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Full Length Research Paper

Tracheostomy in south western Nigeria: Any change in pattern?

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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. This study aims to investigate whether the indications and outcome for tracheostomy in this unit have changed over recent years. A retrospective chart review of 64 patients who had tracheostomy in our ENT facility between January 2002 and December 2008 was done. The age range was 2 months to 96 years with a male to female ratio of 2.8:1. The 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. Transverse skin incision was employed in all the cases. Post operative complications rate was 10.9%. Upper airway obstruction still remains the most common indication for tracheostomy in our centre. Laryngeal carcinoma is 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.

Keywords: Tracheostomy, indications, outcome, pattern, Nigerians.

INTRODUCTION

Tracheostomy is a procedure aimed at establishing an alternative airway by creating a surgical opening in the anterior wall of the trachea and maintained with a tube (Bradley, 1997). Its placement is an important procedure for securing a functional and safe airway in patients with various medical ailments (Kollef et al.,1999; Heffner, 1990). Johannes Scultetus (1595–1645) quotes tracheostomy in his book "Armamentarium Chirurgicum" as a lifesaving intervention in cases of respiratory distress (Feldmann, 1995). Other methods of airway intervention include endotracheal intubation, cricothyroid-otomy, and Percutaneous Dilatation Tracheostomy (PDT).

There are varied indications for tracheostomy however; there is a changing trend in literature as regarding the indications and outcome of tracheostomy especially in children for the management of the airway (Primuharsa et al., 2006; Alladi et al., 2004; Butnaru et al., 2006). In the past, short term tracheostomy for obstructive airway disease secondary to acute inflammatory infection was the most common indication (Parilla et al., 2007) but in recent time trauma to the upper airway has become the commonest indication (Amusa et al., 2004). These have been attributed to the changes in the epidemiology of infectious diseases due to early diagnosis, adequate use of antibiotics and the improvement in the capabilities of medical technology (Amusa et al., 2004; Kremer, 2002).

Tracheostomy complications include but not limited to intraoperative and postoperative bleeding, emphysema, air embolism, pneumothorax, mediastinitis, pneumonia, tracheo-esophageal fistula, tracheal stenosis with difficult decannulation, swallowing disorders and granulations.

The aim of this study is to highlight our experiences

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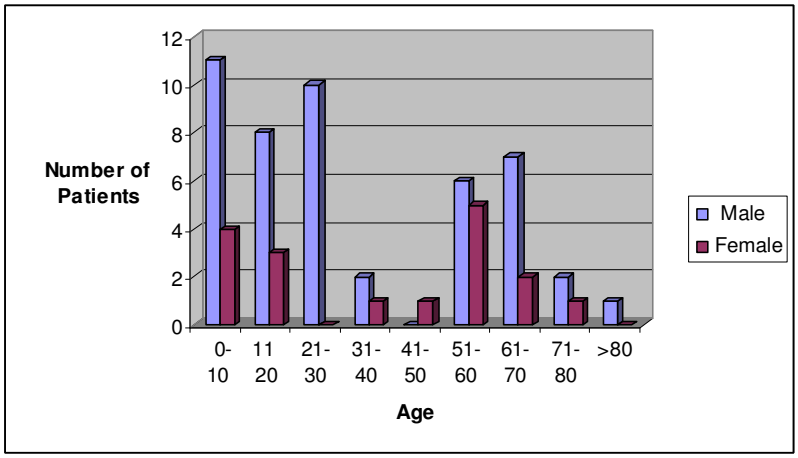

Figure 1: Age distribution of patients with tracheostomy.
Age (years) as at last birthday.
Mean = 31.3 ± 24 years

with patients who had tracheostomy between January 2002 and December 2008 and to determine whether the indications and outcome for tracheostomy in this unit have changed compared to results from previous work in this hospital (Amusa et al., 2004).

MATERIALS AND METHODS

Medical and surgical records of all new patients who presented to the Ear, Nose and Throat (ENT) Unit of Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) via the clinics, emergency units and those who needed tracheostomy during the course of management for various diseases between January 2002 and December 2008 were retrospectively reviewed.

After obtaining clearance from the ethical committee of the OAUTHC, Ile – Ife, Nigeria, and consent from the patients, the medical records of these patients were retrieved and analyzed. The following data were collected and analyzed: age, sex, primary diagnosis, indication for tracheotomy, duration of the tracheotomy before decannulation, hospital stay and outcome of management such as complications, death and cause of death.

The primary diagnosis was classified based on the aetiology which is divided into trauma, infection/inflammation, Neoplasm, congenital and others. The indications for tracheostomy were divided into upper airway obstruction, respiratory insufficiency, bronchial toileting, adjunct to head and neck surgeries.

The results were compared with the results of a previous work done between January 1986 and December 2000 (Amusa et al., 2004).

RESULTS

A total of Sixty four tracheostomies were performed within the study period. The age range was two months to 96 years. There was a marginal preponderance in children aged 0-10 (n=15, 23.4%). This was closely followed by age groups 11-20, 50-60 and 20-30 with 11(17.1%), 11(17.1%) and 10 (15.6%) respectively (Figure 1). Patients aged more than 60 years constituted a significant number (20.3%). There were 47 (73.44%) males and 17 females (26.56%) with a male to female ratio of 2.8:1.

Forty tracheostomies (62.50%) were performed as emergency while 24 (37.50%) as elective procedures. The primary diagnoses of tracheostomized patients are as highlighted in Table 1. The indications for tracheostomy were upper airway obstruction (n= 46, 71.9%), prolonged intubation (n =12, 18.8%), and adjunct to surgery (n = 6, 9.4%) (Table 2). The causes of upper airway obstruction were presented in Table 2. The most common cause of upper airway obstruction requiring tracheostomy was neoplasm (n = 27, 42.2%) followed by trauma (n= 18, 28.1%). The first decade of life recorded the highest incidence with foreign body aspiration causing most of the upper airway obstruction while the 6^{th} – 8^{th} decades of life recorded the least incidence with laryngeal and other head and neck malignancies predominating.

Transverse skin incision was employed in all the cases. Post operative complications seen were stoma infection (n =3), trachea stenosis (n = 2), subcutaneous emphysema (n = 1), and accidental dislodgement (n = 1) giving a complication rate of 10.9% (Figure 2). The duration of tracheostomy ranged between 2 days and two and a half

Table 1: Primary diagnosis of tracheostomized patients.

Diagnosis	Frequency	% of total
Congenital:		
Laryngeal haematoma	1	
Total	**1**	**1.5**
Trauma:		
-Head Injuries	12	
-Foreign body Aspiration	9	
-Airway Burns	2	
- Cut throat	2	
-Severe Maxillofacial injuries	2	
-Iatrogenic Laryngeal Nerve palsy	1	
-Diaphragmatic injury	1	
-Complicated traditional Uvulectomy	1	
Total	**30**	**46.9**
Neoplasms:		
-Laryngeal Ca	14	
-Head & Neck Lymphoma		
-Papilloma	4	
-Thyroid carcinoma	4	
-Nasopharyngeal carcinoma	3	
Total		
	2	
	27	**42.2**
Infections:		
-Post poliomyelitis quadriparesis	1	
-Laryngotracheobronchitis		
Total	1	
	2	**3.1**
Others:		
-Ameloblastoma	1	
-Ossifying fibroma	1	
-Temporomandibular joint ankylosis	1	
-Tracheomalacia	1	
Total	**4**	**6.3**
Grand total	**64**	

Table 2: Indications for Tracheostomy.

Indications	Frequency	% of total
I. Upper respiratory Obstruction		
a) Congenital		
Laryngeal haematoma	1	
Total	**1**	**1.6**
b) Acquired		
1) Infection		
Croup	1	
Total	**1**	**1.6**
2) Trauma		
Airway Burns	2	
Cut throat	2	
Foreign body Aspiration	9	
Severe Maxillofacial injuries	2	
Complicated traditional Uvulectomy	1	
Tracheomalacia (post thyroidectomy)	1	
Recurrent laryngeal nerve palsy	1	
Total	**18**	**28.0**
3) Tumours		
Carcinoma of the Larynx	14	
Head & Neck Lymphoma	4	
Papilloma	4	
Thyroid carcinoma	3	
Nasopharyngeal carcinoma	2	
Total	**27**	**42.2**
2. Respiratory insufficiency / assisted ventilation		
Diaphragmatic Injury	1	
Prolonged intubation	12	
Poliomyelitis quadriparesis	1	
Total	**14**	**21.9**
3. Adjunct for Head and neck surgeries		
Anticipated difficult intubation	3	
Total	**3**	**4.7**
Grand total	**64**	

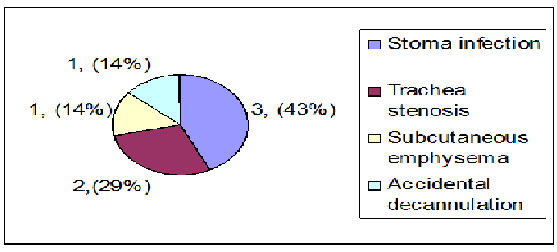

Figure 2: Post operative complications of tracheostomy

years with a mean of 16 days. Forty six (71.9%) of the patients were successfully decannulated. No decannulation was done in 18 patients (28.1%). Some of these patients had upper airway malignancy where permanent tracheostomies were needed for either curative or palliative management; others were in patients with papilloma which are yet to be decannulated. Mean hospital stay was 11 $\pm$ 2.58 days.

The overall mortality rate was 3.1%. There was no tracheostomy related mortality. Follow up of all patients

Table 3: Comparison of present (2002-2008) and previous Tracheostomy reviews.

Indices	Present review (OAUTHC 2002 – 2008)	Previous review (OAUTHC 1986 – 2000) Amusa et al	Enugu (2000-2004) Okafor BC	Enugu (1973-1978) Orji FT and Ezeanuloe
Total number of tracheostomies	64	44	52	96
Age range	2 months – 96 years	----------	11 months-90years	6 months-59years
Male : Female	2.8 : 1	3 : 1	1.4 : 1	1 : 1
Modal age group	0-10years (23.4%)	0-10years (29.5%)	0-20years	0- 20 years
Presentation	Emergency- 62.5%. Elective - 37.5%	Emergency -100%	Emergency – 94.2%. Elective - 5.8%	------
Commonest group of indications	Relief of upper airway obstruction (73.4%)	Relief of upper airway obstruction (93%)	Relief of upper airway obstruction (75%)	Relief of upper airway obstruction (85.4%)
Three most common indications	Carcinoma of the larynx (21.9%), Prolonged intubations (18.8%), foreign body aspirations (14.1%)	Trauma (34.1%), Infections (29.5%), Carcinoma of the larynx (11.4%)	Carcinoma of the larynx (25%), Foreign body aspiration (21.2%), iatrogenic bilateral vocal cord paralysis (9.6%)	Foreign body in the airway (29.2%), Recurrent respiratory papilloma (13.5%), Acute laryngotracheo-bronchitis (12.5%)
Skin incision	Transverse-100%	Transverse -79.5% Longitudinal-6.8%.Unspecified - 13.6%	----	------
Most common complication	Stoma infection (4.7%)	Death (25.0%)	Surgical emphysema (11.5%)	Wound infection (11.5%)
Complication rate	10.3%	45.5%	40.4%	30.2%
Mortality rate	0.0%	25.0%	3.8%	2.1%
Mean hospital stay.	11 $\pm$ 2.58 days.	15.5 $\pm$ 11.3 days	------	-------

has been uneventful.

Comparison with the previous review

The important features emerging from the comparison of the results of the present review and that of previous review of tracheostomies done at OAUTHC Ile-Ife between January, 1986 and December, 2000 are highlighted in Table 3 above.

The total number of tracheostomies done over the 6 – year under the present review was significantly higher than the number of tracheostomies performed over 15-year under previous review.

Although the most common group of indications for tracheostomy in both reviews was upper airway obstruction, carcinoma of the larynx was the most common cause in this present review followed by prolonged endotracheal intubation while trauma was the most common cause in the previous review followed by infection. Trauma as an indication for tracheostomy also decreased slightly from 34.1% to 28.0%. The mortality rate in this present review is significantly lower than the mortality rate of the previous review.

DISCUSSION

The total number of tracheostomies over the six year period in this series was comparatively higher than tracheostomies performed over the 15 year period in the previous review in this hospital despite a change in the trend of airway problems for which tracheostomy was needed.

In our series, the highest age incidence of the patients who had tracheostomy was in the 1-10 age group and most of these patients were managed for foreign body aspiration. In the previous review, upper airway obstruction in this age group was mainly due to childhood infections. This high finding of foreign body aspiration necessitating tracheostomy brings to limelight the need for education of the community on foreign bodies' aspiration avoidance and enforcement of child safety act concerning children toys. Males were more affected and

this is because of their increased susceptibility to trauma which necessitated prolonged intubation and assisted ventilation in some of them.

The indications for tracheostomy in our study are shown in Table 2. Relief of upper airway obstruction being one of the traditional indications for tracheostomy was the major indication for tracheostomy in 73.4% of cases in this review. This agrees with other works by different otorhinolaryngologists in our country as shown in table 2 (Nwawolo et al., 1997; Okoye, 2000; Amusa et al., 2004; Orji and Ezeanolue, 2006). However, a new trend was observed in the various indications for tracheostomy. In the previous review, trauma was the most common cause in which cut –throat injuries predominated, followed by childhood infections. Neoplasms, especially laryngeal carcinoma were the third most common indication for tracheostomy operation. Foreign body aspiration was among the least common indication for tracheostomy. But the present review shows a change in this trend with laryngeal carcinoma predominating, followed by prolonged intubation and foreign body aspiration. It is noteworthy that only one case of infection (CROUP) was managed with tracheostomy during the period under present review.

The indications of tracheostomy are diverse and changing. Many changes have occurred over the years in the use of tracheostomy for airway management (Arcand and Granger, 1988; Wenig and Applebaum, 1991). The indications and outcomes have changed with prolonged intubation being the most common indication these days and the age at which tracheostomy is carried out is even becoming increasingly younger (Okoye, 2000; Parilla, 2007). In the past, infective conditions such as epiglottitis and laryngotracheobronchitis 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 (Hadfield, 2003). Recent improvement in the facilities available at our intensive care unit (ICU) and neurological unit has been responsible for the rise in the use of tracheostomy in the management of neurosurgical patients on prolonged intubation.

The use of tracheostomy as an adjunct to head and neck surgery and in patients with prolonged intubation has made elective tracheostomy operation to be on the increase and also improved the outcome with lower complications (10.3%) compared to results from previous review where all the operations done were on emergency basis and complication rates were higher (45.5%). With the present introduction of fibreoptic intubation when necessary in our centre, the use of tracheostomy in difficult intubation and some head and neck surgeries will further decline.

The total number of laryngeal carcinoma managed with tracheostomy over the period under present review was higher than the five cases seen in the previous review. The reason for this rise is not certain but could be related to the fact that most of our patients with carcinoma of the larynx often present late and in respiratory obstruction, so an emergency tracheostomy was the rule even before confirming the diagnosis (Amusa et al, 2004; Okoye, 2000). It may also be that there is a possible increase in the incidence of laryngeal cancer in our society (Stell and Maran, 2000).

The surgical technique employed in all our patients was the transverse skin incision. This is now the preferred method in our centre whether in an emergency or elective tracheostomy because of the advantage of a better cosmetic result although; the vertical incision has been said to have the advantage being faster.

The complication rate has dropped to 10.3% from 45.5% in the previous review. This could be as a result of an increase in the number of skilled and experienced otolaryngologist in our centre. The complications observed in this review include stoma infection (4.7%) followed by trachea stenosis (3.1%) compared to death (25.5%) followed by stoma infections (6.7%) and laryngeal stenosis (6.7%) in the previous review. The 25% mortality rate associated with tracheostomy in the previous review is exceptionally high when compared with this series, the causes of death which were attributed to the medical complications associated with the primary diseases as well as due to accidental tube dislodgement and tube blockage due to poor toileting. There was no mortality attributed to tracheostomy in this present review pointing to the fact that there have been significant improvements not only in the skill of placing a tracheostomy but also in the post operative management of the patients with open tracheostomy while training is ongoing and logistics are being perfected to commence percutaneous dilatational tracheostomy especially for Intensive care unit and critically ill patients which is the emerging popular practice in emergency medicine.

CONCLUSION

Upper airway obstruction still remains the most common indication for tracheostomy in our centre. Laryngeal carcinoma is the main indication for tracheostomy while infectious conditions which were one of the leading indications a decade ago, have diminished. Prolonged intubation as an indication for tracheostomy is evolving based on recent improvement in the facilities available at our ICU and the use of tracheostomy in the management of neurosurgical patients on prolonged intubation.

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