ABSTRACT

**Introduction:** The elevated incidence of unsuccessful ventilator weaning and endotracheal extubation in COVID-19 patients indicates the necessity of tracheostomy. Tracheostomy can expedite the weaning process and decrease the occurrence of problems. The author aims to investigate the frequency of death among COVID-19 patients who received tracheostomy to determine the potential benefits of tracheostomy in treating COVID-19, particularly in facilitating the transition from mechanical ventilation to reducing airway problems.

**Method:** This study is a cross-sectional observational analytic descriptive study. Data were taken from the medical records of COVID-19 patients who underwent tracheostomy insertion surgery at RSUD Dr. Soetomo Surabaya in the period January 2022 - December 2023.

**Results:** Of the 50 patients who underwent tracheostomy, 33 patients (66%) were male, with an average patient age of 20.7 years and, the youngest age was 1 year, the oldest age was 77 years. The mean time of tracheostomy insertion in the sample was 3.669 days, with the shortest time of insertion being 1 day and the longest being 22 days. There were 12 patients (24%) who confirmed COVID-19 and 38 patients (76%) who did not confirm COVID-19. A total of 20 patients (40%) were alive after tracheostomy insertion, while 30 patients (60%) died.

**Conclusion:** The mortality prevalence of COVID-19 patients with tracheostomy treated at Soetomo General Hospital Surabaya from 2022 to 2023 was 60%.

**Keywords:** COVID-19, tracheostomy, tracheal intubation.

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INTRODUCTION

The WHO designated an epidemic of acute respiratory illness linked to the coronavirus in February 2020 and named it coronavirus disease 2019 (COVID-19). A significant outbreak was caused by COVID-19, the third known animal-to-human transmission in the previous 20 years.\(^1,2\)

Droplets are the primary method of COVID-19 transfer. When someone is near someone who is experiencing respiratory symptoms, droplets have the potential to enter the oral nasal mucosa, as well as the conjunctiva.\(^3\) This is known as droplet transmission. SARS-CoV-2 takes anywhere from 1 to 14 days to incubate. The majority of people only have minor symptoms, but a significant number of patients are in severe condition as a result of the COVID-19 pandemic’s high case rate. Invasive mechanical ventilation and long-term intubation are necessary for many individuals with severe symptoms. Patients who require intubation are admitted to intensive care units and require extended hospital stays.\(^4\)

Tracheostomy has the advantage of enhancing patient comfort while lowering the requirement for sedation. It is thought to help reduce the time of mechanical ventilation, ICU stay, and lower respiratory tract infections.\(^5\) Tracheostomy also allows for better management of secretions due to the ease of suction and the ability to replace the cannula, thereby alleviating the problem of large amounts of secretions in COVID-19 patients.\(^6\) The use of paralytic drugs and sedation can also be reduced with the use of tracheostomy.

A tracheostomy may be necessary for COVID-19 because of the high risk of ventilator weaning and endotracheal extubation failure.\(^7\) This can assist in shortening the weaning process and lower the rate of related problems.\(^8\) The use of surgical procedures to reduce aerosol and droplet exposure is recommended by recent guidelines on tracheostomy treatment in COVID-19.\(^9\) Therefore, the authors are interested in analyzing the prevalence of mortality of COVID-19 patients who underwent tracheostomy to determine whether tracheostomy can help the therapy of COVID-19 cases, especially for weaning from mechanical ventilation and airway complications.

METHODS

This research is descriptive, analytical, and observational. We used the cross-sectional approach to collect data. Information was extracted from the medical records of COVID-19 patients treated at Dr. Soetomo, General Hospital, Surabaya, from January 2022 to December 2023 for tracheostomy insertion procedures. Patients with COVID-19 who had had
tracheostomy insertions performed by surgeons or residents met the study's inclusion requirements. This study will not include patient medical record data that is incomplete. A descriptive analysis was performed to determine the frequency and proportion of each study variable. Version 26 of IBM Statistics Desktop Software (SPSS) was used to conduct this study.

RESULTS AND DISCUSSION

This research included a total of 50 patients. This study conducted a normality test on numerical data, specifically the age and time of tracheostomy insertion. Based on the demographic characteristics of the research sample in Table 1, 33 (66%) patients were male, and 17 (34%) were female. The average age in this study was 20.7 years, ranging from 1 to 77 years old.

Based on the time of tracheostomy insertion, the mean was 3.669 days after insertion, with the minimum insertion time being 1 day and the most prolonged tracheostomy insertion being 22 days. There were 12 patients (24%) confirmed COVID-19 and 38 (76%) patients who were not confirmed COVID-19. As many as 20 (40%) patients lived after tracheostomy insertion, while 30 (60%) patients died after tracheostomy insertion.

DISCUSSION

Global health systems are facing challenges as a result of the COVID-19 epidemic. Severe symptoms requiring mechanical breathing and critical care treatment were reported in 2.5–5% of unvaccinated COVID-19 patients.\(^5,10\) When treating COVID-19 patients who have respiratory failure and need continuous mechanical ventilation, tracheostomy is crucial. However, there is a lack of information about the impact of tracheostomy on COVID-19 results, and different guidelines and procedures have been established due to the ambiguity surrounding the risk of infection transfer.

According to research by Farlow et al.,\(^6\) 64% of COVID-19 patients with tracheostomies were men, and their average age was 54 (20–89 years).\(^11\) The results of this study showed that the tracheostomy insertion duration was 3.46 days, with a range of 1 to 22 days. In comparison, most tracheostomy insertions were found to occur in males (66%) with an insertion length of 22 days with a range of 7 to 60 days. There is ongoing debate on the precise timing of tracheostomy in COVID-19 patients. The survival rate of COVID-19 patients may be impacted by the time of tracheostomy placement. The survival percentage was higher for patients who had tracheostomies longer than 14 days after intubation than those who had them fewer than 14 days after intubation. There is ongoing disagreement over the indications for tracheostomy. While Shiba et al. stated that tracheostomy may not offer any advantage due to the quick advancement of COVID-19,\(^12\) Mattioli et al. suggested that it could extend the duration of stay in COVID-19 patients by expediting the removal of the ventilator.\(^13\)

According to this study, 60% of COVID-19 patients who had tracheostomies also died. The present study's outcomes are consistent with Ramdhani et al's investigation of COVID-19 patients after tracheostomy, which found that 4 patients (9.5%) were effectively released from the hospital and 38 samples (90.5%) perished.\(^14\) This investigation led to the conclusion that there was still a poor survival rate for critically sick COVID-19 patients in Indonesia who had tracheostomies.

According to Taboada et al., patients requiring tracheostomy had a higher hospital death rate (12/29 or 41%) than patients not requiring tracheostomy (13/69 or 18%) (p<0.001).\(^15\) The tracheostomy-related mortality rates did not show any statistically significant disparity between the COVID-19 and non-COVID-19 groups. Both groups had low rates. These death rates are similar to those of prior research in which complications caused less than 1% of secondary deaths. The 30-day all-cause mortality rate for both groups was higher—roughly 20%. A 30-day all-cause death rate of around 26.6% was reported by Liao et al.\(^16\) It is noteworthy that tracheostomy-related mortality did not differ statistically significantly between the two groups, suggesting that tracheostomy is safe to operate in COVID-19 patients.

The fatality rates of COVID-19 patients are significantly impacted by the time of tracheostomy placement. A direct comparison between tracheostomy on the tenth day or earlier and a delayed surgery was linked to a considerably increased risk of mortality, according to research by Flinspach et al.\(^17\) The results of this study showed that the tracheostomy insertion procedure took a minimum of one day and a maximum of twenty-two days. This study's drawback is the lack of knowledge on the effects and complications that affect the mortality of COVID-19 patients after tracheostomy, in addition to confounding risk factors.

CONCLUSIONS

In this study, it can be concluded that the COVID-19 patient death prevalence with tracheostomy who were treated at RSUD Dr. Soetomo Surabaya from 2022 to 2023 was 60%.

ETHICAL CLEARANCE

Patient approval has been obtained in this study, and ethics approval was fulfilled from the Ethics Committee of RSUD Dr. Soetomo No. 1423/LOE/301.4.2/VIII/2023.
CONFLICTS OF INTEREST
No competing interests were declared.

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AUTHOR CONTRIBUTION
All of the authors equally contributed to the study.

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