

Tracheostomy in surgical practice: Experience in a Nigerian Tertiary Hospital

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Summary

Background: Tracheostomy continues to be a standard surgical procedure for airway management.

Objective: This study was conducted to evaluate the indications, and complications associated with the utilization of open surgical tracheostomy in our center.

Design and Setting: It is a retrospective study of all patients that had open surgical tracheostomy at the Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria during a 15-year period between January 1986 and December 2000.

Patients and methods: The medical records of the forty-four patients that had open surgical tracheostomy in the operating theatre within the study period were evaluated.

Results: There were 12 females and 32 males. The mean age was 33.6±24.8 years. The 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). All 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%.

Conclusion: Upper airway obstruction was the major indication for tracheostomy in our center; and the high mortality may be due to the primary medical problems rather than the complications of tracheostomy alone.

Keywords: Open surgical tracheostomy, Indications, Complications.

Résumé

Introduction: La trachéostomie continue d'être un protocole chirurgical de référence en ce qui est de la prise en charge des bronches.

Objectif: Cet étude a été effectuée afin d'évaluer des indications, et des complications associées avec l'utilisation de la trachéostomie chirurgicale ouverte dans notre centre.

Plan et Cadre: C'est une étude rétrospective de tous les patients qui avaient subi la trachéostomie chirurgicale ouverte au centre hospitalier universitaire d'Obafemi Awolowo, Ile-Ife, Nigeria au cours d'une durée de 15ans entre janvier 1986 au décembre 2000.

Patients et Méthodes: Les dossiers médicaux de quarante quatre malades qui avaient eu la trachéostomie chirurgicale ouverte dans la salle d'opération pendant la période d'étude ont été évalués.

Résultats: Il y avait 12 femmes et 32 hommes. L'âge moyen était 33,6±24,8 ans. Les indications pour la trachéostomie étaient: traumatisme (n=15), infections (n=13), laryngite

(bénigne et maligne), tumeurs (n=9), des autres malignités de la tête et du cou (n=4), des cas neurologiques avec l'insuffisance respiratoire (n=2), et la tracheomalacie (n=1). Toutes les trachéostomies ont été opérées comme d'urgence parce que tous les patients étaient atteints d'obstruction respiratoire.

L'incision transversale était utilisée en n=35 des cas, tandis que l'incision longitudinale était utilisée en n=3 et le type d'incision n'était pas précise dans les autres six cas. La sténose laryngite était trouvée en 6,9% des cas et la mortalité était 25%.

Conclusion: L'obstruction des bronches supérieures était l'indication majeure pour la trachéostomie dans notre centre, et le taux élevé de la mortalité pourrait être attribuable aux problèmes médicaux primaire plutôt que des complication de la trachéostomie seulement.

Introduction

Tracheostomy is one of the most common surgical procedures employed in the management of airway obstruction and in the intensive care unit.¹ It is one of the three methods of airway intervention, others being endotracheal intubations, cricothyroidotomy, and in recent times Percutaneous Dilational Tracheostomy (PDT).

Galen first mentioned tracheostomy in medical literature in the second century AD.² The 16th-17th century saw the successful performance of the procedure and it was then referred to as thyroidotomy, bronchotomy, etc. Techniques varied as there were surgeons. The traditional indication for tracheostomy then fell into three categories namely: (1) to relieve airway obstruction, (2) to assist ventilation, and (3) to facilitate tracheo-bronchial toileting. The most common indication then was airway obstruction. Hollinger et al tracheostomised 90% of 86 infants for obstructive airway disease.³ After the Second World War, there was an increase in the use of tracheostomy due to other major indications like protection of the tracheo-bronchial tree and respiratory insufficiency.²

In recent times, short-term tracheostomy for obstructive airway disease due to acute infections is on the decrease due to earlier diagnosis, the use of antibiotics and the use of humidified oxygen. Improved technique of endotracheal intubation has also led to its use in patients requiring ventilatory support; and this has led to a decline in the use of tracheostomy.² However, where long-term intubation of greater than three weeks is required tracheostomy is still the procedure of choice.^{4,5,6} In recent times, PDT technique is getting more popular than the open surgical tracheostomy.⁷

As indicated earlier, this work reviewed the use of open surgical tracheostomy in our institution over a fifteen-year period (1986 - 2000). The indication for this procedure, complications, and its outcome were evaluated.

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Materials and Methods

The medical records of all the forty-four patients that had tracheostomy between January 1996 and December 2000 were reviewed. The age, sex, the indications for tracheostomy, duration of hospital stay and outcome of the intervention were the information that were extracted and analyzed.

Results

Available records showed that forty-four tracheotomies were performed during this period. There were 32 males and 12 females giving a male to female ratio of 3:1.

Table 1 Age distribution of patients with tracheostomy

Age in years	Frequency	% of Total
0 - 10	13	29.5
11 - 20	1	2.3
21 - 30	8	18.3
31 - 40	7	15.9
41 - 50	7	15.9
51 - 60	1	2.3
61 - 70	2	4.5
71 - 80	3	6.8
> 80	2	4.5
Total	44	100

Mean age = 33.6 ± 24.8

Table 2 The indications for tracheostomy

Indications	Frequency	% of Total
A. Traumatic:		
Foreign body in larynx	2	4.5
Cut throat	6	13.6
Facial burns	4	9.0
Mandibular #	1	2.3
Head injury	2	4.5
Total	15	34.1
B. Infections:		
Retropharyngeal abscess	1	2.3
Bronchopneumonia	4	9.0
Ludwig's angina	1	2.3
Croup	4	9.0
Diphtheria	1	2.3
Tetanus	2	4.5
Total	13	29.5
C. Tumors:		
Papilloma	4	9.0
Carcinoma of larynx	5	11.4
Thyroid carcinoma	2	4.5
Parotid carcinoma	1	2.3
Neck masses	1	2.3
Total	13	29.5
D. Neurological:		
Gullein Barre	1	2.3
Bilateral recurrent laryngeal nerve palsy (post thyroidectomy)	1	2.3
Total	2	4.5
E. Others:		
Tracheomalacia	1	2.3
Total	1	2.3
Grand total	44	100

Age distribution of the patients are as shown in Table 1 with the mean age being 33.6 ± 24.8 years.

The first decade of life recorded the highest incidence with the infective causes of airway obstruction predominating, while the 7th - 8th decade of life recorded the least incidence with laryngeal, and other head and neck malignancies predominating.

The mean hospital stay was found to be 15.5 ± 11.3 days; and the incision types were transverse 35, longitudinal 3, and unspecified 6.

Indications for tracheostomy: The most common indication in our center was airway obstruction secondary to traumatic causes, and this was followed by airway obstruction due to infections as shown in Table 2.

Table 3 Distribution of complications

Death	Stoma Hemorrhage	Laryngeal infections	Subcutaneous emphysema
11	1	3	2
25%	2.3%	6.7%	4.5%

Complications: The most common complications in our study were death, which occurred in 25% of the cases, stoma infections (6.7%), laryngeal stenosis (6.7%) and haemorrhage that accounted for 2.3%. See Table 3 for details.

Discussion

One of the traditional indications for tracheostomy is the relief of airway obstruction. Upper airway obstruction was the predominant indication for tracheostomy in 93% of cases in this study. This agrees with the works of other ORL Surgeons from the different geographical parts of Nigeria.^{8,9,10,11,12} The highest age incidence (Table 1) was found to be in the first decade of life, and this was due mainly to childhood infections. The female sex was found to account for only 22% and the preponderance of the male sex (78%) could be due to the fact that males are more prone to trauma.

The indications for tracheostomy in our study are shown in Table 2. Trauma accounted for the most common (34%) of these. Cut-throat injuries were found in 13.6% of cases. This and other traumatic causes of airway obstruction were found between the third and the fifth decades of life. It is customary to perform tracheostomy on patients with cut-throat injuries in our environment in order to provide safe and adequate ventilation before the repair of the lacerations.^{13,14,15,21} Foreign body aspiration was found to be the indication in 4.5% of cases. This incidence is low when compared with the work of Okoye who reported an incidence of 45.5% in his results in the South Eastern part of Nigeria.¹² The lower incidence in this work might be because our patients with foreign body in the larynx present earlier in this part of the country (South-West of Nigeria). Besides, in our own experience, the foreign bodies are usually supraglottic or impacted at the carina, and endoscopic removal is usually employed after an unsuccessful Heimlich Maneuver.

Burns and head injury were the indications in 13.6% of cases. Recent improvement in the facilities available at our Intensive Care Unit (ICU), and the resuscitation of the Burns and Plastic, and Neurosurgical Units has been responsible for the rise in the use of Tracheostomy in the management of this group of patients in our center within the last five years.

Childhood infections like bronchopneumonia, and croup are the most common at 9% each while tetanus and its management accounted for 4.5% of the cases.

The lower incidence of tetanus in this work contrast with those of Okeowo¹⁰ who found tetanus to be the largest single indication (55.5%) for tracheostomy at Lagos University Hospital (LUTH), Lagos. The lower incidence of tetanus in our report could be because our respiratory support facilities were not as developed as to have provided ventilatory support for the tetanus patients in our centre. This situation has since improved in the last five years because new ventilatory support machines have been procured for our intensive care unit. Another reason for our low tetanus data may also be due to a better control of tetanus through the National Policy on Immunization (NPI) within the last ten years.

Tumor was the indication in 29.5% of cases, with the laryngeal tumor accounting for 20.5% of total. Malignant laryngeal carcinoma forms the largest indication for tracheostomy above the third decade of life. In our experience, all our cases with laryngeal carcinoma presented in severe respiratory obstruction and so an emergency tracheostomy was always the rule even before confirming the diagnosis. This is because the patients were usually diagnosed as having bronchial asthma from the referring center and would have been kept until their disease was advanced before being referred. Okoye also reported this late presentation of patients with laryngeal carcinoma in his paper.¹²

Some of the complications encountered in our study are an indicated in Table 3. There was a 25% mortality associated with tracheostomy in our study. This is exceptionally high when compared with a mortality rate of 0.4% for Percutaneous Dilatational Tracheostomy (PDT) reported by Darius Bliznikas in his review of studies on PDT complications by various authors.¹⁶ The causes of death in our study were chiefly due to the medical complications associated with the primary disease, as well as due to accidental tube dislodgement, and blockage due to poor toileting.

References

1. Van Heurn L W: When and how should we do a Tracheostomy? *Curr Opin Crit Care* 2000; 6: 267 - 270.
2. Donald B Hawkins: Intubation, Tracheostomy and Cricothyrotomy. In *Otolaryngology Head and Neck Surgery*. (Eds) Meyerhof Williams Land Rice, Dale H, Saunders, W. B. Harcourt, Brace Jovanovich Inc. pp 1992.
3. Hollinger PH, Brown WT and Maurizi DG: Tracheostomy in the newborn. *Am J Surg* 1965; 109: 771 - 779.
4. Wetmore RF, Handler S D and Potsic WP: Paediatric tracheostomy - experience during the past decade. *Ann Otol Rhinol Laryngol* 1982; 91: 628 - 632.
5. Carter P and Benjamin B: Ten year review of pediatric tracheostomy: *Ann Otol Rhinol Laryngol* 1983; 92: 398 - 400.
6. Chrysdale WS, Feldman RI and Naito K: Tracheostomies a 10 year experience in 319 children. *Ann Otol Rhinol Laryngol* 1988; 97: 439 - 443.
7. Van Heurn LW: Comparative Clinical trial of progressive dilatational and forceps dilatational tracheostomy. *Intensive Care Med* 2001; 27: 292 - 5.
8. Okafor BC: Tracheostomy: A review. *Nig. Med. J.* 1981; 11: 1 - 10
9. Mukherjee DK: Experience with Tracheostomy at Lagos University Teaching Hospital. *Nig. Med. J* 1977; 7: 412 - 416.
10. Nwawolo CC, Oyewole EA and Okeowo PA: Tracheostomy a longitudinal study. *Nig. J. Surg.* 1997; 4: 53 - 57.
11. Okeowo PA: The role of Tracheostomy in Otolaryngological practice in a developing country. *Otolaryngol*, 1983; 4: 231 - 234.
12. Okoye BCC: Tracheostomy in Port Harcourt. *Nigerian Journal of Surgical Sciences*, 2000; 10: 99 - 102.
13. Ladapo AA: Open injuries of the anterior aspect of the neck. *Ghana Med. J.* 1979; 182 - 6.
14. Eishet I Atim et al: Surgical airways problems and management: The UCTH experience. *The Nig. Post Grad. Med. J.* 1997; 4: 15 - 17.
15. Amadasun J EO: Decision making in self-inflicted life threatening Neck injury - Report of two cases. *West African J. ORL-HNS*; 1999; 2: 22 - 23.
16. Darius, Bliznikas, Soly, Baredes: Percutaneous Tracheostomy. Emedicine.com/ent/topic 2000 682.htm.