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Profile of Tracheostomy Patients at Prof Dr. R. D. Kandou Hospital during 2020-2021

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Abstract: Tracheostomy is a common procedure in ICU, typically performed on patients requiring prolonged mechanical ventilation (PMV) or those with airway obstructions. This study aimed to obtain the profile of patients undergoing tracheostomy at Prof. Dr. R. D. Kandou Hospital between 2020 and 2021. This was a descriptive and retrospective study using total sampling from medical records of ICU patients who underwent tracheostomy during the study period. The results showed that a total of 89 tracheostomy cases were recorded, with a sharp increase from four cases in 2020 to 48 in 2021. Most patients were aged 45-70 years (58%), and the gender distribution was nearly equal (51% male, 49% female). Common indications included prolonged mechanical ventilation (42 cases) and respiratory failure (38 cases). Forty percent of patients stayed over a month, and 46% died from underlying conditions. This study also highlighted a lack of standardized decannulation protocols. In conclusion, tracheostomy procedures at Prof. Dr. R. D. Kandou Hospital were most common in middle-aged and elderly patients, with prolonged ventilation and respiratory failure as primary indications. The study underscores the need for clearer decannulation guidelines and improved management strategies.
Keywords: tracheostomy; mechanical ventilation; respiratory failure

INTRODUCTION

Patients admitted to the intensive care unit (ICU) are patients who require immediate medical intervention and require coordinated and ongoing management of organ function.[1] A non-invasive ventilation approach has been suggested as a way to avoid prolonged intubation. Tracheostomy is one of the most commonly performed intensive care unit procedures.[2] Tracheostomy is the formation of a valve or opening into the trachea with the aim of facilitating airway obstruction in the upper airway and increasing the outflow of pulmonary secretions or laryngeal storage in patients with long-term intubation.[3] Generally, tracheostomy is a common procedure for patients who require prolonged mechanical ventilation (PMV). Recent trials comparing "early" tracheostomy (i.e., within eight days of endotracheal intubation) versus "late" tracheostomy (i.e., after at least 10 days of mechanical ventilation) in non-extracorporeal membrane oxygenation (ECMO) patients found no diference in overall mortality, hospital or ICU length of stay. Tracheostomy may be benefcial by lowering airway resistance, improving oral hygiene, and making the airway more secure.[4] Use of tracheostomy seems to increase in patients needing PMV, and is not associated with major discomfort even when using speaking valves. However, early tracheostomy provided no benefit in terms of time of MV and hospital length of stay, mortality or infectious complications rates, and long-term quality of life in patients requiring PMV after cardiac surgery, although, the well-tolerated procedure was associated with less need of sedation, better comfort, and earlier resumption of autonomy.[5]

Establishing an effective and stable airway in patients with maxillofacial trauma is of paramount concern. In both the acute setting and during delayed reconstruction, special considerations must be taken when securing a reliable airway in this patient.[6] Stabilization of facial fracture injuries patients requires a multifaceted approach and begins with the basic tenets of securing stable airway, breathing, and circulation.[6] When performing a procedure on maxillofacial trauma patients, full access to the surgical site must be maintained while securing the airway. Although a tracheostomy can always position the airway away from the operative field, many simple maneuvers can be instituted and may help to avoid the need for a tracheostomy and the associated risks and complications.[2] A previous study on tracheostomy prevalence and indications had also been carried out and found cases in 24 selected studies, 21 indications were reported. The results of meta-analysis showed that the most common indications for tracheostomy were depressed mental status (19.1%), respiratory failure (14.1%), tumors (10.5%), cardiac problems (9.7%), and laryngeal problems (9.5%). These five indications comprised 62.9% of all indications.[3] The purpose of this study was to determine the tracheostomy patient profile at Prof. Dr. R. D. Kandou Hospital during 2020-2021.

METHODS

This was a descriptive study. Samples and data were collected through medical records data. The sampling method used a total sampling technique. The samples used were all ICU patients who required tracheotomy at Prof. Dr. R. D. Kandou Hospital during 2020-2021.

RESULTS

Table 1 showed the sample grouped based on cases. The most common cases for tracheostomy indication were prolonged ventilator (42 cases), followed by respiratory failure 38 cases). Other cases were advanced laryngeal tumors (four cases), post thyroidectomy (three cases), and maxillofacial trauma (one cases).

DISCUSSION

Based on sex, the percentage of male patients (51%) was nearly equal with the females (49%). Meanwhile, based on age the patients were divided into five categories, including 10-25

years (45%); 26-35 years (15%); 36-44 years (15%); 45-70 years (58%); and 71-90 years (8%). Of the five age categories the most dominant was the elderly (>45 years) as many as 58%. The length of stay was mostly >1 month (40%) and the number of deaths due to primary disease was 40 patients (46%). The number of tracheostomy patients at Prof Dr. R. D. Kandou Hospital during 2020-2021 was as follows: 40 cases were found in 2020, and 48 cases were found in 2021.

Case 1: Prolonged ventilator in 42 cases. Despite few complications of tracheostomies, there was no agreement on indications and systems for closure and that a substantial proportion of patients maintained the tracheostomy despite not requiring MV any more. There is the need of accepted protocols for time and modalities of decannulation, also in the view that lack of decannulation of conscious tracheostomized patients before ICU discharge to the general ward was associated with higher mortality.[5] However, there is no consensus on time of tracheostomy or decannulation. Despite several individualized, non-comparative and non-validated decannulation protocols exist, universally accepted protocols are lacking as well as randomised controlled trials on this critical issue. End of life decisions should result from appropriate communication among professionals, patients and surrogates and national legislations should give clear indications.[5]

The most popular ventilatory strategies used to shorten and achieve a more successful weaning from MV in the ICU are: Progressive reduction in the level of assistance of pressure support ventilation (PSV); progressive longer periods of spontaneous breathing trial (SBT) through the tube; synchronized intermittent mandatory ventilation (SIMV: the patient can breathe spontaneously between ventilator-delivered breaths); neurally adjusted ventilatory assist (NAVA); noninvasive mechanical ventilation (NIV); and high-flow oxygen (HFO).[7]

Case 2: Post total thyroidectomy in three cases. Multiple studies have established criteria which patients need a tracheostomy due to tracheomalacia. Nevertheless, still some patients develop tracheal collapse after a thyroidectomy and need an emergent airway within few hours after surgery. Tracheal resection with tracheostomy may also be required in case of cancer infiltration into the tracheal wall.[8] In previous research, we reported on a successful combined thyroidectomy with tracheostomy in a patient with a C1 fracture. This was a technically challenging procedure due to limited tracheal exposure but the surgical airway was an essential step in the recovery of this patient. Avoiding long term intubation and providing early percutaneous endoscopic gastrostomy (PEG) placement in patients with cervical spine fractures is associated with improved outcome and should be attempted to avoid secondary complications such as nasogastric tube syndrome, laryngeal damage, pneumonia, muscle weakness, and delirium from long term sedation amongst many others.[9] Combined thyroidectomy and tracheostomy is mainly a procedure done for tracheomalacia associated with a large goiter and is a safe procedure. The addition of a surgical airway does not increase morbidity or mortality although surgical site infection risk is increased. Our patient received pre-operative antibiotic prophylaxis. We sutured the tracheal flaps to the skin to minimize microbial contamination of the cavity and in order to pull the trachea to the midline and anteriorly to avoid collapse of the lumen in case tracheomalacia would have been a problem. Thyroidectomy through a smaller incision of only 5 cm as in our cases was feasible. In the setting of a large retrosternal goiter, it is crucial to completely mobilize the upper portion of the gland prior to bring the lower portion out of the chest. Devascularization was started lateral and thereafter, the upper pole vessels were secured. Division of the isthmus and dissection of the upper portion of the right sided goiter gave then exposure to the retrosternal portion and once the mass was delivered out of the neck only the lower pole vessels had to be ligated. Recurrent nerve monitoring was not available in our case but may be useful to protect the nerve in similar cases. Our patients had postoperative bleed after heparin was given for deep vein thrombosis (DVT) prophylaxis but did not require reoperation. They had multiple other medical complications but ultimately recovered well. Large goiters should not be considered a contraindication to tracheostomy in patients requiring a surgical airway.[10]

Case 3: Laryngeal tumors in four cases. In advanced stages of the disease, the treatment strategy has evolved to combine functional preservation (speech, swallowing, and respiration)

and loco-regional control to increase survival rates. Despite this, laryngeal cancer remains today as the only tumor for which life expectancy has declined in recent decades, and this is thought to be due to the organ preservation protocols.[11] In the past, the treatment of advanced tumors included surgery with or without radiotherapy according to nodal involvement and resection margins as the main therapeutic option. Nowadays, non-advanced carcinomas and selected advanced-stage tumors are managed with conservative surgery, such as open partial laryngectomy, transoral CO2 laser microsurgery (TLM), transoral robotic surgery (TORS), plus radiotherapy or chemoradiotherapy. However, in advanced tumors, if laryngeal preservation is the main goal, the patients are treated with concurrent CRT. Although this regimen has demonstrated efficacy in preserving the larynx, several of the patients submitted to it have ultimately required salvage laryngectomy or suffer from present long-term.[11]

Case 4: Maxillofacial trauma in one case. Successfully establishing an airway in cases of maxillofacial trauma often requires special consideration of bony and soft tissue damage as well as mechanism of injury. Airway mismanagement can lead to hypoxia, aspiration, further oropharyngeal or laryngeal trauma, and death. Maxillofacial trauma often presents in conjunction with cervical spine injury, skull fractures with associated pneumocephalus or intracranial bleeding, and facial lacerations.[12] Intracranial injuries particularly may be associated with obtundation, necessitating establishment of an airway even without the presence of respiratory distress. Consequences of generalized craniofacial trauma, including jaw displacement, blood and vomitus in the respiratory tract, and blunt or penetrating trauma directly to the neck, can further complicate effective airway stabilization.[13]

Soft tissue swelling and bleeding (facial lacerations, epistaxis, oropharyngeal hemorrhage, etc.) may themselves cause respiratory distress or may obscure anatomy and preclude straightforward intubation. Facial fractures are common after maxillofacial trauma in addition to soft tissue injury and pattern may vary based on mechanism. These injuries can be categorized into three groups depending on the bone(s) involved: upper face (involving frontozygomatic processes, sinuses, or frontal bone fractures), middle face (involving zygomatic arch, nasal bone, orbital floor, naso-orbital-ethmoid, or maxillary fractures), and lower face (involving mandibular fractures). Retrodisplaced midface fractures may obstruct the nasopharyngeal airway, mandibular fractures may release anterior attachments of the tongue base leading to prolapse and airway obstruction, and fracture of the hyoid or laryngeal cartilage may directly obstruct the airway and present a risk for further damage if intubation is attempted. Complications resulting from trauma may hinder the placement of an endotracheal tube and necessitate emergent surgical intervention.[14]

Tracheostomy may be preferred in the setting of severe facial trauma or expected prolonged intubation. The preferred method is via an open approach, although a percutaneous tracheostomy may be performed. In the context of maxillofacial trauma, a tracheostomy affords an airway that is routed entirely clear of the surgical field and is very secure despite extensive manipulation of the head including repositioning, drilling, and so on. Additionally, tracheostomy is ideal if a patient is to be ventilated for a prolonged period of time following surgery. Complications of tracheostomy include pneumomediastinum/pneumothorax, posterior tracheal wall injury, subglottic stenosis, and tracheomalacia as well as the rare but life-threatening tracheoinnominate fistulan·[15]

Percutaneous dilational tracheostomy (PDT) is accomplished using a modified Seldinger technique and is often performed with the aid of bronchoscopy.[15] However, the success of PDT is dependent on the surgeon experience and patient factors, and overall may lead to higher rates of post-tracheostomy tracheal stenosis.[16]

Case 5: Respiratory failure in 38 cases. Tracheostomy is a common procedure performed in the ICU of patients requiring prolonged mechanical ventilation (MV) in cases associated with acute respiratory failure and other airway problems.[17] Respiratory failure cases undergoing tracheostomy have also been found in the results of a recent study which concluded that in contrast

to patients undergoing tracheostomy after ECMO decannulation, tracheostomy during ECMO was neither associated with a decrease in sedation and analgesia levels nor with an increase in the level of consciousness. This finding together with a higher risk of local bleeding in the days following the procedure reinforces.[4]

Tracheostomy was undertaken in 45% of our study cohort, which is more frequent than in studies in general acute respiratory distress syndrome (ARDS) cohorts. In a large international, multicenter, unselected, prospective cohort study of patients with ARDS, only 14% of the patients with severe ARDS had a tracheostomy. This rate was even lower in the context of COVID-19 with a tracheostomy reported in only 7% of severe ARDS patients.[18] When performed during ECMO, patients had a tracheostomy after 11 (6–20) days of mechanical ventilation, which contrasts with general ARDS patients whose tracheostomy is most commonly performed after 14 days after initiation of mechanical ventilation, and a low proportion of patients received tracheostomy within seven days.[18] The increased use of tracheostomy in the ECMO population may be attributable to prolonged mechanical ventilation duration and ICU length of stay, a need for airway access for secretion management, and improvement of the patient's comfort while reducing sedation and promoting spontaneous breathing. The optimal timing of tracheostomy has been controversial.[19]

In this study we found that between 2020 and 2021, tracheostomy procedures at Prof. Dr. R. D. Kandou Hospital primarily affected middle-aged and elderly patients, with 58% of cases occurring in patients aged 45-70 years of age. The gender distribution was almost equal, with 51% male and 49% female patients. The number of tracheostomies sharply increased from just four cases in 2020 to 48 cases in 2021, reflecting a growing demand for airway management, possibly linked to respiratory illnesses like ARDS or complications from mechanical ventilation. The majority of patients (40%), required a hospital stay longer than one month, and nearly half (46%) of the patients died due to severe underlying conditions, underscoring the critical nature of these interventions.

CONCLUSION

Most cases were due to prolonged mechanical ventilation or respiratory failure, but other causes included complications following thyroid surgery, advanced laryngeal cancer, and maxillofacial trauma. Despite the life-saving nature of tracheostomies, the study revealed significant challenges, particularly the absence of universally accepted protocols for decannulation (removal of the tracheostomy tube), which remains a key area for improvement in patient care. The findings highlight the need for better management strategies and clearer guidelines to improve outcomes for tracheostomized patients.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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Table 1. Sample grouped based on cases

Cases	Tracheostomy indication	Management/Treatment	Challenges	Protocols
Case 1: Prolonged ventilator (42 cases)	Prolonged mechanical ventilation (MV) in ICU.	PSV, SIMV, NAVA, NIV, high-flow oxygen.	Lack of consensus on decannulation timing; higher mortality if delayed.	No universally accepted decannulation protocol.
Case 2: Post thyroidectomy (3 cases)	Tracheomalacia, large goiters, cancer infiltration of tracheal wall.	Pre-op antibiotics, combined thyroidectomy and tracheostomy.	Surgical complexity, post-op bleeding, infection risk.	No clear protocol for tracheostomy during thyroid surgery.
Case 3: Laryngeal tumors (4 cases)	Advanced laryngeal tumors (organ preservation needed).	TLM, TORS, CRT, salvage laryngectomy if needed.	Risk of failure in organ preservation, need for salvage surgery.	Timing for laryngectomy varies, preservation attempted.
Case 4: Maxillofacial trauma (1 case)	Maxillofacial trauma with airway obstruction.	Open/percutaneous tracheostomy, airway management.	Airway mismanagement, pneumothorax, tracheal injury.	Early tracheostomy in trauma; no clear timing protocol.
Case 5: Respiratory failure (38 cases)	Acute respiratory failure (ARDS, ECMO).	Early tracheostomy for secretion management, reducing sedation.	Post-procedure bleeding, infection, tracheal stenosis.	Early tracheostomy during ECMO; debated timing for ARDS.

Abbreviations: PSV: Pressure Support Ventilation; SIMV: Syncronized Intermittent Mandatory Ventilation; NAVA: Neurally Adjusted Ventilatory Assist; NIV: Noninvasive mechanical ventilation; TLM: transoral CO2 laser microsurgery; TORS: transoral robotic surgery; CRT: chemoradiotherapy; ARDS: Acute Respiratory Distress Syndrome