Intraoperative Diagnosis of Coronavirus Disease 2019 in an Asymptomatic Patient: A Case Report

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Patients with coronavirus disease 2019 (COVID-19) with variable clinical presentations are encountered in the perioperative setting. While some have already been diagnosed and are symptomatic, others have undiagnosed, asymptomatic COVID-19. The latter group poses the greatest risk of transmission. Given limited capacities in most health care systems, diagnostic testing is mainly performed in symptomatic patients or those with relevant exposure. We report an intraoperative diagnosis of COVID-19 in an asymptomatic patient, prompted by clinical signs. To control a pandemic such as COVID-19, a high index of suspicion is pivotal when caring for asymptomatic patients in the perioperative setting. (A&A Practice. 2020;14:e01235.)

GLOSSARY

BMI = body mass index; **COVID-19** = coronavirus disease 2019; **EQUATOR** = Enhancing the QUAlity and Transparency Of health Research; **ETT** = endotracheal tube; **Fio_2** = fraction of inspired oxygen; **PEEP** = positive end-expiratory pressure; **PPE** = personal protective equipment; **SARS-CoV-2** = severe acute respiratory distress syndrome coronavirus 2; **Spo_2** = peripheral oxygen saturation

By April 2020, more than 2.5 million confirmed cases of coronavirus disease 2019 (COVID-19) and more than 170,000 deaths are reported globally.[1] To identify individuals with COVID-19, patients are screened for symptoms, travel history, and exposure risk. Symptoms include fever, cough, fatigue, and dyspnea.[2] However, there is a large subset of patients who do not exhibit or report symptoms or fall into risk categories.[3] Given the risk of asymptomatic infection, special attention must be paid to patients with increased risk of exposure and infection. For example, residents of long-term care facilities, skilled nursing facilities, and assisted-living facilities may be unable to effectively socially distance or quarantine during the COVID-19 pandemic.[4] Additional consideration must be given to the homeless population, given the potential for similar, close living quarters, lack of hygiene options, and difficulty accessing medical care. There is dangerous potential for rapid spread of severe acute respiratory distress syndrome coronavirus 2 (SARS-CoV-2) among the aforementioned vulnerable populations.[5] Health care providers are at heightened risk when caring for certain populations considered "low risk" for COVID-19.

The patient provided Health Insurance Portability and Accountability Act authorization and written consent to publish this report. This manuscript adheres to the applicable Enhancing the QUAlity and Transparency Of health Research (EQUATOR) guidelines.

CASE PRESENTATION

A 51-year-old woman measuring 1.57 m tall and weighing 125 kg with a body mass index (BMI) of 50.5 kg/m^2 presented to the hospital for left-sided mastectomy for a large breast mass. Her medical history included asthma, hypertension, left ventricular diastolic dysfunction, lower extremity edema, hyperlipidemia, iron deficiency anemia, postoperative nausea and vomiting, and morbid obesity. During her preoperative clinic visit 3 days before surgery, she reported a dry cough that started 3 days previously but also endorsed a chronic cough over the past 5 years that was unchanged from baseline.

Preoperatively, her blood pressure was 114/58 mm Hg, heart rate 89 beats/min, temperature 37.4°C, and peripheral oxygen saturation (Spo_2) 95% while breathing room air. During her preoperative interview by the anesthesiologists, she was conversant and seated comfortably without signs of acute distress. She reported dyspnea on exertion with climbing one-half flight of stairs and orthopnea. She reported both symptoms were chronic and unchanged over the past week. She denied fever, cough, or myalgias within the past week, contradicting documentation from her clinic visit. She reported living in a shelter housing approximately 60 individuals but denied exposure to anyone with COVID-19. General anesthesia with tracheal intubation was planned.

As the patient moved from the stretcher to the operating room table, the pulse oximeter registered an Spo_2 of 87%. This was attributed to the exertion required during her transfer. Once positioned, the patient was lying supine in reverse Trendelenburg position with a ramp underneath the shoulders. An air-cushioned facemask strapped on the patient maintained a tight seal, and 10 L of oxygen per minute was delivered. After 2 vital capacity breaths, the patient's Spo_2 increased to 98%.

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Accepted for publication April 27, 2020.

Funding: None.

Conflicts of Interest: See Disclosures at the end of the article.

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DOI: 10.1213/XAA.0000000000001235

After 5 minutes of preoxygenation with tidal volumes of approximately 1 L, general anesthesia was rapidly induced intravenously with 100 mg lidocaine, 200 mg propofol, 40 mg ketamine, and 120 mg succinylcholine. The trachea was quickly and atraumatically intubated with a 7.5-mm oral endotracheal tube (ETT) utilizing a video laryngoscope. Vital signs, including Spo_2, were within normal limits during and immediately after intubation. Volume-controlled ventilation was started with tidal volumes of 500 mL, positive end-expiratory pressure (PEEP) of 7 cm H_2O, and fraction of inspired oxygen (Fio_2) of 70% (Figure 1). General anesthesia was maintained with sevoflurane 0.7 minimum alveolar concentration, lidocaine 30 µg/kg/min, propofol 35 µg/kg/min, and ketamine 3 µg/kg/min. Long-acting neuromuscular agents were not administered.

Throughout the following hour, the ventilator was adjusted using both volume and pressure-controlled ventilation in efforts to ensure appropriate ventilation and oxygenation (Figure 1). The patient repeatedly exhibited breath holding, "bucking" on the ventilator, oxygen desaturations, and increasing amounts of blood-tinged secretions in the ETT. In response, the Fio_2 was incrementally increased to 90%, and 3 separate sustained inflation recruitment maneuvers utilizing continuous airway pressures of 30–40 cm H_2O for 20 seconds were performed to maintain Spo_2 above 90%. The ETT was suctioned utilizing a flexible catheter. Temperature was monitored throughout the surgery and was 36.5°C–37.0°C. Given the recurrent hypoxemic episodes requiring increased PEEP and Fio_2, increasing secretions, underlying medical conditions, and her undomiciled situation increasing exposure risk, COVID-19 emerged as a potential diagnosis.

We obtained a sample via a nasopharyngeal swab to test for SARS-CoV-2 while the patient was still anesthetized. The airflow in the operating room was reversed to provide a negative pressure environment, and in addition to the N95 masks and eye protection already worn by operating room personnel, isolation gowns and face shields were donned. Before conclusion of the surgery, the sample was confirmed to be positive for SARS-CoV-2 via polymerase chain reaction assay. After the surgery was completed, surgical and ancillary operating room staff left the operating room to limit possible exposure during extubation. The patient was weaned from the ventilator as she emerged from anesthesia. Blood-tinged, frothy secretions from the ETT required repeat suctioning, but she maintained adequate oxygenation on 100% Fio_2 with spontaneous ventilation. Before extubation, the previously utilized air-cushioned facemask was placed over the ETT to limit spread of secretions (Figure 2). To prevent the patient from coughing on emergence, the lidocaine infusion was continued. After extubation, the mask was strapped onto the patient to create a tight seal, and the ventilator circuit delivered supplemental oxygen while the patient spontaneously breathed. The patient recovered in the operating room with only the anesthesiologists in attendance. Oxygen was weaned as tolerated to maintain Spo_2 >90%. Attempts at breathing room air resulted in desaturations to 80%–85%. However, the patient maintained Spo_2 >90% on 2 L oxygen and appeared comfortable without coughing. On repeat questioning, she acknowledged that she resided with approximately 60 individuals in 1 room of the shelter and newly reported that "many appeared to be ill." She was transferred to an inpatient COVID-19 floor with a surgical mask overlying a nasal cannula providing 2 L/min of oxygen. Throughout the following 6 days as an inpatient, her oxygen requirements decreased. She reported dyspnea on exertion and had nocturnal oxygen desaturations, but her Spo_2 remained >88% on room air. Her

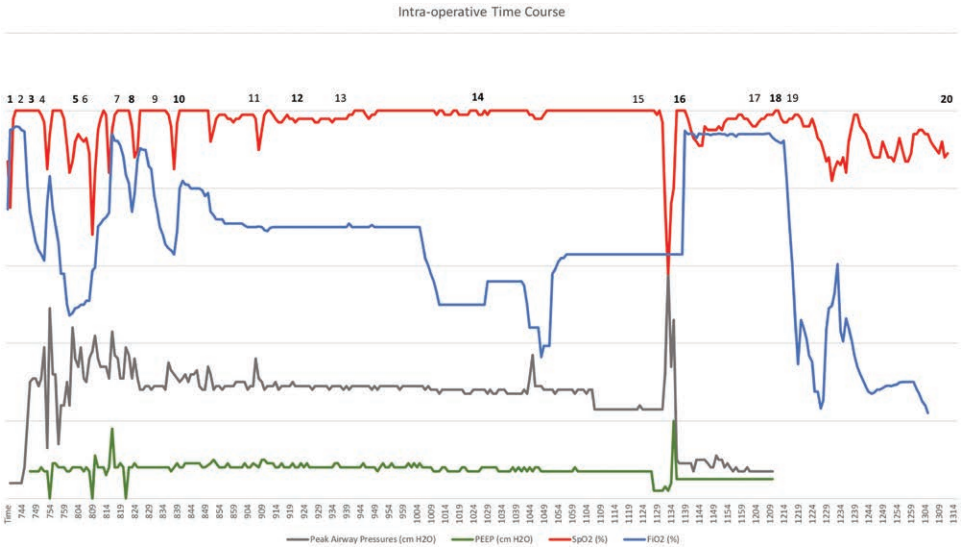

Figure 1. Intraoperative respiratory parameters. 1: Induction of anesthesia. 2: Endotracheal intubation. 3: Trial of pressure support ventilation. 4: Trial of pressure support ventilation. 5: First noted secretions in endotracheal tube. 6: Trial of pressure support ventilation. 7: Secretions in endotracheal tube noted to markedly increase. 8: Recruitment maneuvers performed. 9: Suctioning via endotracheal tube. 10: First discussion of testing for SARS-CoV-2. 11: Surgical specimen removed. 12: SARS-CoV-2 nasopharyngeal swab obtained. 13: Operating room transitioned to negative pressure. 14: Surgery complete. 15: Patient positive for SARS-CoV-2. 16: Suctioning via endotracheal tube. 17: Emergence from anesthesia. 18: Endotracheal extubation. 19: Recovery initiated in operating room. 20: Transferred patient to inpatient COVID-19 unit. COVID-19 indicates coronavirus disease 2019; Fio_2, fraction of inspired oxygen; PEEP, positive end-expiratory pressure; SARS-CoV-2, severe acute respiratory distress syndrome coronavirus 2; Spo_2, peripheral oxygen saturation.

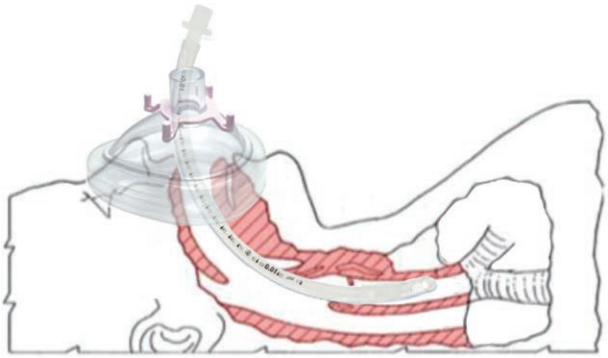

Figure 2. Diagram of endotracheal tube and facemask setup for extubation. Endotracheal tube within lumen of cushioned facemask utilized for extubation.

nocturnal oxygen desaturations were attributed to likely undiagnosed obstructive sleep apnea.

DISCUSSION

This is the first report of intraoperative diagnosis of COVID-19. The patient presented and remained asymptomatic for typical COVID-19 symptomatology throughout the perioperative period. During the preoperative interview, she denied fever, cough, myalgias, fatigue, or known exposures. She reported only chronic, stable shortness of breath and dyspnea on exertion.

Concerns about the possibility of COVID-19 were prompted by high PEEP and Fio_2 requirements, her underlying comorbidities, and exposure risk given her undomiciled situation. The patient's initial hypoxemia and PEEP requirement were attributed to deconditioning, obesity, positioning, her very large "watermelon-sized" breast mass, and underlying pulmonary disease. However, removal of the left breast and reverse Trendelenburg positioning did not improve the patient's pulmonary compliance or PEEP requirements, and we had no suitable explanation for her copious, bloody airway secretions.

Extensive efforts were made to limit exposure to personnel and other patients perioperatively, in concordance with published recommendations.[6] As per our hospital policy, all personnel in the operating rooms were wearing N95 masks. Once suspicion of COVID-19 arose, the operating room staff were informed and asked to don additional personal protective equipment (PPE), such as isolation gowns and face shields. Testing for SARS-CoV-2 was performed expeditiously, and the operating room was transitioned to negative pressure. In spite of copious blood-tinged, frothy secretions, suctioning was minimized to limit viral aerosolization. Because of increased risk of exposure to SARS-CoV-2 from viral aerosolization during airway manipulation,[7] on completion of the surgery and before extubation, operating room staff, other than the anesthesiologists, were asked to leave. The patient recovered in the operating room and transferred wearing a surgical mask over a nasal cannula[8] directly to her inpatient room in a designated COVID-19 unit.

Among patients hospitalized with COVID-19, the prevalence of underlying comorbidities include hypertension (16.0%), cardiovascular disease (12.0%), diabetes mellitus (7.9%), and smoking history (7.6%).[9] Obesity is an independent risk factor for hospital admission for patients younger than 60 years with COVID-19.[10] Presumably the underlying metainflammation and delayed antiviral response in obesity worsens outcomes.[11]

In review, a high index of suspicion for COVID-19 due to a constellation of clinical findings and risk factors in a patient who did not have typical symptoms triggered testing, which led to timely diagnosis and limited exposure to others. Patient-reported absence of fever, cough, or exposure to individuals with a confirmed COVID-19 diagnosis is not sufficient to rule out COVID-19.[12] We believe preoperative screening, including formal testing, needs to be expanded to undomiciled individuals, even if they are asymptomatic, due to the challenges of social distancing and hygiene and ability to limit exposure among this population.

DISCLOSURES

Name: Andrew K. Davis-Sandfoss, MD.
Contribution: This author helped with conceptualization, wrote the original draft, and reviewed and edited the manuscript.
Conflicts of Interest: None.
Name: BobbieJean Sweitzer, MD, FACP.
Contribution: This author helped with conceptualization and reviewed and edited of the manuscript.
Conflicts of Interest: Dr Sweitzer is the executive editor of *A&A Practice*, on the editorial board of *Anesthesia & Analgesia*, and she receives compensation from the International Anesthesia Research Society.
This manuscript was handled by: Markus Luedi, MD, MBA.

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