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Acquired infection after intubating patients with COVID-19: A retrospective pilot study

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The novel coronavirus disease (COVID-19) is very contagious. In severe cases patients may require intubation for mechanical ventilation [1–3]. In this report, we investigated the extent to which medical providers who were involved in intubation for patients with COVID-19 acquired the infection, and the characteristics and outcome of the providers who contracted the disease.

This investigation was approved by the Internal Review Board of People’s Hospital affiliated to Zhengzhou University. Potential acquired infection for those involved in intubating patients with COVID-19 in 36 anesthesia departments in 36 hospitals in four provinces of China, where an outbreak of COVID-19 occurred, were investigated using an online survey. Further survey was performed in 10 anesthesiologists (5 males and 5 females) who contracted the infection after performing intubation, and 4 nurses (1 male and 3 females) who contracted the infection after assisting with intubations, to identify potential associated factors. Data are presented as Mean ± Standard Deviation (SD). Fisher’s exact test at a two-sided significance level of 0.05 was used to identify potential risk factor(s) for intubation providers. P less than 0.05 is considered statistically significant. A total of 211 anesthesiologists from four provinces were involved in the intubation of 664 patients with confirmed or potential COVID-19. Of these 644 patients, 640 cases were eventually confirmed with a diagnosis of COVID-19 (Table 1). Among the 211 anesthesiologists who performed intubation, 10 of them (10/211 = 4.37%; 10/640 = 1.56%), along with 4 nurses who assisted intubation had a confirmed diagnosis of COVID-19 afterwards. Among the 10 cases that resulted in physician infection, 8 of them were induced with rapid sequence induction with muscle relaxant (Table 2). However, two of the cases had cough. The other two cases used awake intubation without muscle relaxant and cough occurred in both of these awake intubations. Coughing is a risk factor for provider infection (P = 0.0001). Number of intubation attempts (within three attempts) did not increase the risk of infection. A video laryngoscope was used in 9 of the cases and a light wand was used in one of the 10 cases. Among those infected, only one provider used a Powered Air Purifying Respirator. Characteristics of the intubation events are presented in Table 2. All of the affected anesthesiologists are experienced anesthesiologists with a working experience of 7–25 years and an age range of 33–48 years old (46 ± 12). They had symptoms 2–12 days after the intubation encounter (average 6 ± 3 days). All had radiological image evidence of bilateral pneumonia and all reported relatively mild to moderate symptoms. The affected anesthesiologists were out of clinical service from 20 to 60 days (average 46 ± 12 days). Seven of them have been discharged from the hospital, but three of them remain hospitalized at the conclusion of the pilot study. Four
nurses who assisted with intubations contracted COVID-19. One of these nurses was in critical condition but was eventually discharged with a loss of 50 days of clinical service. The remaining three nurses have had mild symptoms, but one is still hospitalized at the conclusion of this study.

In conclusion, medical providers performing intubation for COVID-19 patients have a high risk of contracting the disease, ranging from 1.56%–4.37% depending on calculation methods. Despite most of the providers having only mild to moderate symptoms, and the fact that they recovered or are expected to recover, significant clinical service time has been lost. This is preventable with proper personal protective equipment and precautions. Preventing intubation acquired infection should be a top priority to protect those involved in intubations, their colleagues, and their families as we strive to recover from the COVID-19 pandemic.

Author contributions

JZ designed the study, participated data collection and analysis, wrote, edited and approved the manuscript. MS, NL, WZ, GS, XZ, and MZ participated in data collection and analysis, editing the paper, and approved the manuscript. RL designed the study, participated in the data analysis, wrote, edited and approved the manuscript.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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