

Indications and Immediate Outcomes of Tracheostomy in Rwanda

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Abstract

Introduction: Tracheostomy is performed as an alternative to the natural breathing airways for upper airway obstruction, pulmonary toilet or for protecting the larynx. It is a common procedure in surgical departments. **Objectives:** The study aimed at evaluating the immediate outcomes of tracheostomy and the incidence of immediate complications associated with tracheostomy. **Methods:** Using a questionnaire, prospective data was collected from patients, who presented in Ear, Nose and Throat department at the Kigali University Teaching Hospital (KUTH). **Results:** 29 patients underwent a tracheostomy. The age range was 4 to 77 years, mean of 37 years, 82.8% were aged above 18 years. Male to female ratio was 3.8:1. The incidence of tracheostomy was 9.5%. The most common indication was prolonged intubation accounting for 55.2% of cases. No intra-operative

complications were noted. No tracheostomy related mortality occurred within 24 hours after the procedure. 86.2% patients were clinically stable after the procedure while 13.8% were unstable due to their primary medical conditions. **Conclusion:** Prolonged intubation is the most common indication for tracheostomy, most of the times performed as an elective procedure. The procedure is safe for all patients even in resource poor settings and post-operative complications are minimal.

Key words: Tracheostomy, Indications, Immediate outcome, Complications, Rwanda

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Introduction

Tracheostomy is a surgical procedure to create an opening through the anterior wall of the trachea and secured by placing a tube in order to get an alternative breathing pathway (1). The first successful tracheostomy was performed by Antonio Moussa Brasavola for a patient who was suffering from a laryngeal abscess (2,3). Chevalier Jackson revised and refined indications and techniques of the procedure as known today and tracheostomy has become a commonly performed procedure (3). There is a changing trend in the indications of tracheostomy. In the past, the commonest indication was acute inflammatory airway obstruction such as epiglottitis and laryngotracheobronchitis or croup, diphtheria, Ludwig's angina or anaphylaxis. With the advent of early diagnosis and treatment, this has changed and prolonged

intubation has become the most common indication of tracheostomy (4). However, in settings with delayed diagnosis for head and neck tumours, upper airway obstruction is a common indication (5,6). Patients who have sustained craniofacial trauma, laryngeal fracture or mid-face or mandible fracture may require urgent tracheostomy to relieve airway obstruction (7). Patients with advanced malignant disease of the nasopharynx, tongue, larynx, pharynx or upper trachea more often present with difficulty in breathing necessitating tracheostomy (8,9). Airway burns culminate in overwhelming edema which eventually obstructs the airway (10). Bilateral laryngeal paralysis, (11,12) neuromuscular dysfunction in case of tetanus, motor neuron disease, traumatic brain injury and/ or neck injury may compromise breathing that may require mechanical ventilation. A tracheostomy is thus indicated to facilitate laryngotracheobronchial toilet or

to mitigate complications arising from prolonged intubation which include laryngotracheal stenosis among others (3,8,13,14). Patients undergoing extensive head and neck procedures, major surgery of the tongue or floor of the mouth are at a high risk of airway obstruction or aspiration of blood or pharyngeal secretions and these patients may undergo a prophylactic tracheostomy during the operative procedure to protect the airway (10). Complications of tracheostomy can occur intra-operatively, in the early postoperative period or in the late post-operative period (15). The immediate complications are more likely if the procedure is done hurriedly as opposed to an elective procedure (16). Complications include pneumothorax especially in children, (17) hemorrhage, damage to the trachea or due to an injury to the paratracheal structures, particularly the carotid artery and recurrent laryngeal nerve and esophagus as well as anesthesia related complications (18). Early postoperative complications of tracheostomy include wound infection, secondary hemorrhage, subcutaneous emphysema, pneumomediastinum, pneumothorax, obstruction of the tube lumen, accidental extubation, anterior displacement of the tube, tip occlusion against the tracheal wall or there can also be swallowing problems (4). Late complications can be due to a difficult extubation, formation of a tracheo-cutaneous or tracheo-oesophageal fistulae, laryngotracheal stenosis, granuloma formation or a permanent stoma. Other complications include sepsis, peri-stoma infection and tracheostomy dependence especially in children. Death may be due to accidental extubation, hemorrhage, tube obstruction or due to a primary disease (19). Tracheostomy is a common procedure performed at the Ear Nose and Throat (ENT) department at Kigali University Teaching Hospital KUTH. However, indications and outcomes of this procedure have not been documented. This study was conducted to determine the incidence of tracheostomy, to find out the indications of tracheostomy at KUTH, to document the immediate outcomes of patients with tracheostomy as well as the incidence of immediate complications associated with the procedure.

Methods

This was a cross-sectional study done in the Ear, Nose and Throat (ENT) department at the Kigali University Teaching Hospital (KUTH), public national referral hospital which receives patients from across Rwanda and beyond its borders. Ethical approval to conduct the study was granted by the Hospital Internal Review Board. Consent was obtained from patients or guardians of patients who underwent tracheostomy. No patient who underwent tracheostomy during the study period was excluded since consent was obtained from them all.

Data collection and management

A data collection tool was used to gather information related to patients from surgery registry as well as from patient medical files in the ENT department during the period from August, 2012 to April, 2013. A pre-defined data collection tool was used to collect data which included demographics such as age and gender as well as indication for tracheostomy, type of tracheostomy, immediate complications and immediate outcomes. Subsequent visits were made to the patient to record intra-operative complications and a final visit 48 hours after surgery to document any post-operative complications. Data was also collected on the number and type of surgical procedures carried out in ENT department during the study period. Immediate complications were defined as complications occurring within 48 hours after tracheostomy while immediate outcomes were assessed within the first 48 hours after tracheostomy was performed. Data analysis was done using SPSS-14.0 and Microsoft excel.

Results

A total of 304 ENT procedures were performed during the study period. Twenty-nine of these were tracheostomies, accounting for 9.53%. There were more males (23) than females (6) with a ratio of 3.8:1. Males accounted 79.3%. The age range was 4 years to 77 years, with a mean age of 37 years. Eighty-two percent of patients were aged 18 years and above.

A bigger proportion of patients in whom tracheostomy was performed were from adult intensive care unit

(ICU) and pediatric intensive care unit (PICU) (55.2%). The mean intubation time in ICU was 12 days. The rest of the patients were admitted in the ENT wards (44.8%) or from PICU (6.89%). The most common indication for tracheostomy was prolonged intubation in 55.2% (n=16), 75% (n=12) of these patients were having head injury due to road traffic accidents while the remainder were victims of assault. Other indications were airway compromising tumors accounting for 31.0% (n=9) and neck trauma and bilateral vocal cord paralysis with equally 6.9% patients (n=2). Table 1 below summarizes these findings.

Table 1: Indications for tracheostomy

Indications	Frequency	Percentage
Prolonged intubation	16	55.2
Laryngeal paralysis	2	6.9
Traumatic deep neck wounds	2	6.9
Airway compromising tumors	9	31.0
Total	29	100.0

Three tracheostomies (10.3%) were performed as emergencies while 26 (89.7%) were performed as elective procedures during the study period. During the immediate post-operative period (within 24 hours), hemorrhage was recorded in 2 patients, subcutaneous emphysema in one patient and one patient died after the procedure in ICU due to the underlying primary disease, around 2 hours after the procedure. Following the procedure, 86.2% of patients were clinically stable while 13.8% were unstable due to the primary underlying conditions.

Discussion

A study in Nigeria showed that the rate of tracheostomy was 2% in Nigerian and South African hospitals. This is attributed to the preference of intubation over tracheostomy (20). However, the patients who underwent tracheostomy in our study fulfilled the criteria for the procedure and intubation

was no longer an option. The age range and frequency among adults was similar to the Nigerian study. Our mean intubation time of 12 days, is similar to that of Scales and Niall, (2010), who recorded a median of 9 to 12 days (21). Proponents for early tracheostomy for prolonged intubation argue that patients might develop complications from longstanding mechanical effects of the endotracheal tube such as laryngeal ulceration, erythema, granuloma formation or vocal cord paralysis to some extent and recommend early tracheostomy as it may reduce endotracheal tube associated complications and the stay in ICU (3,14,22,23). Few patients were included in these studies and therefore conclusions are not without doubt.

The big percentage of tracheotomies performed in ENT department at KUTH were on elective basis (89.7%). This reflects the good immediate outcomes of patients with tracheostomy in terms of clinical stability postoperatively (86.2%), compared to those who were unstable after the procedure (13.8%). This instability was due to different underlying primary conditions not related to tracheostomy. The finding of elective procedure safety is in accordance with the recommendations of De Leyn et al, (2007) and Adoga and Ma'an, (2008) who link the reduction of post-operative complications with the enough time of preparation prior to the procedure and patient fitness assurance for the surgery when undertaking an elective tracheostomy (3,7). The most common indication of tracheostomy was prolonged intubation (55.2%), 75% of these patients were having severe head injury secondary to road traffic accidents. This shows that road traffic accidents (from motorcycles and cars) is the most common leading cause of patient disability or death among those who got a tracheostomy. Okafor, (2009) found that the predominant indication for tracheostomy was to relieve upper airway obstruction (70%), though etiologies for airway obstruction varied and a small number of patients (30%) had a tracheostomy for mechanical ventilation (20) and this is contrary to this study where we found that the major indication for tracheostomy (55.2%) was prolonged intubation. Specifically cancer of the larynx was identified as the most common cause for upper

airway obstruction that required a tracheostomy among patients in 2 studies in Nigeria (5,6). Like any surgery, bleeding although rare, is a known complication in tracheostomy (24). In our study, no intra-operative complications were recorded among the 29 patients who underwent tracheostomy. Immediate post-operative complications (within 24 hours) noted includes hemorrhage in 2 patients and subcutaneous emphysema in one patient. Bleeding can happen during and after the procedure and it can even be fatal when there is erosion of big vessels such as the brachiocephalic trunk, or slippage of a suture (24). Similar to our study, other studies report that when the procedure is performed in a tertiary hospital, it is generally safe (7).

Limitations

Long term follow up of patients for outcomes and complications associated with tracheostomy were beyond the scope of this study.

Conclusion

The rate of performing tracheostomy is low in ENT department at KUTH. Prolonged intubation is the most common indication for tracheostomy. Head injury is the first leading condition resulting in need for tracheostomy and airway compromising tumors rank second. The procedure is generally safe.

Author contributions

MBK – Involved in conception and designing of the study, drafting of the manuscript and proof reading

TC – Data collection, analysis and initial write up

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