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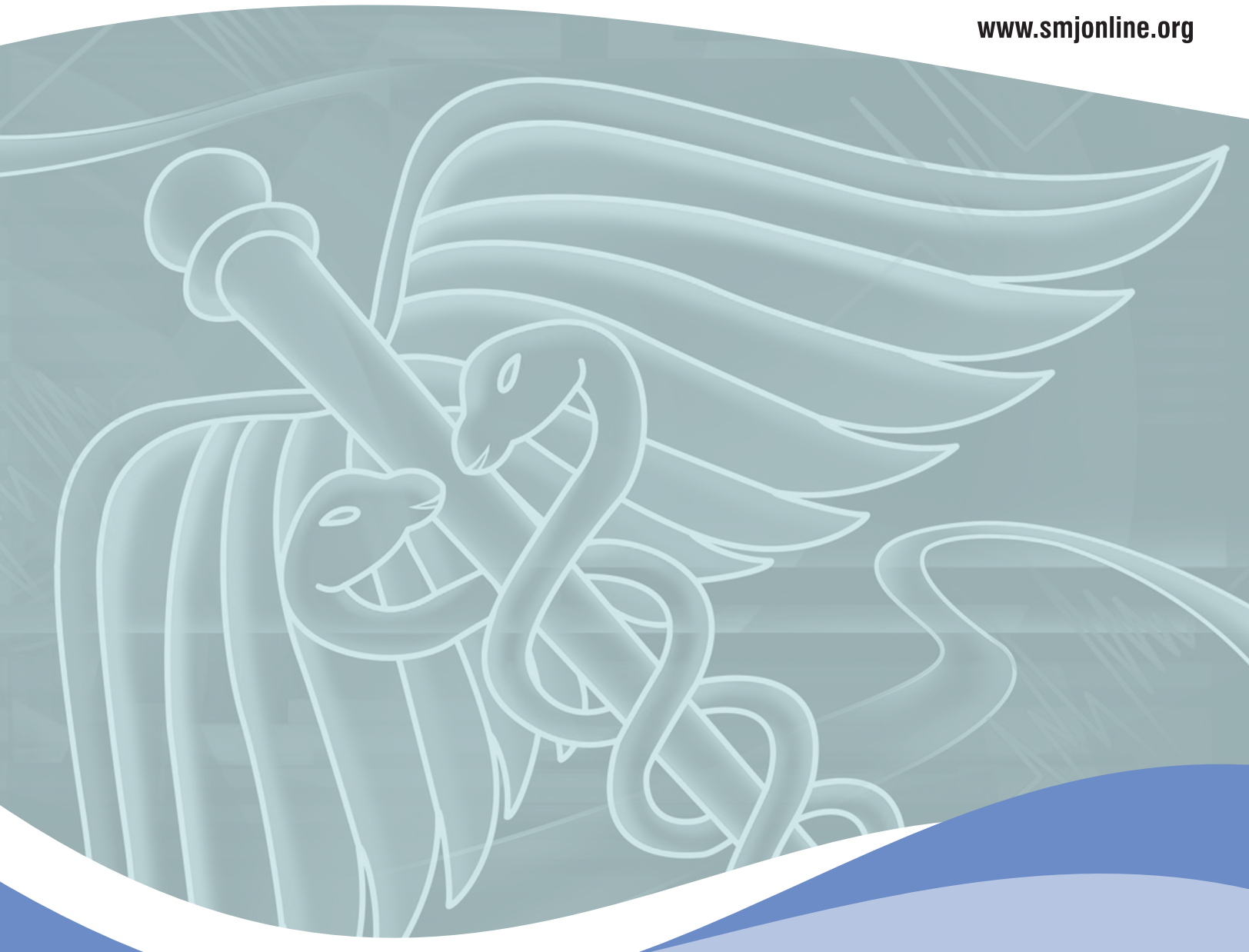

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ORIGINAL ARTICLE

Indications and outcome of tracheostomy at a Federal Teaching Hospital in North Eastern, Nigeria

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ABSTRACT

Background: Tracheostomy is an important life-saving surgical procedure used in managing airway emergencies. **Objective:** This study was conducted to evaluate indications, complications, and outcome of tracheostomy at a Federal Teaching Hospital, Gombe in North Eastern Nigeria. **Methodology:** A 5-year retrospective review of 45 patients who presented to ear, nose, and throat facility of Federal Teaching Hospital, Gombe and had tracheostomy done between November 2011 and October 2016 was carried out. Patients' information was retrieved from the hospital medical record department. **Results:** A total of 45 cases were analyzed, age ranged between 5 months and 84 years, mean of 26.37 years ± 20.89 standard deviation male to female ratio was 1.8:1. The peak age group was 0–15 years (37.8%). Forty (91.1%) of the tracheostomies were performed as an emergency while 8.9% as elective procedures. The major indication for tracheostomy was upper airway obstruction (80.0%). Trauma (33.3%) was the most common cause of upper airway obstruction. Thirteen patients (28.9%) had complications, and the most common complication was tube blockage in 6 (13.3%). Thirty-three patients (73.3%) were successfully decannulated. The mortality rate of 8.9% was recorded. They were related to patients underlying diseases. **Conclusion:** Tracheostomy is still a useful live-saving procedure. Upper airway obstruction due to trauma from crime-/violence-related activities was the most common indication for tracheostomy in this study.

Keywords: Complications, indications, Nigeria, outcome, tracheostomy

INTRODUCTION

Tracheostomy is the surgical creation of a stoma at the skin surface of the anterior part of the neck which leads into the trachea.[1] Usually, the stoma is maintained with a tracheostomy tube. The surgical procedure of tracheostomy is actually a very ancient one. Moreover, it continues to be a standard surgical procedure for airway management.[2] The procedure was portrayed on Egyptian tablets dating back to 3600 BC. The earliest known references to tracheostomy are made in the "Rig reda" a sacred Hindu book published around 2000 BC.[1,3] In the past, the most frequent indications for tracheostomy widely reported in medical literatures was that of upper airway obstruction secondary to trauma and/or infection. However, in recent years prolonged intubation that necessitates mechanical ventilations tends to be among the most common.[4] Significant airway complications have been observed among patients who have prolonged intubation of more than ten days.[2,5-9] In Nigeria, a greater proportion of both pediatric and adult tracheostomies is performed

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to bypass upper airway obstruction. Preoperatively, tracheostomy is also indicated in some major surgeries involving head and neck region where airway compromise is eminent.[10] Even though tracheostomy is a life-saving procedure, numerous complications associated with it have been observed. The younger the patient, the higher the complication rate and the greater the morbidity and mortality associated with it. However with a carefully performed procedure and a meticulous postoperative management, these complications can be avoided.[10] Tracheostomy may occasionally be characterized with social stigma especially in adult, there is need to educate and counsel a patient. Family's education, counseling, understanding, and support are also essential. With the decrease of life-threatening obstructive upper airway infections and the ongoing improvement of intensive care medicine, the role of tracheostomy has been changing.[4] This study aimed to evaluate the indications, complications, and outcome of tracheostomy in a tertiary health institution.

MATERIALS AND METHODS

This is a 5-year retrospective study of patients that was seen and had tracheostomy done at the ENT department of Federal Teaching Hospital Gombe, North Eastern Nigeria from November 2011 to October 2016. The medical records of patients who had tracheostomy during the period under review were retrieved from hospital medical records department. The information that was extracted includes their demographic characteristics, clinical presentation, diagnosis, indication and type of tracheostomy, surgical technique, duration of hospital stay, complications, and final outcome. The inclusion criteria include all patients with complete data. Ethical approval to carry out this study was obtained from the hospital ethical and research committee 7th November 2017. A simple descriptive analysis of data obtained was carried out using SPSS version 20.0 (Chicago II, USA).

RESULTS

There were 52 patients that had tracheostomy done during the review period, 7 had incomplete data and they were excluded from the study. A total of 45 patients were therefore analyzed. There were 29 males and 16 females given male: female ratio of 1.8:1. Their ages ranged from 5 months to 84 years, with a mean age of 26.37 years ± 20.89 standard deviation the age range 0–15 years has the highest number of tracheostomies (37.8%), followed by 26.7% among the age group 16–30 years [Table 1]. Forty (91.1%) of the tracheostomies were performed as emergency while 8.9% as elective procedures. No intraoperative complication was recorded. Transverse skin crease incision was employed in all the cases. Table 2 shows that the most common indication for tracheostomy was upper airway obstruction secondary to trauma in 15 (33.3%) of the patients, followed by tumors 9 (20.0%) and foreign body aspiration 9 (20.0%). Fourteen (31.1%) of the tracheotomized patients were decannulated within 10 days, 8 (17.8%) between 11 and 20 days, 10 (22.2%) between 21 and 30 days, 4 (8.9%) after 30 days while 5 (11.1%) were referred. Postoperative complications were seen in 13 (28.9%) patients and

Table 1: Age and gender distribution of patients with tracheostomy

Age range of patients (years)	Gender of patients		Total, *n* (%)
	Male, *n* (%)	Female, *n* (%)	
0-15	11 (24.4)	6 (13.3)	17 (37.8)
16-30	8 (17.8)	4 (8.9)	12 (26.7)
31-45	3 (6.7)	4 (8.9)	7 (15.6)
46-60	5 (11.1)	2 (4.4)	7 (15.6)
>60	2 (4.4)	0	2 (4.4)
Total	29 (64.4)	16 (35.6)	45 (100)

Table 2: Indications for tracheostomy/primary diagnosis (*n*=45)

Indications/primary diagnosis	Frequency (%)
Relief upper airway obstruction	36 (80.0)
Trauma	
Cut throat (assault to motor-bike rider by passenger and suicidal attempt)	6
Gunshot injury to the neck	3
Tracheomalacia (postthyroidectomy)	2
Road traffic accident	1
Domestic accident from grinding machine	1
Neck injury from gorged from cow horn	1
Corrosive ingestion	1
Total	15
Tumors (benign and malignant)	
Hypopharyngeal carcinoma	2
Laryngeal carcinoma	3
Nasopharyngeal carcinoma	1
Bilateral huge cervical mass (lymphoma)	1
Recurrent respiratory papillomatosis	2
Total	9
Laryngeal cyst	1
Infections (ALTB and acute epiglottitis)	2
Foreign bodies in the airway	9
Prolonged intubation	4 (8.9)
Severe head injury	2
Eclampsia	1
Guillain-barre syndrome	1
Difficulty intubation	2 (4.4)
Ameloblastoma of right mandible	1
Carcinoma of mandible	1
Tracheobronchial toileting	3 (6.7)
Aspiration pneumonitis from groundnut	3
Grand total	45 (100.0)

ALTB: Acute laryngotracheobronchitis

they are tube blockage in 6 (13.3%), stoma infection 4 (8.9%), suprastoma granulation tissue and difficulty with decannulation 3 (6.7%) while 32 (71.1%) did not have complication [Figure 1]. Thirty-three (73.3%) was successfully decannulated by serial gauze blockage while 3 (6.7%) had surgical decannulation. Five (11.1%) were not decannulated but referred to other facility for further care. Four (8.9%) patients died of their disease conditions or ailments. The overall mortality was 4 (8.9%). There was no tracheostomy-related mortality recorded.

DISCUSSION

Tracheostomy is a common surgical procedure employed in the relief of upper respiratory obstruction.[2] It is often a life-saving procedure in a variety of clinical conditions. In this study, the highest percentage of tracheostomies (37.8%) was recorded among children within the age group 0–15 years. It was similarly reported among children (0–10 years) by other researchers.[2,4,7,11-13] However, Kokong *et al*.[14] reported an age group of 20–39 years as being the highest in their study. In the present review, males were more affected (64.4%), this may be due to occupational risk some of them were exposed to in this part of the country, especially in seeking for their daily livelihood since man is usually a bread winner for the family. Other authors had also corroborated male preponderance in their studies.[7,8,12,13,15] Upper airway obstruction has remained the major indications for tracheostomy from various studies around the world,[16] although the causes vary from one region to other. In the study, 80% of tracheostomies performed were to relief upper airway obstruction. This agrees with studies done by other authors.[2,7,12,17,18] Trauma (33.3%) was a major cause of upper airway obstruction in this study. Four of our patients are commercial motor bike riders; they were assaulted, robbed, and also sustained cut throat injuries from their passengers while 2 had cut throat from suicidal attempt on themselves. Amusa *et al*.[2] in Ile-Ife recorded cut throat injuries as a major cause of upper airway obstruction, while Kokong *et al*.[14] reported 9.8% cases of cut throat injury from suicidal attempts in their study. In our series, mental illness was reported in one case of self-attempt. Cut throat injuries may be homicidal or suicidal as in this our series and they are potentially life-threatening injuries because of the many vital structures in the neck which may be affected leading to severe hemorrhage, air embolism or respiratory obstruction and death.[19] Hence, prompt and adequate intervention is required to save a patient. Possible factor for suicidal attempts are global economic depression with attendant unemployment. Studies have suggested an increase in the parasuicide and suicide rates among unemployed individuals than in general population.[20] This is more so for the male who is the breadwinner of the family in many societies. From various reports in Nigeria, the most common method of committing suicide seems to be ingestion of poisonous materials followed by the use of weapons such as the knife and the Dane gun.[21-23] In our series, sharp object (razor blade and knife) was used. It is good to know that hanging, poisoning, and drowning are other common methods of committing suicide in some regions of the world. Three of our patients had gunshot injuries to the neck due to intertribal communal clash. This type of injuries can also pose potential life-threatening condition. There is need to preach peace and tolerance and also to enhance security situation by relevant authority so as to stem down the crime-related activities in our environment. Head and neck tumors are the second most common cause of upper airway obstruction in this study, of which laryngeal carcinoma constitute only 6.7%. Figure 1 is lower than that of Adetinuola *et al*.[7] and Aliyu *et al*.[10] which are 21.9% and 25%, respectively. There is need for awareness as those that presented with laryngeal carcinoma in this study came in advanced stage. In this series, foreign body in the airway is the third common cause of upper air way obstruction and children are most vulnerable. Other studies though in different proportion report similar findings among children.[4,7] There is need to give health education to parents, care givers, teachers in the schools and to general public at various levels in the society about foreign body aspiration in the airway with emphasis on preventive measures. Only two (4.4%)

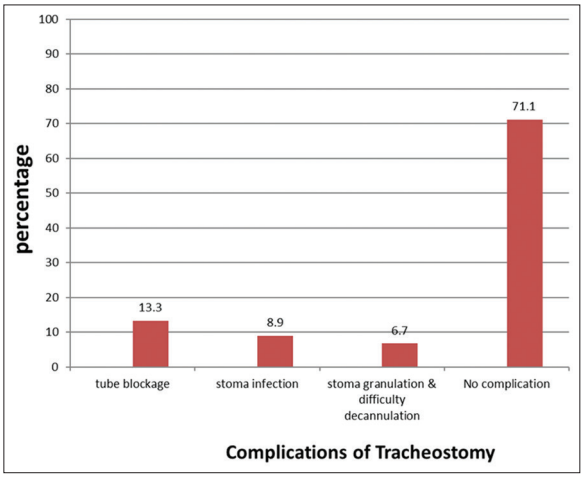

Figure 1: Complications of tracheostomy

cases of infective process (Acute epiglottitis and Acute laryngotracheobronchitis) was recorded in this study as a cause of upper airway obstruction, this is in support of changing trends that in the past, infective conditions were major indications for tracheostomy but the better handling of infections with the use of intubation and conservative management in the intensive care unit has reduced the incidence of these indications.[24,25] In this study, 4 cases representing 8.9% had tracheostomy done as a result of prolonged intubation, 2 of them from severe head injury, one Eclampsia and one Guillain-barre syndrome. Other reasons for carrying out tracheostomy in this current study were difficult intubations which were due to mandibular malignancy in two of our patients. Tracheostomy was done for them under mask anesthesia after failure of an attempt intubation by an expert anesthetist. Three cases developed severe pneumonitis following aspiration of groundnut seed. They had tracheostomy for tracheobronchial toileting in conjunction with use of antibiotics. In our study, 91.1% of our patient had tracheostomy done as an emergency procedure. This is not surprising as majority of our patients presented with acute obstructions from severe trauma and foreign body aspiration that necessitate urgent attention and relief. Those that had tumors presented in advanced stage and with upper airway obstruction that also need urgent relief. The surgical technique employed in all our patients was transverse skin incision. We routinely used this method for both emergency and elective cases because it gives us better cosmetic result. The vertical incision has the advantage of being faster, less vascular, and runs in the line of the tracheal.[7,8] Complications of tracheostomy may occur intraoperative or anytime during postoperative periods.[26] Complication rate as reported in literature have a wide range (6%–66%) with a mortality of <2%.[26] It has been noted that complications are associated commonly with emergency tracheostomies than elective.[27] The complication rate in this study was 28.9% and they included tube blockage (13.3%), stoma infection (8.9%), and supra-stoma granulation with difficulty decannulation in 6.7% cases. Fraga *et al*.[28] reported a complication rate as high as 40% in their study. The lack of adequate number of trained Ear, Nose and Throat nurses that would take care and closely monitor of our posttracheostomy patients has also contributed to the mortality in our study. Majority (73.3%) of our patients were successfully decannulated after weaning them off from their tracheostomy tubes. We make sure that the indications for which tracheostomy was performed has been resolved; the patient was also able to maintain a safe and adequate airway independent of tracheostomy tube and a Plain X ray soft tissue of the neck were carried out before commencement of weaning process to exclude formation of supra-stoma granulation tissue. We employ the technique of serial gauze blockage/occlusion of tracheostomy tube for our weaning process to the other method of sequential downsizing of the tube because the former is readily available, cheaper and is easy to monitor by doctors and nurses should in case there is any airway compromise. The 3 cases that had difficulty decannulation as a result of supra stoma granulation tissue were decannulated surgically. We recorded mortality of 4 (8.9%) in this series, they were related to patients underlying diseases. Two deaths were due to severe head injury, 1 from advanced laryngeal cancer while the remaining one died of severe neck/laryngeal injury from a grinding machine.

CONCLUSION

Tracheostomy is still a useful live-saving procedure. Upper airway obstruction as a result of trauma from crime/violence activities was the most common indication for tracheostomy in this study.

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Conflicts of interest

There are no conflicts of interest.

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