

TRACHEOSTOMY - THE KORLE BU TEACHING HOSPITAL EXPERIENCE

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ABSTRACT

Background: Tracheostomy has been an old life saving procedure. It may be done as an elective or emergency procedure depending on the indication. **Objectives:** a) To determine the frequency and indications of tracheostomy as well as reasons for late presentation of patients who require emergency tracheostomy at the Ear, Nose and Throat (ENT) Unit, Korle Bu Teaching Hospital, Accra. b) To determine whether there is a statistically significant difference in the outcome between changing the tracheostomy tube for the first time on the 3rd postoperative day and on the 5th postoperative day. **Methods:** This was a prospective cross-sectional study of patients who had tracheostomy at the ENT Unit, Korle Bu Teaching Hospital, Accra from 1st June, 2013 to 30th November, 2013. Hospital records were used to obtain indications for tracheostomy and establish frequency of tracheostomy over the period. Questionnaires were also administered to all patients who had tracheostomy from 1st June, 2013 to 30th November, 2013 and consented to be part of this study. Randomization of the patients into those for first tracheostomy tube change on the 3rd and 5th postoperative days were done. **Results:** The main indication for tracheostomy was found to be Acute Upper Airway Obstruction secondary to Laryngeal and Hypopharyngeal Tumours. This represented 68.0% of respondents. The frequency of tracheostomy done at the ENT Unit, Korle Bu Teaching Hospital was found to be 50 tracheostomies per year. 68.0% of the patients who had tracheostomy during the study period presented late to the ENT Unit, Korle Bu Teaching Hospital. The main reasons why these patients presented late was due to delayed referral by doctors and nurses and financial difficulties. Most of the patients who presented late were first seen at private and public hospitals. They represented 40.0% of respondents. 80.0% (20) of the patients who took part in the study had emergency tracheostomy whilst 20.0% (5) had elective tracheostomy. No statistically significant difference in terms of outcome was found between changing the tracheostomy tube for the first time on the 3rd postoperative day and on the 5th postoperative day (p-value was 0.672). **Conclusions:** The main indication for tracheostomy at the ENT Unit, Korle Bu Teaching Hospital is acute upper airway obstruction secondary to laryngeal tumour. The frequency of tracheostomy at the ENT Unit, Korle Bu Teaching Hospital is 50 tracheostomies per year. The main reason why patients who had tracheostomy presented late was due to doctors' and nurses' late referral. Changing the tracheostomy tube for the first time on the 3rd postoperative day is safe and thus this can be practiced. Patients can also be discharged home earlier with lower hospital bills.

KEYWORDS: Tracheostomy, ENT-KBTH, late presentation.

INTRODUCTION

Tracheostomy has remained a much needed life saving surgical procedure worldwide and especially in our environment where patients present late with upper airway obstruction.^[1]

1.1 History of Tracheostomy

The word tracheostomy is derived from the Greek language. The procedure was referred to as bronchotomy and laryngotomy by the Greeks and Romans. Other names used have been pharyngotomy, tracheostomy and tracheotomy. The word tracheotomy first appeared in print in 1649.

Asclepiades of Bythinien, who lived in Rome in 100 BC is said to have performed the first tracheostomy. Hippocrates (460-377 BC) condemned tracheotomy. He was afraid of carotid artery damage. He knew that laceration or ligation of carotid vessels would cause death and advocated intubations.

Tracheostomy is one of the oldest surgical procedures and was dreaded because of its associated complications. It was until the 19th century that the procedure was understood clearly and indications properly defined. This happened after the anatomy of the larynx and trachea had been clearly outlined.^[2]

1.2 Anatomy of The Trachea

The trachea, a partly cartilaginous and partly membranous tube begins at the level of C6 vertebra in continuity with the larynx to the upper border of T5 vertebra, where it divides into the two bronchi, one for each lung. It is attached to the lower margin of the cricoid cartilage by the cricotracheal ligament. The trachea is 10cm long in adults with the superior half in the neck and the inferior portion in the thoracic region. The trachea is nearly but not quite cylindrical, being flattened posteriorly. The tracheal diameter is 2cm. In the first year of life the tracheal diameter is only 3mm.

Tracheal Relations—The *anterior surface* of the trachea is convex, and covered, in the neck, from above downward, by the isthmus of the thyroid gland, the inferior thyroid veins, the thyroidea ima artery (when that vessel exists), the sternothyroid and sternohyoid muscles, the cervical fascia, and, more superficially, by the anastomosing branches between the anterior jugular veins; in the thorax, it is covered from before backward by the manubrium sterni, the remains of the thymus, the left innominate vein, the aortic arch, the innominate and left common carotid arteries, and the deep cardiac plexus.

Posteriorly, the trachea is in contact with the esophagus. *Laterally*, in the neck, it is in relation with the common carotid arteries, the right and left lobes of the thyroid gland, the inferior thyroid arteries, and the recurrent laryngeal nerves; in the thorax, it lies in the superior mediastinum, and is in relation on the right side with the pleura and right vagus, and near the root of the neck with the innominate artery; on its left side are the left recurrent laryngeal nerve, the aortic arch, and the left common carotid and subclavian arteries.

The trachea is composed of imperfect rings of hyaline cartilage, fibrous tissue, muscular fibers, mucous membrane, and glands. Each cartilage forms an imperfect ring, which occupies the anterior two-thirds of the circumference of the trachea, being deficient behind, where the tube is completed by fibrous tissue and unstriped muscular fibers. The cartilages are placed horizontally above each other.

The trachea is supplied with blood mainly by the inferior thyroid arteries while its thoracic end is also supplied by the bronchial arteries. The veins end in the inferior thyroid venous plexus. The nerves are derived from the vagus and the recurrent laryngeal nerves, and from the sympathetic; they are distributed to the trachealis muscles and between the epithelial cells.^[3, 4]

1.3 Definition of Tracheostomy

Tracheotomy implies making an incision in the trachea. Tracheostomy involves removing a small part of the wall (making a stoma), but the strict distinction between these terms is often ignored.

Tracheostomy thus involves creation of an opening on the anterior wall of the trachea and the insertion of a tube through the opening to relieve upper airway obstruction, facilitate ventilation and removal of secretions.^[4] Instead of breathing through the nose and mouth, the patient now breathes through the tracheostomy tube.^[3]

1.4 Research Problem

Currently statistical data existing on the Ghanaian experience with tracheostomy is scanty. Common indications for tracheostomy, frequency of tracheostomy, factors leading to late presentations of patients who end up requiring emergency tracheostomy at the Korle Bu Teaching Hospital are yet to be published. There is also a lack of data on the earliest time for first tracheostomy tube change e.g. 3rd, 5th, 7th postoperative day.

1.5 Justification/relevance of study

Tracheostomy is an ancient surgical procedure. Publications on tracheostomy from many parts of the world are available. In the West African Subregion, a lot of Nigerian publications about tracheostomy have been done.^[1, 5, 6, 7, 8] This however, is not the situation concerning Ghana.

Various indications for tracheostomy have been well documented. They include upper airway obstruction, airway protection in the comatose patient, facilitation of tracheobronchial toileting and prolonged mechanical ventilation.^[9] It is also done as an elective procedure as part of major head and neck surgeries.^[10] Findings from various studies have reported different pathologies as the main indication for tracheostomy. Cervicofacial trauma and laryngeal carcinoma have been reported as being the leading indications for tracheostomy.^[9] This study thus provides data on the common indications and frequency of tracheostomy at the Korle Bu Teaching Hospital which is currently scanty. This is important for public health education and has helped to compare the Ghanaian experience with work from other parts of the world.

Cuffed tracheostomy tubes are the recommended tubes for use at the time of surgery as these prevent blood from the operating field from draining down into the trachea. The cuffed tubes are then changed into double lumen tubes which the patient uses for a longer time after the tracheocutaneous tract has been well formed. The time for the first tube change has varied from 3 – 14 days from various publications.^[11, 12, 13] The day of first tube change has cost implications for the patient as the earlier tube change would mean a shorter hospital stay and thus a lower bill at the end. This study thus sought to determine whether there was a statistically significant difference in terms of outcome between changing the tracheostomy tube for the first time on the 3rd postoperative day and on the 5th postoperative day.

OBJECTIVES OF STUDY

2.1 General Objective

To evaluate tracheostomies done at the Korle Bu Teaching Hospital.

2.2 Specific Objectives

- 1) To determine the common indications for tracheostomy at the ENT Unit, Korle Bu Teaching Hospital, Accra.
- 2) To establish the frequency of tracheostomy done at the Korle Bu Teaching Hospital, Accra.
- 3) To determine factors leading to late presentation of patients requiring emergency tracheostomy to the hospital.
- 4) To determine whether there is a statistically significant difference in terms of outcome between changing the tracheostomy tube for the first time on the 3rd postoperative day and on the 5th postoperative day.

LITERATURE REVIEW

3.1 The Evolution of Tracheostomy

Tracheostomy has been performed from days of old having gone through various challenges before its present acceptance as a surgical procedure. The evolution of tracheostomy can be grouped into five stages. The first period from 2000BC to 1546AD begins with writings about incisions being made into the “windpipe” in the Abers Papyrus and the Rig Veda. This was the ‘period of legend’. Between 1546 and 1833 i.e. ‘the period of fear’, the procedure was considered as irresponsible and only a few courageous surgeons performed it. Their reputation was thus at risk when they performed this type of surgery.

The third stage i.e. ‘period of drama’ started with a report by Trouseau who used tracheostomy in the treatment of diphtheria in 1833. This period spanned 1833 to 1932. Following this, tracheostomy became a highly dramatized operation done for emergencies such as acute airway obstruction. Then came the ‘period of enthusiasm’ i.e. from 1932 to 1965. During this period the adage, “if you think tracheostomy.....do it” became popular. Tracheostomy was recommended for a variety of disease conditions. Wilson for instance suggested the use of tracheostomy in the diagnosis and treatment of poliomyelitis.

Following this stage, was the ‘period of rationalization’ starting from 1965 till today. The relative merits of intubation versus tracheostomy are debated. The choice of one method is made over the other based on the particular scenario/case being managed.^[14, 15]

3.2 Incidence of Tracheostomy

In a 5- year review, 52 tracheostomies were performed, with an average of 10.4 tracheostomies per year at the University of Nigeria Teaching Hospital.^[6] In another study at the University of Ilorin Teaching Hospital,

Nigeria aimed at assessing the clinical presentation and management of patients presenting with acute laryngeal obstruction, they reported 2.4 tracheostomies per year i.e. over the study period of 5 years, 12 emergency tracheostomies were performed.^[7]

In a 10-year study which was conducted at Bugando Medical Centre from January 2001 to December 2010 in Northwestern Tanzania, averagely 17.2 emergency tracheostomies were performed yearly.^[9] These findings were compared with our findings at the Korle Bu Teaching Hospital.

3.3 Indications of Tracheostomy

The indications for tracheostomy are varied including upper airway obstruction, airway protection in the comatose patient, facilitation of tracheobronchial toileting and prolonged mechanical ventilation.^[9] It is also done as an elective procedure as part of major head and neck surgeries.^[10] In the Sub Saharan region of West Africa tracheostomies are done as an emergency procedure mainly for upper airway obstruction since most of such patients present to the hospital late.^[11]

In a study by Kitcher et al at the Korle Bu Teaching Hospital in Accra, Ghana, 61 patients i.e. 8.1% out the total number of 750 emergency admissions over a two-year period were found to be due to stridor.^[16] The leading causes of ENT emergency admissions were foreign bodies in the esophagus, epistaxis, throat infections and stridor. A significant number among the stridor patients would have had to have tracheostomy to relieve their airway obstruction.

Literature findings vary as in some cases cervicofacial trauma (due to road traffic accidents and cut throat) has been reported as the main indication for tracheostomy in adults.^[11] In other studies however laryngeal carcinoma has been said to be the main indication for tracheostomy in adults.

The indications for tracheostomy in children have mainly been reported as due to foreign body impaction in the larynx and recurrent respiratory papillomatosis.^[5] In the past however tetanus was said to be the leading indication in childhood.^[17] Infections like acute epiglottitis and acute laryngotracheobronchitis used to play a significant part in the causation of airway obstruction especially in children. This has changed with time due to early diagnosis, advancement in medical technology and adequate use of antibiotics. Intubation is mostly done in place of tracheostomy with conservative management in intensive care units.

Prolonged intubation and the use of tracheostomy in the management of some neurosurgery patients have also become an important indication for tracheostomy in Nigeria due to improved intensive care facilities and expertise^[18]

This study thus sought to review the various indications for tracheostomy at the Korle Bu Teaching Hospital which provides data on the situation in Ghana which was not readily available.

3.4 Types of Tracheostomy

This may be done either as an Open Surgical procedure or by the Percutaneous Dilatation Tracheostomy method. In our part of the world the open surgical procedure is mainly performed. Open Tracheostomy may be done as an elective or emergency procedure depending on the indication. Other methods of airway intervention include endotracheal intubation and cricothyroidotomy.^[9]

Tracheostomy is also classified as temporary or permanent tracheostomy. Temporary tracheostomy is used for a short time lasting a few days to a few weeks and removed when the primary disease for performing the procedure has been treated. An example is when tracheostomy is done preoperatively for major head and neck surgeries. Permanent tracheostomy is used by the patient as long as he/she lives. This is done in situations where there is bilateral vocal paralysis or irreversible laryngeal damage. Example of irreversible laryngeal damage can be caused by trauma. Permanent tracheostomy may also be done in severe obstructive sleep apnea syndrome.^[19]

3.5 Technique of Tracheostomy

Tracheostomy may be done either as an Open Surgical procedure or by the Percutaneous Dilatation Tracheostomy method. The open surgical method is described as this is the commonest type done at the Korle Bu Teaching Hospital. This may be done if possible under general anaesthesia with the patient intubated. Example is in the intensive care unit for tracheobronchial toileting. The procedure can also be done under local anaesthesia especially in emergency conditions like acute upper airway obstruction and when difficult intubation is anticipated as in maxillofacial injuries. The patient is placed supine with a sandbag behind the shoulders thus hyperextending the neck to bring as much of the trachea as possible close to the skin and into the operating field.

A horizontal incision is made on the anterior neck two finger breaths above the sternal notch. A vertical incision from the lower border of the thyroid cartilage to the jugular notch may rather be used. The horizontal incision has the advantage of a cosmetically better scar and can be used preferably in elective cases. The vertical incision on the other hand is used in emergency cases since it gives easy access due to minimal tissue dissection and bleeding.^[20] It however has the disadvantage of an unsightly scar as the wound contracts. This is because the vertical incision does not heal well since it cuts across the lines of election of the cervical skin.

The incision is carried through skin and subcutaneous tissues down to the strap/infrathyroid muscles (i.e. sternohyoid, sternothyroid, omohyoid and thyrohyoid

muscles). These are separated in the midline, held aside with two retractors and the pretracheal fascia identified. Then this is incised in a vertical direction, avoiding the inferior thyroid veins.

Then the thyroid isthmus is identified, freed from the trachea, clamped, divided and oversewn with 3/0 silk (i.e. transfixion of the thyroid isthmus). The tracheal rings are then seen and at this point, the cricoid cartilage is identified deliberately as making an incision into the cricoid or the first tracheal ring would lead to laryngeal collapse and subglottic stenosis. The only indication for a high tracheostomy is laryngeal carcinoma because if the whole larynx is to be removed in total laryngectomy, then a fresh tracheostome would be performed lower down in a clean area.^[20]

An opening is then made by removing a part of the second and third tracheal rings so that an appropriately sized tracheostomy tube can be inserted. The third and fourth tracheal rings may also be used.^[21] A low tracheostomy i.e. tracheostomy tube placed below the isthmus of the thyroid gland must be avoided as it can lead to injury to the highly placed large vessels in the neck. An example is erosion of the innominate artery which can lead to fatal bleeding.^[22]

In the trachea of children, only a vertical incision is made in the trachea as removal of any segment of tracheal wall tends to lead to tracheal stenosis.^[23] During the operation of tracheostomy in adults it is preferred that a cuffed tracheostomy tube is used. The cuffed tube prevents blood from flowing down the tracheal lumen from the surgical site during the procedure.

3.6 Postoperative Care

The postoperative period after tracheostomy is very crucial and must be carefully managed. The underlisted factors would need to be addressed.

1) Nursing

The nurse taking care of such a patient needs to be conversant with the care of the tracheostomy tube. The patient would need a bell to call for help in case there is any difficulty e.g. tube blockage. A pen and paper would also enable the patient to write concerns.

2) Fixation of the Tracheostomy Tube

The neck is flexed and then the tube retained by double tapes passed around the patient's neck, with a reef knot on either side. It is essential not to tie the knot in a bow as it can be undone. The neck is flexed so that when the patient is moved to the extension position the tapes do not become slack which may lead to displacement of the tube when the patient coughs. The tube should also not be tied too tightly. Alternatively, the flanges of the plastic tube may be sutured to the underlying neck skin.^[24]

3) Removal of Secretions

The tracheostomy tube acts as a foreign body in the trachea thus with the exposure to dry air a lot of secretions are produced in the trachea and these must be suctioned otherwise the tube would become blocked. During the first 48 hours the secretions must be suctioned half-hourly or whenever necessary and thereafter every 1 or 2 hours. This must be done under sterile conditions.

4) Humidification

The air entering the tracheostomy tube must be humidified as the nose is not doing this any longer. Normal saline drops may be instilled down the tube at regular intervals or humidifiers may be used. This prevents crusting of secretions.

5) Dressings

Dressings need to be applied around the tracheostomy tube to prevent macerations from the secretions and the movement of the tube edges.

6) Changing the Tracheostomy Tube

It is essential that the tracheostomy tube is left in place for 48-72 hours as this allows time for the tracheocutaneous tract to form well.^[23] This also prevents crusting of secretions in the tracheostomy tube.^[25] This has however been a subject of some controversy among ENT Surgeons as some advocate for first change of tracheostomy tube to be done at the 3rd postoperative day whilst others would wish to wait for as long as 7 days.

Though work has been done on the subject of tracheostomy in the sub region of West Africa, not much information is available on the situation in Ghana and therefore it was necessary to conduct this study to describe our own experience with tracheostomy.

3.7 Reasons For Late Presentation of Patients

Various reasons have been assigned for the late presentation of patients who may end up requiring tracheostomy to the hospital. Examples of such cases include laryngeal carcinoma and recurrent respiratory papillomatosis patients. The following are some of the reasons.

i) Late Referral of Patients By General Practitioners/Non-Specialists

Acute upper airway obstruction may be caused in an adult commonly by a laryngeal tumour and in a child by an inhaled foreign body, recurrent respiratory papillomatosis or acute laryngeal infections. In an infant laryngomalacia is likely to be the cause of airway obstruction. These diseases may sometimes be confused with asthma and so be misdiagnosed and effective treatment delayed since the clinical presentation can be similar.^[8, 24] This can be fatal in some instances. The symptoms of acute upper airway obstruction due to laryngeal disease include noisy breathing, breathlessness, cough and hoarseness of voice whilst its signs include inspiratory stridor, tachypnoea, wheezing, suprasternal

and intercostals recessions.^[7] Asthma on the other hand is likely if a patient presents frequently with more than one of the following symptoms: expiratory wheeze, breathlessness, chest tightness and cough, especially if symptoms worsen at night and in the early morning.^[26]

If a child has signs of airway obstruction of sudden onset, foreign body inhalation must be excluded whilst if associated with fever, croup or epiglottitis must also be ruled out. An adult presenting with progressive unremitting hoarseness of voice with signs of upper airway obstruction, laryngeal tumour is likely.

Thus any patient suspected by a general practitioner to have asthma but after adequate anti-asthma medications have been given, clinical condition continues to worsen acute laryngeal obstruction must be considered.^[27] Thus lack of continuous education of healthcare providers on these various conditions that lead to acute upper airway obstruction and eventually tracheostomy being done thus contributes significantly to the late referral of such patients who present to them for early and appropriate treatment to be given them at an Ear, Nose and Throat Clinic.

ii) Societal Beliefs

Beliefs of our people that such diseases are not hospital illnesses might also contribute. For other patients the belief that life without a voice is meaningless or as found in Calabar, Nigeria where some people believe in reincarnation, there is the fear of mutism in the next life should such patients undergo surgery.^[8]

iii) Fear of Surgery

Some patients also do not come to the hospital early because surgery might have been suggested for their condition.^[8] The incidence of preoperative anxiety in the Nigerian surgical population for instance has been found to be fairly high.^[28] These patients may not continue their treatment for the fear of surgery.

iv) Emotional Challenge

The experience of tracheostomy though a routine procedure for the clinician comes with a lot of emotional and physical difficulties for the patient. This might explain why some patients would present late to the hospital. A comprehensive approach to the preoperative counseling to suit the patient need is important.^[29] Akenroye et al at Ondo State in Southwest Nigeria observed that patients who receive permanent tracheostomy have problems with family reluctance to receive them in their new state with a tube in their neck and also to adjust to their environment.^[19]

v) Cost of Treatment

The high cost of treatment has also been found to be a factor leading to late presentation of patients to the ENT Unit. An example in Ghana is among children with recurrent respiratory papillomatosis who require frequent admissions for surgery and so parents sometimes buy time by delaying their reviews at the ENT Clinic thus

eventually resulting in upper airway obstruction and thus tracheostomy. Tracheostomy in these cases can lead to seeding of papillomata into the trachea.^[30]

3.8 Tracheostomy Tube Change

Cuffed tracheostomy tubes tend to be used intraoperatively as they are best suited for preventing aspiration of blood during the procedure. These are then left in place for some days to allow the tracheocutaneous tract to form well thus avoiding loss of the airway on attempting to replace the cuffed tube with a permanent double lumen tube which allows easy cleaning by the patient.

Premature tube changes can lead to the creation of a false passage, developing subcutaneous emphysema, pneumothorax and an inability to control the airway and to ventilate the patient.^[11]

The double lumen tubes are mainly of two types – metallic and plastic types. At the ENT Unit of Korle Bu Teaching Hospital, the preferred double lumen tubes are the plastic type. This has been due to instances of patients reporting with fractured metallic double lumen tracheostomy tubes. Some of these cases were fatal.

There are reported cases of fractured tracheostomy tubes at Enugu, Nigeria by B.C. Okafor and in Ghana by Antwi-Kusi et al at the Komfo Anokye Teaching Hospital, Kumasi. The German silver type containing nickel tends to crack and the tracheobronchial secretions also cause an alkaline reaction with the types made up of an alloy of zinc and copper. These reactions also weaken the tubes.^[33, 34] The majority of reported fractured tracheostomy tubes have been metallic.^[35]

The first change of tracheostomy tube is done between the 3rd and 7th postoperative days.^[12, 13] Other authors have said 5-7 days and 1-2 weeks.^[11] While some surgeons argue that allowing a longer time enhances the formation of the tracheocutaneous tract others have said that patients have a better chance of going home early if the first tracheostomy tube change is done earlier without any significant loss of the airway.^[36]

In the West African Sub Region the cost of treatment has a significant effect on the quality of care the patient would receive as the socioeconomic status of our patients are mostly poor.^[30] The duration of inpatient stay is long as patients even when discharged cannot afford their bills.^[5] Any intervention that would shorten the period of being on admission would go a long way to reduce the financial burden on our patients. If the first tracheostomy tube change can be carried out safely on the 3rd postoperative day instead of the 5th postoperative day then the patient is likely to have a reduction in the hospital bill as the discharge day would be earlier. This study thus sought to establish whether there is any statistical difference in terms of complications/outcomes

between the first change of the tracheostomy tube on the 3rd and on the 5th postoperative days.

3.9 Process of Tube Change

I) Preparation

At least two well trained staff are needed for every tube change. One holds the tube whilst the other changes the tapes and dressing. If the patient is a child he/she may be agitated, thus a third person would be needed to restrain the child.

The patient must be informed of the procedure and all the steps well explained so as to obtain maximum cooperation. The procedure must be done at a time when all the needed staff are likely to be available.

II) Equipment needed for tube change include:

- a) Tracheal dilator: for keeping the trachea open during the tube change
- b) Blunt ended scissors: for cutting the tapes
- c) Adequate lighting
- d) Same size double lumen tube with all the parts prechecked i.e. inner tube, outer tube and obturator
- e) Smaller size tracheostomy tube: needed in a situation where the same size tube cannot be inserted into trachea
- f) Stitch cutter: for removing skin sutures if necessary
- g) Syringe: for deflating the cuff
- h) Sandbag or rolled up towel: to place underneath shoulders if procedure is to be done with patient in the supine position
- i) Suction machine: to suck secretions in the trachea and oropharynx
- j) Tracheostomy tapes: to secure the tracheostomy tube
- k) Water soluble lubricating gel: to ease insertion of the tube
- l) Normal saline: to clean peristomal skin
- m) Gloves, apron and eye shield: to prevent cross-infection
- n) Pre-cut tracheostomy gauze dressing: to absorb secretions from trachea thus protecting the skin
- o) Guidewire or bougie - to ensure correct placement of a tube in an early or difficult tube change
- p) Stethoscope: to assist with chest auscultation and correct cuff inflation

III) Procedure of tube change includes the following:

- a) Apply a small amount of lubricating gel along the shaft of the tracheostomy tube
- b) Let the patient either lie flat with a sandbag under the shoulders or patient may sit upright
- c) Clean around the old tube with wet gauze
- d) Untie/cut the tapes of the soiled tube
- e) Quickly inspect the stoma site
- f) Insert the new tube
- g) Remove the introducer
- h) Ensure that tracheostomy tube is in the trachea – listen for breath sounds through the tube, check for chest movements during inspiration and expiration and auscultate for equal and bilateral breath sounds
- i) Secure tapes around the neck with neck flexed

- j) Place the inner tube in position
- k) Suction mouth and trachea as required
- l) Apply dressing^[21]

If the tube change is done well the patient would be comfortable after the procedure as observed in our patient in figure I below who had tracheostomy after excision of a huge right neck mass.



Figure I: A Tracheostomy Patient.

3.10 Complications of tube change

It is important that the first tube change is carried out by well trained staff who can manage any of the underlisted complications that may arise. The complications that may arise include the ff.

- 1) Hemorrhage
- 2) Aspiration
- 3) Hypoxia
- 4) Misplacement of tube
- 5) Failure to re-insert tube
- 6) Respiratory arrest^[21]

MATERIALS AND METHODS

4.1 Study Design

This was a prospective cross-sectional study.

4.2 Study Sites

The study was conducted over a six month period at the Ear, Nose and Throat Unit of the Korle Bu Teaching Hospital, Accra starting from 1st June, 2013 to 30th November, 2013. This hospital is the foremost tertiary and referral centre in Ghana. It is also the teaching hospital of the University of Ghana Medical School. The ENT Unit is staffed by a team of seven consultants supported by residents in providing ENT service.

The ENT Unit receives referrals from primary and secondary centres mainly from the Greater Accra, Eastern, Central, Western and Volta Regions of Ghana. These patients are first detained at the Surgical and

Medical Emergency Unit and then they are reviewed and admitted to the ENT Wards by the ENT team. Other referrals are also received at the ENT Clinic during clinic hours where they are reviewed and where necessary admitted. Elective cases are however prepared for surgery and admitted to the Wards after the appropriate anaesthetic assessment.

The entry points for this study were Wards A and B which are the male and female wards respectively for the ENT Unit.

4.3 Study Subjects

The study consisted of all patients who had tracheostomy at the ENT Unit of the Korle Bu Teaching Hospital within the six month period and consented to be included in the study.

4.4 Inclusion Criteria: All patients who had tracheostomy within the study period and consented to participate in the study.

4.5 Exclusion Criteria: Patients who had tracheostomy at the ENT Unit, Korle Bu Teaching Hospital but were unwilling to be part of the study. Children were also excluded as they had only single lumen tubes which were not changed in the immediate postoperative period.

4.6 Study Sample: The estimated sample size was 45 over one year as obtained from hospital-based records over the period of 2009 – 2011. Averagely 45 tracheostomies were done yearly over the 3 year period.^[37] This study sample was however 25 as the study could only be done over six months.

4.7 Techniques and Tools

A survey consisting of the use of interviewer administered questionnaires (Appendix III) was carried out to determine the demography and factors leading to late presentation of patients who ended up requiring emergency tracheostomy to the hospital. Late presentation of patients in this study referred to patients who had clinical features of laryngeal or hypopharyngeal disease like hoarseness of voice, dysphagia and odynophagia but did not report for appropriate and early treatment until their condition worsened thus presenting to ENT-KBTH in acute upper airway obstruction.^[9]

Desktop reviews using hospital based records were carried out with the aid of a structured questionnaire (Appendix IV) to determine the indications and frequency of tracheostomy and to establish whether there's a statistical difference in terms of outcome between changing the tracheostomy tube on the 3rd postoperative day and the 5th postoperative day. Patients were grouped into those who had their tracheostomy tubes changed on the 3rd postoperative day and those changed on the 5th postoperative day. This was done by serializing all the patients. All odd-numbered patients had their first tracheostomy tube change on the 3rd

postoperative day whilst all even-numbered patients had their first tube change on the 5th postoperative day.

Provision was made for translation of the questionnaire to local language for participants who did not understand English Language. The questionnaire was test run on a few patients to determine applicability and appropriate corrections made.

4.8 Data Management and Analysis

The data was recorded on a worksheet and entered into a computer. Analysis was then carried out with SPSS computer software version 15.0. The summary statistics for continuous data were presented with use of mean, median and range. Results were also presented in tables, graphs and charts. Fisher exact test was used to test whether there was any statistically significant difference in outcome between changing the tracheostomy tube for the first time on the 3rd and 5th postoperative days. A p-value less than 0.05 was considered as statistically significant.

4.9 Ethical and Legal Considerations

Ethical clearance for this study was obtained from the Ethical and Protocol Review Committee of the University of Ghana Medical School.

Informed Consent: Informed consent was obtained from patients (respondents) before being enrolled into the study. (Appendix II) The respondents were educated on the need for this study to be done so as to be able to know the situation in Ghana. We also let them know that they are under no compulsion to be part of the study.

RESULTS OF STUDY

A total number of 25 patients who had tracheostomy done at the Korle Bu Teaching Hospital during the study period consented to be part of the study.

5.1 Ages of respondents

A mean age of 52.8 years (with age range from 14 to 77 years) was calculated with a standard deviation of 17. A median age of 57.0 years was also calculated.

5.2 Gender of respondents

Twenty males and five females with a male: female ratio of 4:1 was obtained.

5.3 Nationality of respondents

A greater proportion of respondents were Ghanaians i.e. 88% (22) whilst 12% (3) were non- Ghanaians from Togo.

Ghanaian patients involved in the study were from five regions, mostly from the Greater Accra region i.e. 48% of total respondents. The Central Region had the least number of patients (4%).

5.4 Educational level of respondents

The educational levels with the highest percentage among the patients who participated in the study were

elementary and secondary school who were each represented by 44% i.e. 11 patients. The lowest percentage was tertiary level of education (12%). This is shown in Figure II below.

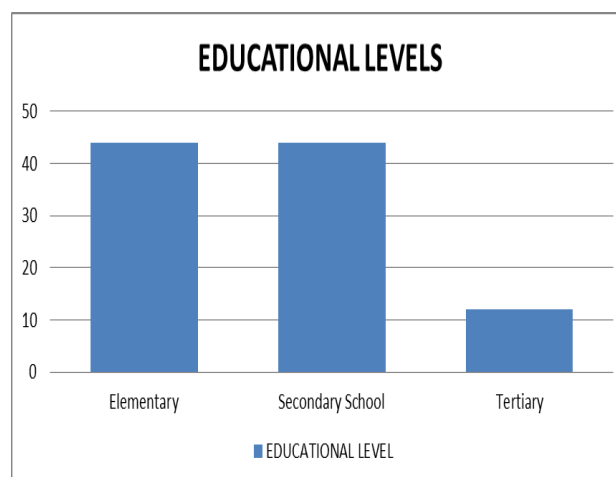


Fig II: Educational Levels

5.5 Occupation of respondents

Public or civil servants obtained the highest percentage of 36% (9) among respondents. 24% (6) of the patients involved in the study were unemployed and pensioners.

5.6 Late presentation of patients

68% (17) of the patients who participated in the study presented late. These patients had to have emergency tracheostomy. 32% (8) of the patients did not present late. These patients had elective tracheostomy on account of failed intubation or imminent airway obstruction due to laryngeal tumour and also emergency tracheostomy after thyroidectomy. One patient had elective tracheostomy before extubation after excision of a huge right submandibular mass.

5.7 Duration of illness of late presenters (from onset of symptoms)

Patients who noticed problem/symptoms up to 6 months were 6 i.e. 24.0% whilst 4 patients i.e. 16.0% also noticed problem/symptoms after 1 year. The details are as presented below in Figure III.

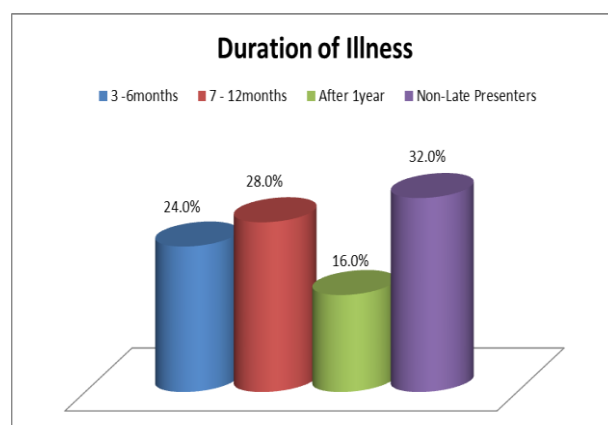


Fig III: Duration of Illness.

5.8 Duration before first treatment

40.0 % (10) of patients sought treatment within the first one month of noticing the symptoms or illness. 8.0% (2) also sought treatment for their condition at 1 year of noticing the symptoms. The details are as shown in Table 1.

Table 1: Duration Before First Treatment.

Duration	Frequency	Percentage
Non-Late Presenters	8	32.0
1 week	4	16.0
1 month	6	24.0
2 months	2	8.0
2.5 months	1	4.0
3 months	1	4.0
8 months	1	4.0
1 year	2	8.0
Total	25	100.0

5.9 First healthcare provider

The first healthcare provider with the highest number of patients was private clinic or hospital i.e.6 (24.0%) whilst the least patronized place was drug store or pharmacy i.e. 3 (12.0%). Respondents who sought help/treatment from clinics or hospitals (both private and public) were 10 (i.e. 40.0%).

5.10 Other places treatment was sought before ENT-KBTH

The highest number of other healthcare providers where treatment was sought apart from the primary place was two other places apart from the primary treatment place. One patient came from the primary treatment point without seeking help from another place.

5.11 Recommendation to come to ENT-KBTH

All the seventeen patients who presented late were either referred by doctors or nurses.

5.12 Reason for reaching ENT-KBTH late

The most common reason (representing 20.0%) why patients presented late was due to delayed referral. 8.0% presented late due to delayed diagnosis.

5.13 Type of tracheostomy

Twenty emergency tracheostomies and five elective tracheostomies were done during the period of the study.

5.14 Indications for tracheostomy

The indication with the highest frequency obtained for tracheostomy during the study period was Acute Upper Airway Obstruction secondary to Laryngeal tumour i.e. 13 patients (52.0%). Acute Upper Airway Obstruction secondary to Laryngeal Tumour and Hypopharyngeal Tumour together represented 68.0% of the indications for tracheostomy. 16% of respondents also had tracheostomy post thyroidectomy. The details are as indicated in figure IV below.

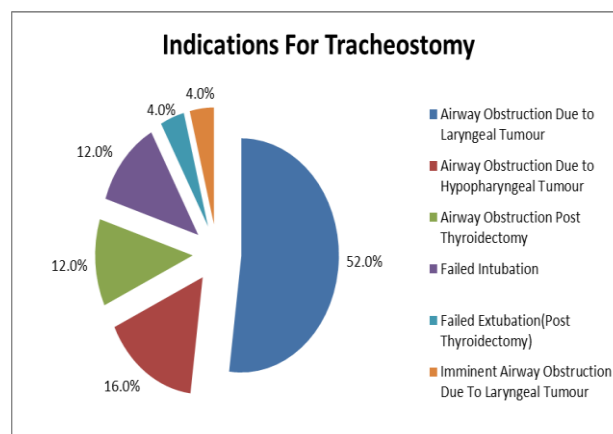


Fig IV: Indications for Tracheostomy.

5.15 Day of first tube change

Thirteen patients (i.e. 52%) had their tracheostomy tubes first changed on the 3rd postoperative day whilst twelve patients also had it changed on the 5th postoperative day (i.e. 48%).

5.16 Outcome of first tube change

On both the 3rd and 5th postoperative days of first tracheostomy tube change the outcome with the highest frequency was 'no problems'. These are demonstrated below in Figure V.

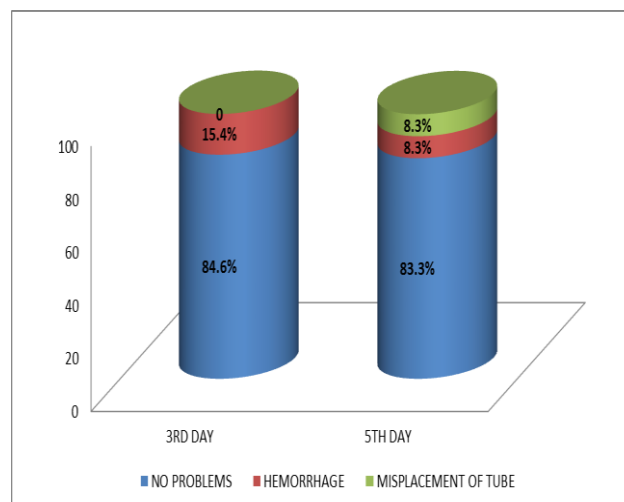


Fig V: Day of First Tube Change and Outcome of Change.

Table 2: Day of First Tube Change and Outcome of Change.

Outcome of Change			
Outcome of Change	No problems	Problems	Total
Day of first tube change			
Third day	11	2	13
Fifth day	10	2	12
Total	21	4	25

Fisher's exact test: p-value is 0.672

From Table 2 above, using the Fisher's exact test, p-value of 0.672 it can be inferred that there is no statistically significant difference between the day of first tube change and outcome of change.

DISCUSSIONS

6.1 Ages of respondents

In this study the age ranged from 14 to 77 years with a mean age of 52.8 years in contrast to that of patients with upper airway obstruction according to the study by Adoga et al whose ages ranged from 9 months to 66 years and according to the study by Ogunleye et al who had a mean age of 27 years and age range of 6 months to 70 years.^[1, 5]

The other studies included children thus had younger ages. This study did not include children. The focus of this study was on adults since they had cuffed tracheostomy tubes inserted at surgery and changed in the immediate postoperative period. Children at the ENT Unit, KBTH have uncuffed single lumen tubes inserted during their surgery (tracheostomy) and there is no change of tracheostomy tube from single lumen to double lumen tubes in the immediate postoperative period as is done in the case of adults. In this study, as statistical difference in terms of outcome between changing the tracheostomy tube for the first time on 3rd or 5th postoperative days was being done, children could not be included. In children there is a risk of damage to the developing tracheal membranes if cuffed tracheostomy tubes are used. In addition, the air leak around the tube is minimal since the tracheal lumen in children below 12 years is small.^[21]

It is worth noting that two neonates had tracheostomy during the study period on account of Treacher Collins Syndrome (had bilateral choanal atresia) and Pierre Robin Sequence. These babies were not admitted to the ENT wards but were managed on the Neonatal Intensive Care Unit.

A 4-year old male child also had elective tracheostomy during the study period on account of too frequent episodes of acute upper airway obstruction secondary to recurrent respiratory papillomatosis and subsequent direct laryngoscopies and removals of papillomata by cold steel method.

6.2 Gender of respondents

Male: female of 4:1 obtained in this study is similar to that obtained by Ogunleye et al in their study in which they had 4.3:1 male: female ratio.^[5] Laryngeal tumours mostly malignant accounted for the highest indication for tracheostomy in this study. Males tend to smoke cigarette and drink alcohol more and thus have a higher incidence of laryngeal tumour and thus were more than females.

Low incidence of smoking among Ghanaian women explains the lower incidence of laryngeal and hypopharyngeal tumours and thus fewer tracheostomies

done for women during the study period. In Ghana, culturally, women who smoke are considered immoral thus frowned upon. Another factor is the low levels of economic independence among Ghanaian women. These observations were reported by Owusu-Dabo et al in the Ashanti Region of Ghana.^[43]

6.3 Nationality of respondents

Most of the patients involved in this study were Ghanaians and this is not surprising as Korle Bu Teaching Hospital is Ghana's foremost referral centre. It is also noteworthy that three of the patients involved in this study were referred from Togo to Ghana for treatment. This is explained by the fact that there are no radiotherapy facilities in Togo and other West African countries apart from Nigeria thus they tend to refer their malignancies to Ghana for treatment.

6.4 Respondent regions

This study shows that referrals to the ENT Unit of Korle Bu Teaching Hospital came from 5 regions of Ghana. This shows that adequate ENT facilities and Specialists need to be provided for the various regions of Ghana so that early treatment can be instituted for patients who could otherwise have avoided tracheostomy if their conditions were diagnosed early.

Most referrals coming from the Greater Accra region can be explained by the accessibility of Korle Bu Teaching Hospital by patients within the region. There is also no other major ENT centre in the Greater Accra Region.

6.5 Educational levels of patients

Only 12% of the patients in this study had tertiary education. The low educational level could have accounted for the high incidence of laryngeal and hypopharyngeal tumours among the respondents as these tumours tend to be common among people of lower educational levels.^[39]

A higher incidence of laryngeal and hypopharyngeal cancers was also observed in fifteen French hospitals among people of low educational level who were likely to work as manual workers in factories etc with all the occupational exposure to gases increasing their risk for these cancers.^[39] Thus the observation in this study is not surprising.

6.6 Occupation of respondents

Patients who were likely to be high income earners were few in the study. 20% of respondents were pensioners or unemployed. This is still consistent with the view that low socioeconomic status is associated with increased risk of laryngeal cancers who were the majority among the patients involved in the study.^[39]

6.7 Late presentation of patients

68% (17) of the patients who took part in this study presented late thus had emergency tracheostomy done. This is similar to other studies done by Adoga et al in

Nigeria and Gilyoma et al in Tanzania where patients are said to have presented late with upper airway obstruction due to advanced disease thus necessitating the performance of tracheostomy for these patients.^[1, 9]

40.0% (10) of patients sought treatment within the first one month of noticing the symptoms or illness whilst respondents who sought help/treatment from clinics or hospitals (both private and public) were 10 (i.e. 40.0%) constituting the majority. This is remarkable as though most patients sought treatment early from both private and public hospital they still reached the ENT Unit of Korle Bu Teaching Hospital late. A significant 94.2% (16) of the late presenters in this study went through at least one other treatment centre apart from their first healthcare provider before reaching our unit. This emphasizes the need for continuous medical education of healthcare providers i.e. doctors, nurses etc. on common ENT conditions so that these patients are referred early to the appropriate ENT centres for early treatment to be initiated. The training of more ENT Specialists to be easily accessible throughout the country can also not be overemphasized. This was also recommended by the study in Nigeria by Ogunleye et al.^[6]

All the late presenters in this study were referred by doctors and nurses to the ENT Unit, Korle Bu Teaching Hospital and the main reason according to the patients (20.0%) was delayed referral to the teaching hospital. This again buttresses the earlier point made about the need for early referral to experts for treatment. 16.0% of the patients also said that financial difficulties were their main reason for presenting late. These patients with financial difficulties would thus have delayed even more after being referred to the teaching hospital.

8.0% of the patients had presented late requiring tracheostomy due to delayed diagnosis. These had been diagnosed of having laryngeal tumours but initial biopsies of the lesions had been reported as inflammatory lesions. Thus they had been discharged only to come back in acute upper airway obstruction and repeat biopsies reported as malignant lesions after having had tracheostomy.

6.8 Type of tracheostomy

Twenty emergency tracheostomies and five elective tracheostomies were done during the period of the study. The frequency of tracheostomy is thus 25 in 6 months (i.e. 50 tracheostomies per year) which compared with the finding from Tanzania and Nigeria is high. In a 5- year review, 52 tracheostomies were performed, with an average of 10.4 tracheostomies per year at the University of Nigeria Teaching Hospital.^[6] At the University of Ilorin Teaching Hospital, Nigeria, they reported 2.4 tracheostomies per year.^[7] In a 10-year study at Northwestern Tanzania, averagely 17.2 emergency tracheostomies were performed yearly.^[9] In this study 20 emergency tracheostomies were done in 6 months.

The higher frequency of tracheostomies done at the Korle Bu Teaching Hospital may be explained by the fact that Ghana has few major ENT centres thus most complicated/complex problems get referred to the Korle Bu Teaching Hospital, Accra or the Komfo Anokye Teaching Hospital, Kumasi thus increasing the patient load of these centres. Ghana's National Health Insurance policy has undoubtedly increased patient access to formal healthcare. This was observed by Blanchet et al in their study on Ghana's National Health Insurance Scheme.^[41] Thus our higher frequency of tracheostomies may be due to that. Countries where the cash and carry system of healthcare payment exists, low income earners are not likely to report early for treatment. Some of these patients may even die without ever being seen by an ENT specialist. Early and prompt referral of patients to ENT Units must be ensured to avert the need for tracheostomy to save lives.^[5]

6.9 Indications for tracheostomy

Acute upper airway obstruction was the main indication for tracheostomy. These were due to laryngeal and hypopharyngeal tumours in 68% of the patients in this study. These could have been avoided if patients had presented early for adequate and early treatment to be started. This finding is different from those found in studies by Gilyoma et al in Tanzania and Amusa et al at Ile-Ife, Nigeria where traumatic causes of acute upper airway obstruction were the highest indication for tracheostomy.^[9, 42]

In the Tanzanian study they observed that trauma was mainly due to road traffic accidents since motorcycles had become a major means of transportation. This can become the situation in Ghana in the near future as motorcycles popularly referred to as "okada" are fast becoming a major means of transportation in our urban areas. 'Okada' is a name derived from a defunct Nigerian airline which was known to transport people quickly and in a timely manner though not so comfortable in Nigeria. Thus the motorcycles have been compared to the airline.^[43]

Our findings are however similar to that reported from the University of Ilorin Teaching Hospital, Nigeria by Alabi et al who also found laryngeal tumours to be the commonest indication for tracheostomy.^[7] Acute laryngeal infections might not have played a significant part due to widespread use of antibiotics today thus decreasing their incidence. Thus the indications vary from centre to centre.

16% of patients in this study had tracheostomy after thyroidectomy. These must have had bilateral recurrent laryngeal nerve damage, laryngeal edema or laryngomalacia. The tracheostomy for some of these patients e.g. those with bilateral recurrent laryngeal nerve damage might thus be permanent. The modalities of laryngeal function restoration are technically difficult

thus a permanent tracheostomy with a speaking valve is an easier option.^[19]

6.10 Day of first tube change and outcomes

From the findings in this study there is no statistically significant difference in outcomes of changing the tracheostomy tube for the first time from cuffed tube to double lumen tube on either the 3rd or the 5th postoperative days (Fisher exact test: p-value is 0.672). Thus, the first tube change on postoperative day 3 is safe. This finding is similar to that found during the first tracheostomy tube change in children by Ellen S Deutsch in Chicago who also observed that the first tube change can be safely carried out on the 3rd postoperative day at the bedside.^[12]

Patients who have the first tube change on postoperative day 3 can thus be discharged by postoperative day 5 when they would have learnt care of the double lumen tube. If the first tube change is done on the 5th postoperative day or later the patient has to spend a minimum of 7 days in hospital before being discharged thus increasing hospital bills as well as family inconvenience of having to care for a sick relative at the hospital.

The very good surgical technique of performance of tracheostomy and post operative management at our centre could have also contributed to the lower incidence of complications after the first tube change. This was also observed in Tanzania by Gilyoma et al and in South Western Nigeria by Adetinuola et al who also reported fewer complications due to improved surgical skill.^[9, 18]

6.11 Limitations of study

- 1) Tracheostomy in children did not feature in this study because the tracheostomy tubes used for children in our unit are mainly single lumen tubes thus not changed in the immediate postoperative period so as to qualify to be part of this study.
- 2) Tracheostomies done at other units of the Korle Bu Teaching Hospital such as the Intensive Care Unit were not included in this study as the method applied in this study of changing the tracheostomy tube on the 3rd or 5th day could not have been applied to critically ill patients who were not going to be able to learn care of the double lumen tubes.
- 3) The technical difficulties of getting the proposal approved by the Ethics and Protocol Review Committee of the University of Ghana limited how long the study could be done. Thus though the study had been planned to run for one year, it had to be done over six months.

CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

- 1) The commonest indication for tracheostomy at the Korle Bu Teaching Hospital is acute upper airway obstruction secondary to laryngeal tumour. Second most common indication for tracheostomy is acute

upper airway obstruction secondary to hypopharyngeal tumours.

- 2) The frequency of tracheostomy done at the ENT Unit, Korle Bu Teaching Hospital is 50 tracheostomies per year.
- 3) The main factor leading to late presentation of patients to the ENT Unit, Korle Bu Teaching Hospital is delayed referral by doctors and nurses. This is followed by financial difficulties and the notion that the disease the patient is having is not to be treated at the hospital.
- 4) Patients were also found to be mainly seen at Private or Public Hospitals before reaching the ENT Unit of Korle Bu Teaching Hospital.
- 5) There is no statistically significant difference between changing the tracheostomy tube for the first time on the 3rd postoperative day and on the 5th postoperative day in terms of outcome.

7.2 RECOMMENDATIONS

- 1) Public education on common ENT conditions must be encouraged on television and on radio stations. This would promote early reporting of ENT conditions to the ENT units for early intervention to be started.
- 2) There is the need for continuous medical education of healthcare professionals i.e. doctors, nurses etc. on common ENT conditions so that these patients are referred early to the appropriate ENT centres for early treatment to be initiated.
- 3) The training of more ENT Specialists (doctors and nurses) must be intensified so that they can easily be accessible throughout the country.
- 4) ENT Specialist outreach services to the regions and districts of Ghana must be promoted.
- 5) West African countries without radiotherapy facilities must be encouraged to set up their own for their patients to have ready access to these facilities without travelling all the way to Ghana for treatment.
- 6) It is recommended that tracheostomy tube change for the first time is done on the 3rd postoperative day as it is safe. This would reduce duration of admission and thus reduce hospital bills. It is however suggested that a large series is done to assess this observation.

7.3 ACKNOWLEDGEMENTS

I wish to acknowledge the dedicated supervisory role played by Prof E.D. Kitcher and Dr Kenneth Baidoo in the write up of this article. God richly bless you!

I thank all my colleagues and staff of the ENT Unit for cooperating with me during the performance of the study.

I am most grateful to my dear wife and my children for supporting me throughout my period of study at the Korle Bu Teaching Hospital.

I also wish to thank the patient who gave me permission to use her picture as part of this dissertation.

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8.2 APPENDIX I

Patient Information Sheet

Introduction

I am Dr. Peter Appiah-Thompson, a medical doctor working at the ENT Unit of the Korle Bu Teaching Hospital. I would be giving you some background information and to invite you to be part of this research. As you go through the information being provided you may ask for clarification of any part you do not understand.

Purpose of Study

Tracheostomy involves creation of an opening on the anterior wall of the trachea and the insertion of a tube through the opening to relieve upper airway obstruction,

facilitate ventilation and removal of secretions. Instead of breathing through the nose and mouth, the patient now breathes through the tracheostomy tube. This procedure is commonly done at the Korle Bu Teaching Hospital for patients who present in severe upper airway obstruction.

This study would determine the common indications (reasons) for tracheostomy and factors leading to late presentation of patients including perceptions about tracheostomy at the ENT Unit, Korle Bu Teaching Hospital, Accra. The study would also determine whether there is a statistically significant difference in outcome between changing the tracheostomy tube for the first time on the 3rd postoperative day and on the 5th postoperative day.

Voluntary Participation

Participation is entirely voluntary. Choosing to participate or not does not affect any service you receive at the ENT Unit. You may decide to stop participating even if you agreed earlier.

During the study the following information may be asked of you: your socio-demographic data (age, sex, address etc.) and factors leading to your late presentation (for those who had emergency tracheostomy) to the ENT Unit, Korle Bu Teaching Hospital, Accra. (Appendix III) Information to be recorded from your medical records would include the reason for your tracheostomy. You would also have the change of your tracheostomy tube for the first time on the 3rd or the 5th day after your operation. (Appendix IV). This would be randomly done and the outcome noted.

Risk: There is no risk known for participating in this study as method of treatment you would be given will be the standard method.

Benefit: Data gathered from this research would be used to educate the general public and medical practitioners to reduce the late presentation of patients to the ENT Unit and compare our work to that at other centres in the world.

Confidentiality: Your name will not be registered on the questionnaire. A number would be assigned to you. The numbers would start from 1 onwards. Example is Trache 1, Trache 2 etc. No third party will have access to the information you provide.

8.3 APPENDIX II

Patient Identification Number for this Study:

CONSENT FORM FOR STUDY

Title of Study: Tracheostomy - The Korle Bu Teaching Hospital Experience

Name of Researcher: Dr. Peter Appiah-Thompson.

Please tick to confirm

I confirm that I have read and understood the information sheet for the above study ()

I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ()

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reasons and without my medical rights being affected. ()

I agree to take part in the above research. ()

..... Signature/Thumbprint
of Participant Researcher's Signature Signature/Thumbprint of Witness

8.4 APPENDIX III**QUESTIONNAIRE**

Please tick (x) in the box () the appropriate answer

DEMOGRAPHIC CHARACTERISTICS

1) How old are you? Years : (specify).....

2) What is your gender? Male () Female ()

3) What is your educational level?

No education () Primary education () Middle School Leaver ()

Secondary education () Tertiary education () Islamic education ()

Others (specify).....

4) What is your occupation? Student () Unemployed () Farmer () Trader () Government worker ()

Others (specify).....

LATE PRESENTATION TO KBTH

(For respondents who had emergency tracheostomy on account of having presented late with health problem)

1) How long ago have you noticed this health problem?

i. Weeks (specify).....

ii. Months: (specify).....

iii. Years: (specify).....

2) How long after recognizing this health condition did it take you to seek treatment?

i.) Weeks: (specify).....

ii.) Months: (specify).....

iii.) Years: (specify).....

3) Where did you first seek treatment after recognizing your problem?

Traditional healer () Prayer camp () Drug Store/Pharmacy ()

Private Clinic/Hospital () Public Hospital/Polyclinic () Teaching Hospital ()

4) How many other places were you seen before coming to KBTH? (Specify).....

5) Who recommended that you come to ENT KBTH? A Doctor/Nurse's Referral () Friend /Neighbors ()

Self () Radio/Television ()

6) What made you keep long before coming to ENT-KBTH? Fear of Surgery () Delayed referral ()

Financial difficulties () I thought this was not an illness to be treated at the hospital () Other reason?

State.....
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8.5 APPENDIX IV

HOSPITAL BASED RECORDS (OFFICE USE ONLY)

- 1) Hospital number.....
- 2) Age Sex.....
- 3) Address..... R egion.....
- 4) Nationality
- 5) Type of Tracheostomy done
 - Elective ()
 - Emergency ()
- 6) Indication for Tracheostomy

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- 7)
- 8) Day of first tracheostomy tube change
 - 3rd postoperative day ()
 - 5th postoperative day ()
- 9) Outcome or Complication of first tube change
 - No problems ()
 - Hemorrhage ()
 - Aspiration ()
 - Hypoxia ()
 - Misplacement of tube ()
 - Failure to re-insert tube ()
 - Respiratory arrest ()
 - Other, State.....