

## Tracheostomy in Northern Nigeria- A Multicentre Review

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**Background:** Conventional surgical tracheostomy is an old technique of bypassing the upper airway that remains relevant even in the 21<sup>st</sup> century. Although many airway problems have been addressed in recent years via endotracheal intubation and endoscopically guided percutaneous tracheostomy, conventional surgical tracheostomy still remain the routine in our country for all airways that require surgical intervention. This study highlights the common indications and pattern of complications of tracheostomy in northern Nigeria.

**Methods:** A 5 year retrospective review of tracheostomy in three tertiary hospitals in the north east, north central and north west zones of Northern Nigeria.

**Results:** A total of 111 cases was analyzed, 79 (71.2%) males and 32 (28.8%) females with a m:f ratio of 2.5:1, age ranged between 2months to 75years, mean age of 29.4 and a std. deviation of 22.7. The commonest indication was head and neck tumors (37.8%) followed by airway foreign body (22.5%) and head and neck trauma (18.9%). Complication rate was 6.3% and mortality of 0.9%.

**Conclusion:** Tracheostomy is a life surgical procedure that is not devoid of complications, however most of the complications can be avoided with meticulous technique, adequate and appropriate post operative care.

## Introduction

Tracheostomy is a surgical procedure that establishes an airway in the front of cervical trachea. Tracheostomy is often a life saving procedure in a variety of clinical conditions. It has been employed in acute upper airway obstruction irrespective of the cause<sup>1</sup>. Tracheostomy as a life saving measure has been performed since ancient times<sup>2</sup>. In spite of the evidence of performance of this all important procedure in the ancient times, it was not until early nineteenth century when it formed part of the surgeons' armamentarium. It was considered to be risky and dangerous and therefore rarely performed before nineteenth century<sup>3</sup>. Galen and Aretaeus occupy most part of early history of tracheostomy when Galen approved the operation and successfully opened the windpipe of a goat. Many authors recognized Asclepiades of Bittynia (Second century AD) as the first to perform the operation<sup>4</sup>. In the fourth century BC, Alexander the Great "punctured the trachea of a soldier with the point of his sword when he saw a man choking from a bone lodged in his throat"<sup>5</sup>. The evolution of tracheostomy transude various stages at different periods. Period of 'legend' (2000 B.C. to A.D. 1546); Period of 'fear' (1546 to 1833) only brave few performs the procedure, Period of 'drama' (1833 to 1932) procedure done only as emergency, Period of 'enthusiasm' (1932 to 1965) 'if you think of tracheostomy do it' that was the popular adage; and Period of 'rationalization' (1965 to date)<sup>5</sup>.

Previously upper airway obstructions secondary to trauma and/or infections are the most frequent indication for tracheostomy. Of late however, prolonged intubation that necessitates mechanical ventilation tends to be among the commonest. The airway complications of prolonged intubation are observed significantly on the patients whose intubation period is more than ten days<sup>2</sup>. Presently, the life saving role of tracheostomy in many clinical conditions is well established. Well defined more specific indications were identified. The relative safety of tracheostomy over prolonged intubation has been reported<sup>6</sup>. It may be expected that in the 21<sup>st</sup> century the frequency of tracheostomy may decrease owing to technological and scientific developments, however there

is evidence that approximately 13% of ICU admissions will require tracheostomy at any one time<sup>6</sup>. Historically tracheostomy has had a high rate of complications<sup>7</sup>. There has been a tremendous improvement on methods of getting to the trachea such as percutaneous endoscopically guided tracheostomy. Conventional surgical tracheostomy is what we routinely practice in our country in both emergency and elective cases. Therefore the aphorism that ‘when tracheostomy crosses your mind is the time to do it’<sup>8</sup> may still be relevant, thus this study. We hereby review our experience of five years in three tertiary centers in the three geopolitical zones of northern Nigeria. This study highlights the common indications and pattern of complications of conventional surgical tracheostomy in northern Nigeria and suggests possible ways for reducing the complications.

### Patients and Methods

This is a retrospective review of tracheostomies done within a period of five years between 1<sup>st</sup> January, 2007 and 31<sup>st</sup> December, 2011 in three tertiary health facilities in northern Nigeria. Northern Nigeria has 19 states divided in three geopolitical zones. A centre was selected from each of the zones, University of Maiduguri Teaching Hospital (UMTH), National Ear Care Centre Kaduna (NECC) and University of Ilorin Teaching Hospital (UITH) representing north-east, north-west and north-central zones respectively. The medical records of patients who had tracheostomy during the period under review were retrieved. Parameters such as age, sex, indications, tracheostomy timing (emergency or elective) and complications were extracted. Data The commonest indication for tracheostomy was head and neck tumors in 37.8% followed by airway foreign body (22.5%). The majority (69.4%) of the 111 tracheostomies were done as emergencies; compared to only 34 (30.6%) which were elective collected was analyzed using statistical package for social sciences (SPSS) version 15. Excluded in this study are cases with incomplete records.

### Results

A total of 111 cases were retrieved, 79 (71.2%) males and 32 (28.8%), The ages ranged between 2 months to 75years with a mean age of 29.4 years and a std. deviation of 22.7. The rate of tracheostomy was highest among the under 10 years of age followed by 60-69 years age group (Table 1). Males were 79 (71.2%) and there were 32 (28.8%) females giving a male to female sex ratio of 2.5: 1. The commonest indication for tracheostomy was head and neck tumors in 37.8% followed by airway foreign body (22.5%). The majority (69.4%) of the 111 tracheostomies were done as emergencies; compared to only 34 (30.6%) which were elective.

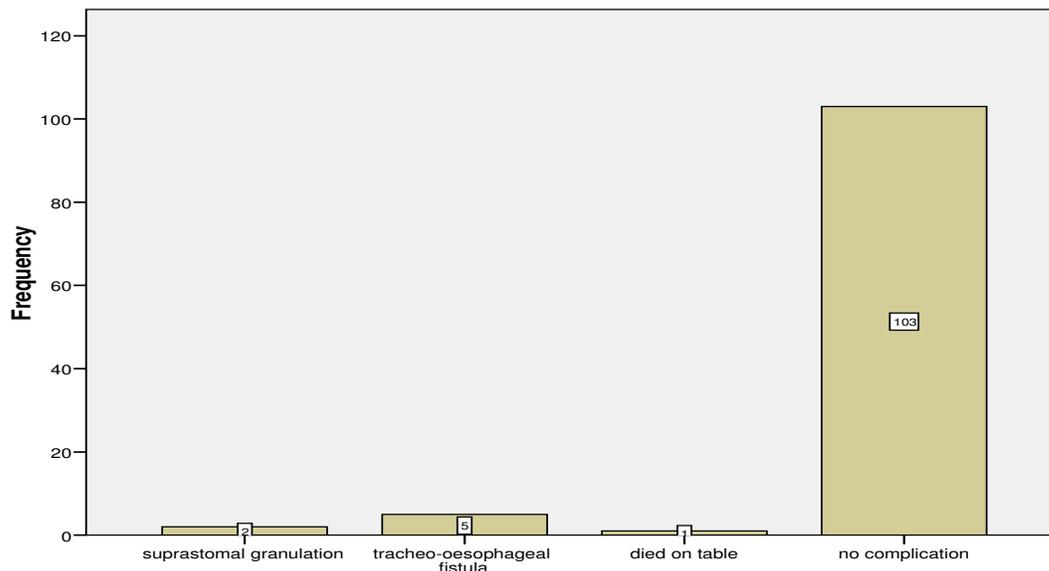
Of the 111 cases, 92.8% had no complications. One patient died on table.

**Table 1.** Distribution by Age Group

Age group in years	Frequency	Percent (%)
0-9	36	32.4
10-19	7	6.3
20-29	13	11.7
30-39	13	11.7
40-49	13	11.7
50-59	10	9.0
60-69	15	13.5
70-79	4	3.6
Total	111	100.0

**Table 2.** Distribution by indications

Indications	Frequency	Percent (%)
Head and neck tumors	42	37.8
Bil. VC nodules/palsies	4	3.6
Head and neck trauma	21	18.9
Deep neck abscess	2	1.8
Airway foreign body	25	22.5
Difficult intubation	2	1.8
Laryng. cyst/polyp/oedema	2	1.8
Recc. resp. papillomatosis	9	8.1
Laryngocele	1	0.9
Prolonged intubation	2	1.8
Pierre Robin's Syndrome	1	0.9
Total	111	100.0



**fig. 3: complications recorded**

**Discussion**

Tracheostomy as a surgical procedure whether elective or emergency is one of the common surgical operations nowadays not devoid of complications<sup>9</sup>. In this study we retrospectively reviewed 111 cases of tracheostomy performed in our hospitals to highlight indications and complications and to suggest possible ways of preventing or minimizing the complications. According to literature available to us there has not been a study of this topic in northern Nigeria as a region.

The highest rate of tracheostomy was among age group below 10 years (32.4%) as seen in Table 1. Majority of indication in this age group was foreign bodies in the airway, this agrees with the studies in the southwestern Nigeria with the modal age group of 0-10years<sup>10, 11</sup>, Okafor<sup>12</sup> and Orji<sup>13</sup> in southeastern Nigeria reported highest rate among age group 0-20 years. There is the need to extend the campaign on the dangers of foreign body aspiration in childhood to antenatal clinics, so

that mothers will be educated early. In an audit of paediatric tracheostomies in Port Harcourt Nigeria, Onotai<sup>14</sup> find out that about 85% of indication was foreign body in the upper aerodigestive tract this buttresses the need for education on child care. However in Northwestern Tanzania, the highest age incidence was third decade<sup>15</sup>.

In this study, males constituted 71.2% (79) and females 28.8% (32), m:f ratio of 2.5:1 this may be explained by the nature of outdoor risky jobs undertaken mostly by men in this part of the country. This ratio is similar to what Amusa et al<sup>10</sup> and Eziyi et al<sup>11</sup> reported in southwestern Nigeria- 3: 1 and 2.8: 1 respectively. It however differs from Okafor<sup>12</sup> and Orji<sup>13</sup> who reported 1.4: 1 and 1: 1 respectively from south eastern Nigeria where women are equally involved in outdoor risky activities as men. The fact that common head and neck tumors like cancer of the larynx are commoner in men may have added to the higher proportion of males. A comparative study of elective and emergency tracheostomy in Bangladesh<sup>16</sup> reported m: f ratio of 6.5:1 and 9:1 in that order. This may probably be due to their method of patient selection. All their elective cases were selected from ICU/preoperative patients with planned tracheostomy and the commonest indication for emergency cases was laryngeal cancers. Erkan Esen et al<sup>2</sup> in turkey also recruited patients for study with m: f ratio of 2.3:1.

The commonest indication in our series is head and neck tumors (37.8%) followed by airway foreign bodies (22.5%) then head and neck trauma (18.9%) as shown in table 2. Although categorization of the indications differ, a study from southeastern Nigeria revealed the three commonest indications to be Carcinoma of the larynx (25%), foreign body aspiration (21.2%), iatrogenic bilateral vocal cord paralysis (9.6%)<sup>12</sup> while in southwestern Nigeria was Trauma (34.1%), Infections (29.5%), Carcinoma of the larynx (11.4%)<sup>10</sup>. These three regions of Nigeria differ in culture, weather, occupation and literacy levels. Disease burden and pattern likely vary considerably, this and probably lack of standardization of our classification for tracheostomy is responsible for this variation. Tracheostomy is mainly a utilitarian procedure which is more often than not life saving, fig.2 revealed that 69.4% of cases in this study were done as emergency while 30.6% were elective. This finding concurs with that of Eziyi et al from southwestern Nigeria<sup>11</sup> who reported 62.5% as emergency and 37.5% elective. In southeastern Nigeria<sup>12</sup> 94.2% was reported as emergency, 5.8% as elective and Japhet<sup>15</sup> in Tanzania reports 80.4% emergencies, 19.6% electives. Complications of tracheostomy may occur intra-operative or anytime during postoperative periods<sup>17</sup>. It has been noted that complications are associated commonly with emergency tracheostomies than electives<sup>18</sup>. Complication rate as reported in literature have a wide range (6-66%) with a mortality of less than 2%<sup>17</sup>. In this study we recorded 7 cases (6.3%) of complications consisting of 5 tracheo-oesophageal fistula and 2 suprastomal granulation as shown in Figure. 3. All the 5 fistulae were discovered intraoperatively and were successfully closed immediately via the same incision. One of the suprastomal granulation had it excised once and was successfully decannulated, while the second one had 5 successive excisions before decannulation. We recorded one case of mortality (0.9%) - patient died on table. These findings falls within the range of what is documented in standard literature.

Two studies from southwestern Nigeria<sup>10, 11</sup> recorded complication and mortality rates of 45.5% & 25% and 10.3% & 0.0% respectively. However, that of studies from the southeastern Nigeria<sup>12, 13</sup> were 40.4% & 3.8% and 30.2% & 2.1% respectively. In Bangladesh, studies revealed a complication rate of 39.1% and 1.67% mortality associated with tracheostomy in a particular hospital<sup>19</sup> while overall complication rate in that country was between 5% and 40%<sup>20</sup>. Our complication and mortality rates are within the range quoted by most studies; however tracheostomy as a life saving procedure ideally should be devoid of worrisome complications and mortality. Tracheostomy complications can be avoided if the procedure is carefully performed and appropriate postoperative management instituted<sup>21</sup>. Based on the literature reviewed and the findings of this study we suggest that careful and appropriate technique should be employed while

performing tracheostomy, whether elective or emergency. Secondly, all junior residents in ORL must be deliberately trained to perform tracheostomy perfectly without supervision under any circumstance, this is because most senior doctors do not stay in and some emergencies cannot wait. Also public enlightenment on some of the preventable indications of tracheostomy should be embarked on.

The conventional surgical tracheostomy technique is an old life saving procedure which remains relevant today. It is particularly so to us because of improvements in our health care settings with more ICU equipments like ventilators thereby requiring tracheostomy at a time of the management. On the other hand, majority of our patients with head and neck tumors presents late to hospitals necessitating tracheostomy in most of them as emergency. It is therefore mandatory to train all ORL residents to perform tracheostomy perfectly under no supervision. Complications can be minimized with meticulous technique and appropriate post operative management.

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