TRACHEOSTOMY PROCEDURES OVERVIEW DURING COVID-19 PANDEMIC AT BANDUNG HASAN SADIKIN HOSPITAL

Yolanda Arlita Anastasia, Sinta Sari Ratunanda*

Department of Otorhinolaryngology - Head and Neck Surgery, Faculty of Medicine Padjadjaran University / Hasan Sadikin General Hospital Bandung, Indonesia

ABSTRACT

COVID-19 is a contagious disease caused by SARS-CoV-2. Roughly 15-30% of individuals diagnosed with COVID-19 suffer from severe symptoms, such as ARDS, which requires intensive care and breathing assistance via intubation, mechanical ventilation, and tracheostomy. The objective of this study is to examine the tracheostomy procedure used during the COVID-19 pandemic at Dr. Hasan Sadikin Hospital. A descriptive research design was utilized, and the subjects included all patients who underwent tracheostomy at the hospital from March 2020 to September 2021. Data were collected from medical records and analyzed using Microsoft Excel 2019 or IBM SPSS version 22. The study included 177 medical records, with 139 meeting the inclusion criteria and 38 excluded. The findings revealed that 139 tracheostomy procedures were performed by the ENT department during the pandemic, with an average patient age range of 50-64 and predominantly male. Additionally, two COVID-19 patients underwent tracheostomy, and 11.51% of patients experienced complications, the majority of which were subcutaneous emphysema.

Keywords **:** COVID-19, intubation, tracheostom

Introduction

The COVID-19 pandemic continues to be the most significant global challenge at present. Since January 2020, when the World Health Organization declared COVID-19 a pandemic, the number of confirmed positive cases has remained very high, with 245,373,039 individuals affected and 4,979,421 deaths attributed to the virus. In Indonesia, there were 4,242,532 confirmed cases of COVID-19 and 143,333 deaths reported to WHO between January 3, 2020, and October 31, 2021. Furthermore, data collected between January and May 2021 by WHO showed that 3.45 million individuals died from COVID-19, including 6,643 healthcare workers. As of the end of October, data from the COVID-19 Task Force and Indonesian health professional organizations indicated that 2,032 healthcare workers had died from COVID-1(1,2)

COVID-19 is caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), which is highly contagious and primarily targets the respiratory tract. The virus is transmitted through the airways, primarily in the form of droplets and aerosols, and can be contracted through invasive medical procedures such as ETT, NGT, and tracheostomy. The symptoms of COVID-19 vary widely, ranging from asymptomatic, mild or moderate symptoms to severe symptoms, which can cause clinical manifestations in the airways. A significant proportion of people (15-30%) treated for COVID-19 experience severe symptoms or Acute Respiratory Distress Syndrome (ARDS), which requires intensive care and respiratory assistance, such as intubation, mechanical ventilation, or tracheostomy (3,4)

COVID-19 is an infectious respiratory disease caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2). The virus spreads through droplets and aerosols in the air and can be contracted through invasive medical procedures such as ETT, NGT, and tracheostomy. COVID-19 symptoms can range from asymptomatic to severe, with a 15-30% chance of severe symptoms like Acute Respiratory Distress Syndrome (ARDS) which require respiratory assistance such as intubation, mechanical ventilation, or tracheostomy. Tracheostomy is a surgical procedure that is performed on patients with upper airway obstruction or long-term respiratory difficulties, and may be considered for COVID-19 patients who require prolonged mechanical ventilation or when extubation is not feasible. Two methods of tracheostomy exist: percutaneous and surgical. (5)

Tracheostomy is a commonly performed procedure with varying outcomes. According to research conducted by Lena M et al, the average number of annual tracheostomy procedures in the United States is 100,000. Tracheostomy is often used for prolonged mechanical ventilation, with a significant increase in incidence in all age groups, particularly 55-year-old patients, in North Carolina between 1993 and 2002. This increase was associated with decreased mortality rates, days of ventilator use, and length of stay. In Japan, tracheostomy was performed on 13.0% of ARDS patients treated in the ICU, with patients who underwent tracheostomy having a higher probability of survival. However, morbidity rates were higher, likely due to the purpose of tracheostomy in reducing the use of intubation. Tracheostomy is an AGP and has specific challenges in the current pandemic context, such as the risk of infection and oversized ICU capacity. The optimal timing of the procedure is also debated, with research suggesting performing tracheostomy at a very early stage or delaying the procedure for 14 days or more after intubation. The decision to perform tracheostomy requires input from a critical care specialist and ORL-HNS specialist, with consideration for healthcare worker safety and proper equipment. Research shows that modification of PPE use can minimize the risk of infection during the procedure. This study aims to provide an overview of tracheostomy procedures during the COVID-19 pandemic at Hasan Sadikin Bandung Hospital.

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Tracheostomy in this pandemic remains a challenge for some health centers. Preparation and restriction of the number of operator personnel, PPE preparation, procedure room, and tracheostomy time considerations are still being studied. This research is very helpful for the medical world in increasing survival rates while minimizing the risk of infection in medical workers. The unfortunate thing is that the research is still not widely carried out in the country. Therefore researchers are interested in conducting this study. This study aims to find out the overview of tracheostomy procedure during COVID-19 pandemic at Hasan Sadikin Bandung Hospital.

Method

The methodology employed in this study was descriptive research. The target population for this study comprised all patients who underwent tracheostomy, while the subjects were all the patients who had tracheostomy at Hasan Sadikin Hospital from March 2020 to September 2021. The data was obtained from the medical records of the patients during the same period. The inclusion criteria for this study involved medical records of patients who had tracheostomy conducted by the ORL-HNS department at Hasan Sadikin Hospital from March 2020 to August 2021. On the other hand, exclusion criteria consisted of patients who had tracheostomy conducted by a department other than ORL-HNS, incomplete or missing medical records of the patients, and records that could not be accessed

In this study, the researchers utilized a total sampling technique to select all patients who met the inclusion criteria during the data collection period for analysis. The study variables included age, gender, indications, method of procedure, room of procedure, proportion of COVID-19 patients, and complications of tracheostomy. The data collected will be analyzed using descriptive statistics and processed using statistical software such as Microsoft Excel 2019 or IBM SPSS version 22. The results will be presented in a table and graph format

Result

Subject of study

The research was conducted by analyzing medical records of patients who underwent tracheostomy procedures at Hasan Sadikin Hospital from March 2020 to September 2021. A total of 177 medical records were analyzed, of which 139 met the inclusion criteria while 38 were excluded based on the study criteria.

General characteristics of the subject of study

The general characteristics of the study subjects, including age, gender, and COVID-19 confirmation, were recorded and presented in Table 1.

Table 1 General Characteristics of the Research Subject

Variable	Frequency (N=139)	Percentage (%)
Age (years)		
<17 years old	8	5.75
17-34 years old	10	7.19
35-49 years old	29	20.86
50-64 years old	57	41
>64 years old	34	24.46
Gender		
Man	99	71.22
Woman	40	28.78
Proportion of COVID-19 patients		
Confirmed COVID-19	2	1.44
Non-COVID-19	137	98.56

The information presented in the table reveals that among the subjects of the study, males (71.22%) outnumbered females (28.78%). The largest age group among the patients was 50-64 years old, comprising 57 individuals (41%), followed by those above 64 years old, with 34 individuals (24.46%). Patients aged 35-49 years old accounted for 29 individuals (20.86%), while those aged 17-34 years old and below 17 years old made up 10 individuals (7.19%) and 8 individuals (5.75%), respectively. Out of the total number of patients, only 2 individuals (1.44%) tested positive for COVID-19.

Indications of tracheostomy

Table 2. Indications of tracheostomy

Indication	Frequency (N=139)	Percentage (%)
Upper airway obstruction	88	63.31
Prolonged ETT	24	17.27
Bronchial toilet	13	9.35
Other	14	10.07

The data in table 2 shows that the main reason for tracheostomy in the study was upper airway obstruction, with 88 patients (63.31%) indicating this as their cause. Prolonged ETT was the reason for 24 patients (17.27%), while bronchial toilets accounted for 13 patients (9.35%). Other indications, including preoperative tracheostomy, were reported in 14 patients (10.07%).

Tracheostomy Action

Table 3. Tracheostomy action

Variable	Frequency (N=139)	Percentage (%)
Action Methods		
Tracheostomy Surgical	139	100
Percutaneous tracheostomy	0	0
Action Room		
OK *negative pressure*	6	4.32
OK Cito	86	61.87
OK elective	17	12.23

Emergency	2	1.44
ICU	26	18.7

According to the data presented in table 3, it was observed that all patients (100%) who underwent the tracheostomy procedure at Hasan Sadikin Hospital were subjected to surgical tracheostomy, while none of them received percutaneous tracheostomy. The majority of these procedures were carried out in the emergency operating room, which accounted for 86 patients (61.87%), followed by 26 procedures performed in the ICU (18.7%). Furthermore, 17 tracheostomies were done in the elective operating room (12.23%), while 6 procedures were carried out in the negative pressure operating room (4.32%). Lastly, 2 procedures were performed in the emergency room, accounting for 1.44% of the total procedures.

Complications of tracheostomy

Table 4. Complications of tracheostomy

Complication of tracheostomy	Frequency (N=139)	Percentage (%)
No complications	123	88.49
Subcutaneous emphysema	10	7.19
Cardiopulmonary resuscitation	5	3.6
Paresis plica vocalis	1	0.71

The occurrence of complications in patients who underwent tracheostomy was observed in a total of 16 individuals (11.51%). The most frequent complication reported was subcutaneous emphysema which affected 10 patients (7.19%), followed by cardiopulmonary resuscitation in 5 patients (3.6%), and paresis of the vocal cords in one patient (0.71%)

Discussion

In this study, 139 patients who had been subjected to tracheostomy procedures at Dr. Hasan Sadikin Hospital for the period of March 2020 to September 2021 who met the inclusion and exclusion criteria. The average age in the subjects of this study was 52.58 years with the largest age distribution, namely in the age group of 50 – 64 years as many as 57 people (41%). The number of male sufferers was 99 people (71.22%) which was higher when compared to women 40 people (28.78 %).

Several studies have shown that old age and male was the highest tracheostomy population. The results of a study by Gilyoma, et al. using data for 10 years found that the comparison between men and women performed tracheostomy was 3:1 with the majority over 40 years old. (3) A systematic review study conducted by Alidad, et. Al in 2019 also found out of 24 articles the average of patients who had a tracheostomy was 49.2 years and 66.1% of them were men. (4)

From the results of the study, there were only two patients who had confirmed cases of COVID-19 who had a tracheostomy procedure (1.44%). The tracheostomy procedure itself is sometimes performed with an indication of *prolonged* ETT, but in patients infected with COVID-19 this can be difficult to do due to poor prognosis in intubated patients and the presence of a high risk for transmission. (5) Despite of this, research conducted by Chao, et al. found that tracheostomy measures are safe for both patients with COVID-19 and operators.(10)

The majority of patients who performed tracheostomy due to upper airway obstruction were 88 patients (63.31%). The results of this study are in line with a study conducted by Alabi in Nigeria which obtained the result that 60.5% of trachesostomy was performed in patients with upper airway obstruction. (8) Research conducted by Adedeji, et al. also found 64.5% of tracheostomy was performed due to the presence of upper airway obstruction followed by the presence of laryngeal tumors (32.7%). (9) The same thing happened in the study conducted by Liliana that obtained the results of pharyngeal or laryngeal tumors and deep neck abscesses are comorbidities in patients who performed an emergency tracheostomy. (10,11)

Research shows that all patients (100%) who were performed tracheostomy procedures by the ORL-HNS department underwent a surgical tracheostomy and none were treated with percutaneous tracheostomy. The results of meta analysts found that percutaneous procedures have a higher risk for the presence of perioperative complications such as death and cardiac arrest but have a lower risk of peristomal bleeding and postoperative infection (11). The results of this study showed that the majority of procedures were performed at emergency OR as many as 91 patients (65.47%) in emergency conditions. Research conducted by Gupta also found that the majority of tracheostomy cases were performed in emergency conditions (58%) which is in line with this research(10) .

Complications in patients who performed tracheostomy occurred only in 16 people (11.51%). The most common complication experienced was subcutaneous emphysema of 10 people (7.91%), followed by cardiopulmonary resuscitation in 5 patients (3.6%) and one patient who had plica vocalis parese (0.71%). This is in line with other studies that show that the incidence of tracheostomy complications ranges between 5-65%(11)

Post-tracheostomy subcutaneous emphysema can occur in the suturing of incision wounds or the use of cassa in the use of tracheostomy canules without a cuff so that air from the trachea is trapped in the soft tissues around the stoma. Size of tracheostomy cannucle that was too small or tracheal incision that was to large can also cause airflow to be trapped in the subcutaneous tissue through the sidelines of the cannule and trachea. Subcutaneous emphysema can be prevented by the use of intubation so that it can prevent coughing during the installation of a tracheostomy cannule and avoid dissection that is too wide in the trachea. Most cases of subcutaneous emphysema can be spontaneously reabsorbed by the body within a few days, therefore subcutaneous emphysema belongs to the category of mild complications so it does not include alarmingly life-threatening complications(10) .

It was concluded that the description of the tracheostomy procedure carried out by the ORL-HNS department during the COVID-19 pandemic in the period March 2020 - September 2021 at Hasan Sadikin Hospital Bandung was 139 procedures with an average patient group of 50 – 64 years, mainly men, two COVID-19 patients who had tracheostomy, and only 11.51% of patients who experienced tracheostomy complications with the majority of complications occurred were subcutaneous emphysema.

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