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Research Article

Clinical indications and Late Complications Among Adult Patients Done Tracheostomy at Bugando Medical Centre Tanzania

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Abstract

Background Tracheostomy is one of the surgical procedure developed in early times of civilization. Since then it has remain as one of the lifesaving surgical procedure worldwide. In Bugando Mwanza the referral and teaching hospital two studies has been done about tracheostomy but the details of the late complication is not well established also the clinical indications varies in both studies. Therefore these study will enlightening more on the clinical indications and give details on the late complications that results due to tracheostomy.

Methods: This was 4 years and 2 months retrospective study; conducted at Otorhinolaryngology Head and Neck department at Bugando Medical Centre from November 2019 to December 2023. Data were retrieved from patients' files kept in medical record department and analyzed using SPSS.

Results: One hundred and ninety patients had tracheostomy during the study period. Among them, one hundred and eight patients (56.8%) were male, and eighty-two (43.2%) were female. Their ages ranged from 18 years to 91 years with the mean age of 51.55 (SD 17.97) years. The majority of the patients were above 60 years (72%). The most common indication of tracheostomy was upper airway obstruction secondary to tumor accounting 59.5%, followed by respiratory failure accounting 24.7%, followed by upper airway obstruction due to traumatic causes and COPD which each accounted for 7.9%. The majority of tracheostomies (98.9%) were performed as emergency, and 2 patients (1.1%) had elective tracheostomy. %; Leading complication were tracheostomy tube blockage by 15.79% followed by hemorrhage and tracheostomy dependency by 7.89% then stoma infection by 7.37%.

Conclusion: upper airway obstruction secondary to tumor is the most common indication for tracheostomy in our Centre and the leading complications were tracheostomy tube blockage by 15.79% followed by hemorrhage and tracheostomy dependency by 7.89% then stoma infection by 7.37%.

Keywords: tracheostomy; indications; late complications

Introduction

Tracheostomy is one of the oldest surgical procedure done mostly in the emergence setting to serve people life.This surgical procedure involves creating an opening in the anterior wall of the trachea to facilitate airway access and ventilation(1).

Tracheostomy it is done on between 10% and 24% of patients on invasive mechanical ventilation, as a life-saving procedure when performed with an appropriate indication and surgical technique.(2).

The most common indications for tracheostomy are relieve of upper airway obstruction, prolonged mechanical ventilation, airway protection in the comatose and facilitation of tracheo-bronchial toileting (3,5).The indications of tracheostomy are diverse and changing,there has been a change in the indications for tracheostomy over the past two decades (4). In the past, obstructive airway disease secondary to acute aero-digestive infections was the most common, but in the pre-COVID-19 years, trauma and aero-digestive tumors have dominated the others (6,7).

During COVID-19 pandemic a significant number of critically ill patients with severe respiratory distress required mechanical ventilation for extended periods were high, and tracheostomy was considered to facilitate weaning from ventilator to provide long term airway management(8).However, tracheostomy continual to be considered aerosol-generating procedures, placing health care workers at risk for infection,concerns about the viral transmission during and after tracheostomy (9),this provinde a unique challenge of tracheostomy care.

Tracheostomy carries a risk of adverse events that increase patient morbidity, prolong hospital stay and undue strain to an already low resourced healthcare system (10).

In Rwanda the incidence of tracheostomy was 9.5%. The most common indication was prolonged intubation accounting for 55.2% of cases (11).

Study done at ICU in Egypt found that the indication for tracheostomy was prolonged intubation 80.5%followed by diaphragmatic paralysis 19.5%. Complications for tracheostomy were tracheal stenosis13.9% and subglottic stenosis 25% (12).

A retrospective study in south west Nigeria review of 64 patients who had tracheostomy done between January 2002 and December 2008. The found age ranged was 2 months to 96 years with a male to female ratio of 2.8:1. Peak age incidence was in the age-group 0-10 (23.4%). Forty tracheostomies (62.5%) were performed as emergency while 24 (37.5%) as elective procedures. Postoperative complications rate were 10.9%. Upper airway obstruction remains the leading indication for tracheostomy in the facility. Laryngeal carcinoma was the main indication for tracheostomy while conditions such as infections, which were one of the leading indications a decade ago, have diminished. Other indications included trauma, prolonged intubation, and adjunct to surgery. There was no tracheostomy related mortality (13).

Study in West Africa found that indications for tracheostomy were trauma (n =15), infections (n = 13), laryngeal (benign and malignant) tumors (n = 9), other head and neck malignancies (n = 4), neurological cases with respiratory failure (n = 2), and tracheomalacia (n = 1). Most of the tracheostomies were performed as an emergency as all the patients presented in respiratory obstruction. Transverse incision was employed in n = 35 cases, while the longitudinal incision was employed in n = 3 and the type of incision was not specified in the remaining six cases. Laryngeal stenosis was found in 6.9% of cases and the mortality was 25 % (14).

Study done in Tanzania in a referral and Teaching hospital Mwanza shows the prevalence of tracheostomy in the environment, to be 1.8%and the clinical indication pattern has changed from trauma in previous studies to upper airway obstruction secondary to neoplastic conditions. Majority of the patients came from rural areas 74 %. Among them the leading clinical indications for tracheostomy was upper airway obstruction by 65.7%, within which malignancy predominated other conditions by 65.2%, followed by trauma 26.1%, then prolonged intubation (15).

The most common indication for tracheostomy was upper airway obstruction secondary to traumatic causes in 55.1% of patients, followed by upper airway obstruction due to neoplastic causes in 39.3% of cases. The majority of tracheostomies (80.4%) were performed as an emergency. Transverse skin crease incision was employed in all the cases. Post-tracheostomy complication rate was 21.5%. Complication rate was significantly higher in emergency tracheostomy than in electives ($P < 0.001$). The duration of temporary tracheostomy ranged from 8 days to 46 months, with a median duration of 4 months. Tracheostomy decannulation was successively performed in 72.4% of patients who survived. Mortality rate was 13.6%. The mortality was due to their underlying illnesses, none had tracheostomy-related mortality. (3)
A study conducted at Muhimbili National Hospital found upper airway obstruction (UAO) with Laryngeal carcinoma was the leading Indication and primary diagnosis (26%), followed by UAO with hypo pharyngeal carcinoma (19.2%), UAO with respiratory papillomatosis (13.7%), Prolonged intubation in Cerebrovascular accident (9.6%) and the least was access to surgery in Ameloblastoma (16).

The meta-analysis study in Iran showed that the common indications for tracheostomy were depressed mental status (19.1%), respiratory disease (14.1%), tumors (10.5%), cardiac problems (9.7%), and laryngeal problems (9.5%). The five indications comprised of 62.9% all indications. Depressed mental status (19.1%) was the prevalent indication, foreign body was the leas indication for tracheostomy (17).

This study done explains that a properly performed tracheotomy has a low incidence of complications that are more easily managed than are the complex laryngotracheal complications of prolonged endotracheal intubation. Post-tracheotomy tracheal stenosis occurs in 8% of patients and is secondary to an overly large tracheotomy stoma or damage at the tracheostomy tube cuff site. Stoma stenosis can be minimized by not making an overly large tracheal stoma and by prevention of undue leverage on the tracheostomy tube. Cuff stenosis can be minimized by using a high-volume low-pressure cuffs with prevention of overdistention of the cuff. Bronchoscopic dilatation, laser resection, and Silastic T-tube placement provide good patency of the airway until definitive surgical resection and reconstruction can be done. Tracheoesophageal fistula is an uncommon but life-threatening complication that can be prevented by avoiding overdistention of the tracheostomy tube cuff. Patients are managed conservatively until they are able to be weaned from a ventilator. A single-stage repair of the esophagus and the trachea should be done. Tracheoinnominate artery fistula can be avoided by correct placement of the tracheostomy stoma in the second and third tracheal rings not in the lower trachea and also to avoidance

an overinflation of tracheostomy tube cuffs (18).

Methodology

Study area

The area of study was at BMC .Where its a referral, consultant and university teaching hospital for the Lake and Western Zones of the United Republic of Tanzania, it situated along the shores of lake Victoria in Mwanza City it has over 1000 beds . It`s provide specialist care for eight regions and serves a catchment's population of over 16 million people.

Study design

This was a retrospective study.

Study duration

The study duration was for 4 years and 2 months (November 2019 to December 2023).

Study population

The study included all records of adult patients who were admitted at ENT department since November 2019 and were done or had tracheostomy at BMC till December 2023.

Inclusion criteria

- Patient admitted to both critical care and non critical care units.

Exclusion criteria

- Patient admitted at ENT department with incomplete medical records. Data collection

Data were collected by trained researcher by using electronic health management system, and checklist was used as tool for data collection.

Data quality assurance and control

- Questionnaire was tested and revised accordingly before being used in field.
- Readings was approved by second person.
- Data collector was trained properly in data collection.
- Tools to be used was tested and approved properly.
- Data was cleaned before analysis.

Data processing and analysis and results presentation

Data was collected and complied later, was cleaned and entered in Microsoft excel program for analysis.All numerical data was presented by using line chart, table was used for presentation of categorical variables and Percentage was used to summarize categorical variables.

Limitation of the study

The study was conducted at one hospital so the information was not generalized ;also it did not include pediatric patients.

Ethical consideration

Ethical clearance were given by CUHAS/BMC joint ethical committee.

Results

The study participants involved were 190 patients. Among them, 108 patients (56.8%) were male, and 82 (43.2%) were female. There ages ranged from 18 years to 91 years with the mean age of 51.55 (SD 17.97) years. Majority of the patients involved were above 60 years (72%).

Table 1: Distribution of the patients done tracheostomy by age and gender

Age	Gender		
	female	male	Total
13-19	1(25)	3(75)	4(100)
20-29	13(65)	7 (35)	20 (100)
30-39	14 (43.75)	18 (56.25)	32 (100)
40-49	16 (51.61)	15 (48.39)	31 (100)
50-59	15 (48.39)	16 (51.61)	31 (100)
>60	23 (31.94)	49 (68.06)	72 (100)
Total	82 (43.16)	108 (56.84)	190 (100)

The most common indication of tracheostomy was upper airway obstruction secondary to tumor accounting about 59.5%, followed by respiratory failure accounting 24.7%, followed by upper airway obstruction due to traumatic causes and COPD which each accounted for 7.9%.

Table 2: Distribution of indications of Tracheostomy according to age

Age	Indications				
	Cancer	Copd	Resp failure	Trauma	Total
13-19	2	0	0	2	4
20-29	9	0	6	5	20
30-39	14	3	12	3	32
40-49	15	5	7	4	31
50-59	19	1	10	1	31
>=60	51	6	12	3	72
	110	15	47	18	190

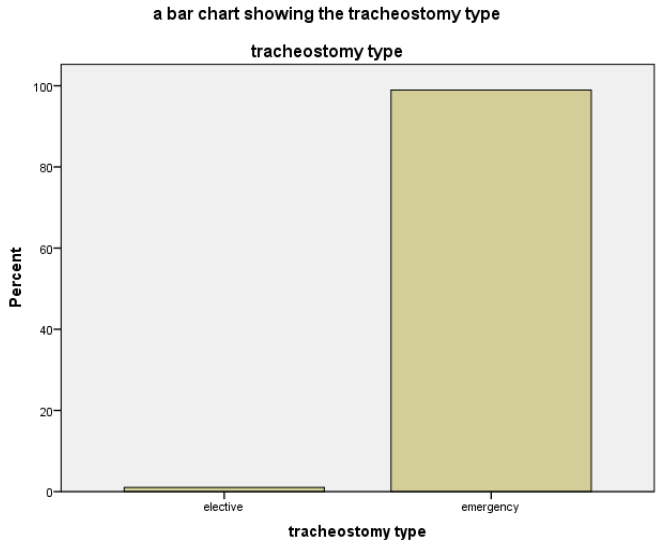
There is statistical significance between indication of tracheostomy and the age whereas the p value is 0.000. As observed the in table above majority of the patients were in the elderly group.

Table 3: The distribution of the indications of tracheostomy according to gender

Gender	Indications				
	cancer	copd	Resp failure	Trauma	Total
female	46	20	0	6	82
male	64	27	1	11	108
Total	77	47	1	17	190

There is no significance between the indications of tracheostomy in relation to gender as the p value is 0.548

Fig 1: Shows the type of tracheostomy



The majority of tracheostomies (98.9%) were performed as emergency, and 2 patients (1.1%) had elective tracheostomy

Table 4: Shows the distribution of late complications of tracheostomy

complication	frequency	Percentage%
Pneumonia	16	6.8
Discharge per incision site	2	1.05
hemorrhage	15	7.89
Dislodged tracheostomy	11	5.79
No complications	44	23.16
Stoma bleeding and infection	2	1.05
Stoma infection	14	7.37
Stoma infection and stenosis	1	0.53
Stoma necrosis	2	1.05
Stoma stenosis	13	6.84
Stoma ulceration	2	1.05
Tracheal stenosis	9	4.74
Tracheocutenous fistula	1	0.53
Tracheoesophageal fistula	9	4.74
Tube blokage	30	15.79
Granulation tissue	2	1.05
Tissue pneumatosis	2	1.05
Tracheostomy dependence	15	7.89
Total	190	100

The ones did not develop late complications were 23.16%; Leading complication were tracheostomy tube blockage by 15.79% followed by hemorrhage and tracheostomy dependency by 7.89% then stoma infection by 7.37%.

Discussion

Tracheostomy is a life-saving surgical procedure mostly done in our hospital. The prevalent of tracheostomy been 1.8 in the study done by Kimario et al(15).The findings of these study is the age of the involved study participants ranged from 18years to 91years with the mean of 51.55(SD 17.97).Mostly affected age group is patients above 60years old by 72%.This finding are similar to other studies as 13,15.In the study 15 shows age range of 50-59years this is basically different due to time duration of the studies.

The prevalent indication for tracheostomy in our study was upper airway obstruction secondary to neoplastic causes (59.5%), followed by respiratory failure causes (24.7%), followed by upper airway obstruction due to traumatic causes and COPD which each contributed 7.9%. This findings is similar to the study done in Muhimbili,Bugando and Nigeria(13,15,16).The study done in Bugando 10years back showed pattern of upper respiratory obstruction secondary to trauma which this has changed (3,12).Other studies 11,12 showed prolong intubation as the leading indication this is mainly due to geographical location due to different disease pattern and social behavior of certain individuals.Also can be due to the study setting chosen to perform certain researches.

Our study found that upper airway obstruction secondary to neck malignancy was the commonest indication in patients between the 6th and 8th decades. This is similar to the study done in Nigeria (12) and to the study done at BMC (3). In our experience, most cases with neck malignancies presents late with severe respiratory distress so emergency tracheostomy is always performed lo relief the air way. Majority of the tracheostomy are done emergency about 98% same to other studies(3,13,15).This shows that awareness of the patient toward understanding malignancies knowledge is still low. Public and private sectors should intervene this in order to be knowledge to the community.Respiratory failure was the second most common cause accounting for 24.7% due to which prolonged intubation was required which nessecited the need of tracheostomy to avoid prolonged intubation.

Trauma was the third most common cause accounted to 7.9% which majority were between the 2nd and the 4th decades. This is similar to study (3,12) where trauma to the head and neck was the leading indications in the 3rd decade of life in the series and interestingly the majority of these injuries were from road traffic crashes especially involving motorcycles which have become a major means of com muter transportation in Tanzania [3].

Tracheostomy as a procedure there are complications that arise which are immediately, early and late. My study concentrated on the late complications that happens. We found the leading complication been tube blockage by 15.79% followed by hemorrhage and tracheostomy dependency by 7.89% then stoma infection by 7.37%. In a study done in West Nigeria found leading

complication been laryngeal stenosis by 6.7%this finding differ from our patients probably due to the knowledge of tracheostomy care and the technique of doing the produce.

Conclusion

Upper airway obstruction secondary to tumor malignant tumor was the most common indication for tracheostomy in our hospital.

Emergence type of tracheostomy is still most common done despite complications which are observed in patients.

In our setting leading complication is tube blockage by 15.79% training should be emphasis more about tracheostomy care to reduce this Multidisciplinary team approach about patient care, protocols, and paying attention to patient quality of life such as early return to oral feeding, ambulation and speech has great potential for improved tracheostomy care.

Recommendation

Early Identification of patients at risk**:** implement protocols to identify patients at risk for upper airway obstruction early inorder to reduce their hospital stay.

Regular training and new updates should be provided to surgical staff on advanced tracheostomy techniques such as percutaneous tracheostomy.

Protocals should be developed and implemented for post-operative care such as suctioning, and tube care.

Education to patients and their families about tracheostomy care should be provided including tube changes, and regular cleaning of the tube.

Establishing support groups for patients to share experiences and receive emotion support.

Ethical approval: Given by the joint ethical committee of CUHAS/BUGANDO.

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Authors` Contributions

OMK-drafting the manuscript, literature review and discussions.

SKI-Literature search, data collection, discussion of the data.
ER-Discussion of the results and overview of the manuscript.

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