suffering from a laryngeal abscess. Chevalier Jackson revised and refined indications and techniques of the procedure as known today and tracheostomy has become a commonly performed procedure. In the past, the commonest indication was acute inflammatory airway obstruction such as epiglottitis and laryngotracheobronchitis or croup, diphtheria, Ludwig's angina or anaphylaxis. With the advent of early diagnosis and treatment this has changed and prolonged intubation has become the most common indication of tracheostomy.[2]

Tracheostomy has many potential advantages over translaryngeal intubation. It decreases airway resistance (even for tubes of identical inner diameter), is responsible for fewer oral-labial ulcerations, facilitates oral hygiene, eases bronchopulmonary toilet, and improves airway security. It also contributes to fewer pulmonary infections and improved patient comfort. It also facilitates lower dose of sedative drugs administration, less time spent heavily sedated, and enhances patient mobility and ability to be fed orally. However, the effect of tracheostomy on ICU and in-hospital outcomes remains the topic of debate.[3]

Traditionally, tracheostomies have been performed by surgeons in the operating room in a procedure aptly termed surgical tracheostomy (ST), or open tracheostomy. Today, STs are also performed in the ICU at bedside to avoid complications that arise with transporting the patient. Percutaneous dilatational tracheostomy (PDT) is mostly performed as a bedside procedure where tracheostomy tube is placed in the trachea after creating an opening in the trachea by blunt dissection of pre tracheal soft tissue with the help of Seldinger technique. Studies have shown percutaneous tracheostomy to increase risk of tracheal stenosis and recent work suggested that PTs may have increased mortality rates when compared to ST.[4]

METHODS

Our study is aimed to report the most common indications, complications, outcomes in tracheostomised patients. Our study also reports some special case scenarios.

This was a prospective study which includes 50 patients, done in the Ear, Nose and Throat (ENT) department at Dr. B. R. Ambedkar College and Hospital, Bangalore, between September 2020 and April 2022.

Consent was obtained from patients or guardians of patients who underwent tracheostomy. No patient who underwent tracheostomy during the study period was excluded since consent was obtained from them all.

For evaluation of patients undergoing tracheostomy, a database was created which included demographic profile of the patient such as age, gender, diagnosis as well as indication, complications which were divided into early, intermediate and late complications and day of decannulation.

We included patients mechanically ventilated, and not tracheostomized at ICU admission.

All tracheostomies were done by open technique in supine position with extension at neck. In intubated patients, we had to pull the endotracheal tube up to vocal cords after deflating the cuff.

Data collection and management

A pre-defined data collection tool was used to collect data which included demographics such as age and gender as well as indication for tracheostomy, type of tracheostomy, immediate complications, immediate outcomes and time of decannulation. Subsequent visits were made to the patient to record intra-operative complications and a visit 48 hours after surgery to document any post-operative complications. Data analysis was done using SPSS-14.0 and Microsoft excel.

RESULTS

Among 50 patients, 41 (82%) were males and 9 (18%) patients were females.

Table 1: Distribution according to gender of the study patients.

Sex	Number of patients	Percentage (%)
Male	41	82
Female	9	18
Total	50	100

The age of the patients included in this study ranged from 20 years to 80 years. Majority were in age group between 40 to 60 years (48%).

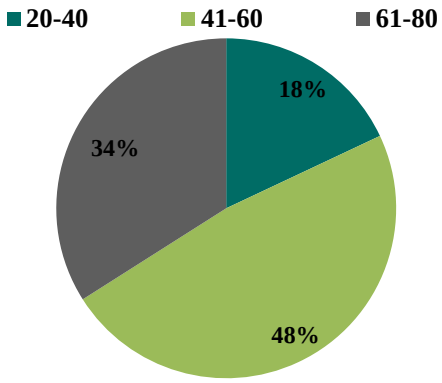

Figure 1: Distribution according to age of the study patients.

Out of 50 patients, 39 (78%) patients underwent tracheostomy due to prolonged intubation (cerebrovascular accident, head injury, organophosphorus poisoning, respiratory failure), 11 (22%) patients underwent tracheostomy for upper airway obstruction due to malignancy (malignancy of oral cavity, oropharynx, larynx, hypopharynx, oesophagus).

Out of 50 patients, 38 (76%) developed complications, of which intermediate complications were encountered in 32 (64%) patients, followed by early complications in 5 (10%) patients and late complications in remaining 1 (2%) patient.

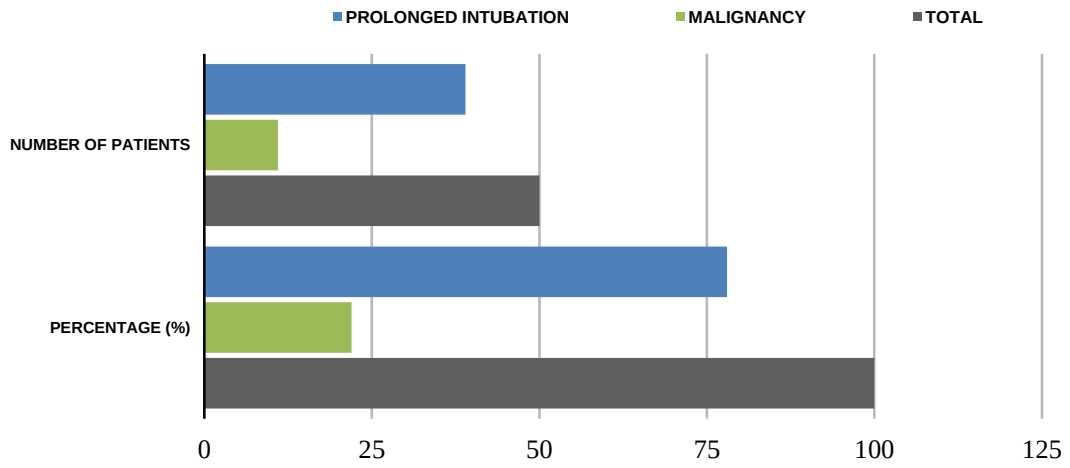

Figure 2: Distribution according to indications for tracheostomy.

Commonest early complication was haemorrhage encountered in 3 (6%) patients; apnoea was seen in 2 (4%) patients. The most common intermediate complications were tube blockage seen in 23 (46%) patients followed by local wound infection and granulations in 7 (14%) patients, subcutaneous emphysema in 2 (4%) patients. Late complication was Tracheo-esophageal fistula encounterd in 1 (2%) patient.

Out of 50 patients, 9 (18%) patients were decannulated between the day 10-14 of tracheostomy, 22 (44%) patients were decannulated after 20 days of tracheostomy and 13 (26%) patients were decannulated after a month of tracheostomy.

Table 2: Distribution according to complications observed.

Type of complications	Number of patients	Percentage (%)
Early	5	10
Intermediate	32	64
Late	1	2
No	12	24
Total	50	100

Among 50 tracheostomised patients, 6 patients died due to cause unrelated to tracheostomy, making mortality rate of 12%.

Table 3: Distribution according to the time of decannulation.

Time of decannulation (days)	Number of patients	Percentage (%)
10-14	9	18
> 20	22	44
> 30	13	26

DISCUSSION

Tracheostomy is a surgical procedure which consists of making an incision on the anterior aspect of the neck and opening a direct airway through an incision in the trachea.

Tracheostomy has an important role in the airway management of ICU patients. Several studies have identified the benefits of tracheostomy over endotracheal intubation, such as sparing further injury from translaryngeal intubation, providing a stable airway, facilitating pulmonary toilet, increasing patient comfort and mobility, permitting speech and feedings, and facilitating weaning from the ventilator.[5]

Tracheostomy tubes

Tracheostomy tubes have a main shaft (cannula) attached to a neckplate (or flange), and cuffed tubes have a pilot balloon, which shows whether the cuff is inflated. The neck plate has a slot where ties can be placed, and fenestrated tubes can have a cuff and/or inner cannula. Their insertion is aided with an obturator. Tracheostomy tubes can be made from metal (silver or stainless steel) or most commonly, from plastic (polyvinyl chloride, silicone, or polyurethane).[6]

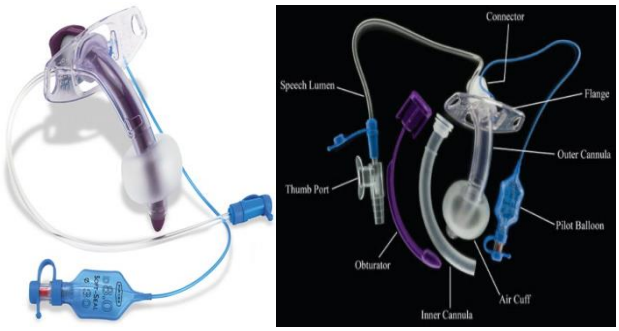

Figure 3: Tracheostomy tubes.

Complications

Complications of tracheostomy can be considered occurring in three-time frames: immediate, early (0–7 days of procedure) or late (beyond day 7). Immediate complications include haemorrhage, damage to nearby structures, air embolism, aspiration, loss of airway, hypoxaemia, hypercarbia, death.

Early are haemorrhage, tube displacement, pneumothorax, pneumo-mediastinum, subcutaneous emphysema, stomal infection, stomal ulceration, accidental decannulation, dysphagia. Late complications include tracheal stenosis, tracheomalacia, granulation tissue, pneumonia, aspiration, tracheovascular fistula, tracheoesophageal fistula, accidental decannulation, dysphagia.[7]

Decannulation

If the patient is able to breathe around the tube when it is occluded then there is no need to downsize the tube, which is usually the case if the initial cuffed tube has been replaced with an uncuffed fenestrated tube. Decannulation should take place in an ordered sequence. The tube should be blocked during the day and unblocked at night for the first 24 hours. If the patient tolerates this, then the tube can be occluded for a full 24-hour period and if this is tolerated then the tube can then be removed. If the patient is unable to tolerate this occlusion of the tube, then it may be necessary to downsize the tube to give more room around it. Once the tube has been removed an airtight dressing must be applied to occlude the stoma.[8]

Limitation

Long term follow up of patients for outcomes and late complications associated with tracheostomy were beyond the scope of this study.

CONCLUSION

In this study 40 to 60 years was the most common age group for which tracheostomy was done. It was done more in males than females. The most common indication for tracheostomy was prolonged ventilation followed by malignancy. Incidence of complications was 76%. The most common early complication observed was haemorrhage, most common intermediate complication was tube blockage and most common late complication was tracheo-esophageal fistula. Mortality occurred in 6 out of 50 patients.

During this study, we encountered certain challenging cases which I would state as it as special case scenarios, out of which, one retro-positive status patient was tracheostomised after taking all the universal precautions.

A male patient who was a case of malignancy of upper esophagus with compression symptoms like dyspnea was tracheostomisied 18 days post-surgery, patient required recannulation due to tracheo-esophageal fistula which occured due to the proliferative growth.

One adult male was tracheostomised with a platelet count of 50,000/ml, intraoperative bleeding was controlled by cauterisation.

Tracheostomy is one of the most useful and reliable techniques employed in the care of patients with real or potential respiratory insufficiency. Even now, patients present late to the surgeon in severe stridor necessitating emergency tracheostomy, which increases the risk of complications. When indicated, tracheostomy should be performed confidently without hesitation.

To conclude even today, tracheostomy remains the lifesaving procedure and complications of tracheostomy are largely preventable.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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