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Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Brief Report

Health care personnel exposure to a patient with asymptomatic SARS-CoV2 infection during a prolonged surgical intervention

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Key Words:

Health care worker
 Personal Protective Equipment
 Covid-19
 Exposure investigation
 Aerosol-generating procedure

There is ongoing debate regarding the role of aerosols in the transmission of SARS-CoV2 in the health care environment. Here, we report a case in which multiple operating room health care providers were exposed to a patient with asymptomatic SARS-CoV2 infection during a prolonged orthopedic surgical intervention and had no evidence of COVID-19 during the 14-day post-exposure period.

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Current evidence suggests that the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) is mainly transmitted via respiratory droplets produced during prolonged close contact to an infected person as well from contact with contaminated surfaces.¹ Since the potential for SARS-CoV2 to remain viable in a closed environment as an aerosol for 3 hours was first reported, there has been ongoing concern about the role of airborne transmission, especially for health care providers (HCPs) involved in aerosol generating procedures (eg, endotracheal intubation, bronchoscopy).^{2,3} Additionally, transmission from asymptomatic and/or presymptomatic individuals has been reported, although the extent in which they play a role in widespread transmission remains uncertain.^{4,5} Here we describe the outcomes of several operating room (OR) HCPs exposed to a patient who was later discovered to have laboratory-confirmed asymptomatic SARS-CoV2 infection.

A 17-year-old man with no medical history was airlifted to the hospital in March 2020 immediately after a car accident in which he was an unrestrained front seat passenger and partially ejected through the windshield. On arrival, his chief complaint was left lower extremity pain. Complete review of systems was otherwise unremarkable. His temperature was 98.2 F (36.8 C) and O2 saturation on

room air was 98%. On exam, he had an externally rotated left leg, and plain films revealed comminuted fractures involving the distal femoral shaft and a right bimalleolar ankle fracture. Chest X-ray was normal. He was placed in skeletal traction and later the same day underwent an intramedullary nail treatment of the left femoral fracture and an open reduction-internal fixation of the right ankle fracture.

The duration of general anesthesia from start to finish was 6 hours and 5 minutes. Near the completion of the procedure, the lead surgeon was notified that the computed tomography of the chest performed as a part of a total body trauma scan had shown subtle peripheral, subpleural ground glass opacities, most prominent in the right upper and left lower lobe (Fig 1). These findings were felt to be due to pulmonary contusions; however, other etiologies could not be excluded given lack of other signs of thoracic traumatic injury. The case was discussed with our institution's Infection Prevention (IP) Coronavirus disease 2019 (COVID-19) response team. SARS-CoV2 testing was not recommended at that time, as the patient was asymptomatic. Nevertheless, OR staff changed their surgical attire to COVID-19 personal protective equipment (PPE) consisting of N95 mask, face shield, gowns, and gloves. On hospital day #2, the patient had a brief postoperative cough (which resolved less than 24 hours later) and, after further discussion, he was placed on contact and droplet isolation precautions and underwent SARS-CoV2 testing on via real-time polymerase chain reaction from a nasopharyngeal swab. The test returned positive 8 hours later. Other than leg pain, the patient remained without symptoms up to 14 days after the day of the accident.

An exposure investigation was launched due to the occurrence of endotracheal intubation without recommended PPE (Table 1). A line

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Financial support: None reported.

Ethics statement: Informed consent was obtained from the patient included in the study.

Conflicts of interest: All authors report no conflicts of interest relevant to this article.

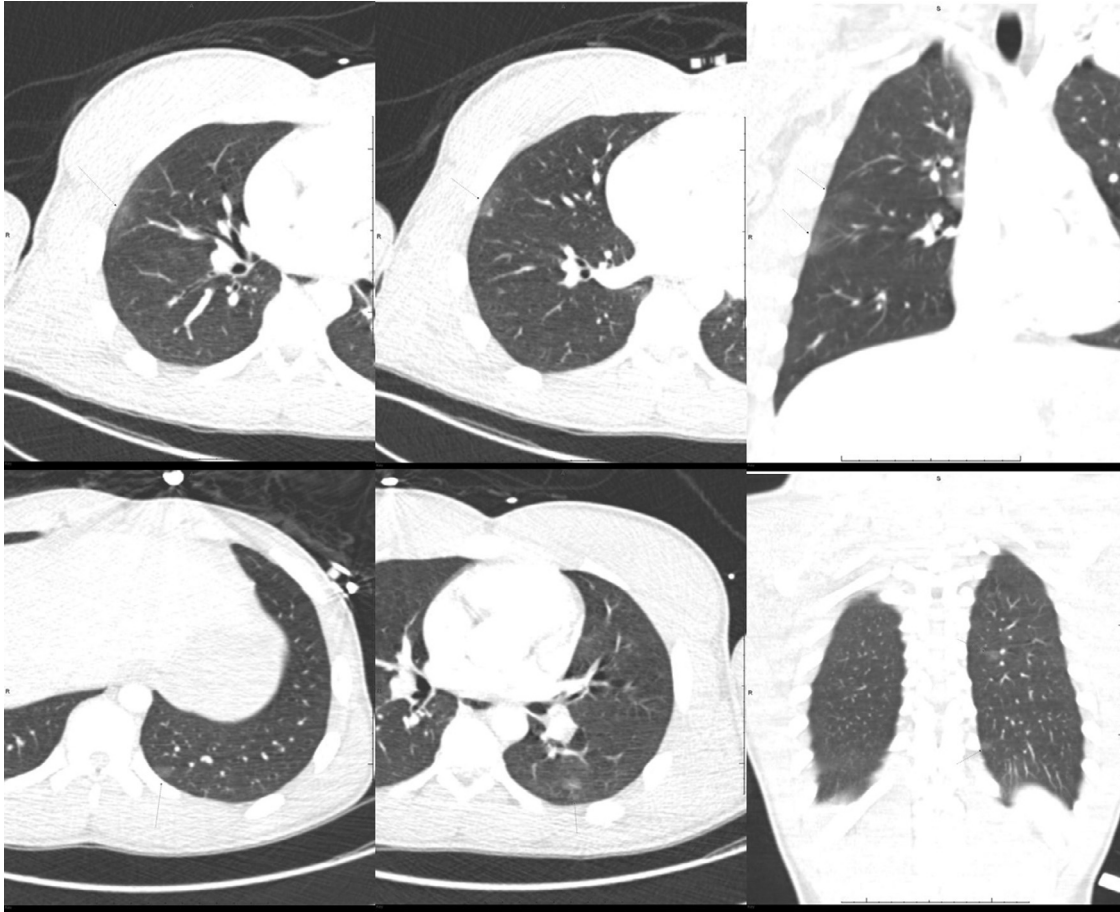


Fig 1. Computed tomography of the chest on presentation showing subtle ground glass opacities (indicated by thin arrows).

list of all HCPs present in the OR was created; eleven HCPs were potentially exposed. Individual telephone interviews were conducted by IP to determine exposure type. This revealed that the patient underwent rapid intubation inside the OR using a GlideScope video laryngoscope (Verathon Medical Inc., Bothell, WA) due to presence of

a cervical collar. Only 3 HCPs were involved in intubation. They had worn routine surgical attire (surgical mask, gloves) with one additionally wearing goggles. All 3 were deemed to have had a high-risk exposure and were placed on quarantine at home for 14 days per CDC guidance.⁶ They were advised to perform twice-daily

Table 1
Exposure investigation from laboratory confirmed COVID-19 patient in the OR

HCP in the OR	Title	Present during AGP	COVID-19 Personal Protective Equipment during AGP (N95 mask, gowns, gloves, face shield)	Symptom development during 14-day incubation period from exposure	SARS-CoV2 test performed	Placed on quarantine at home for 14-days
HCP1	Anesthesiologist	Yes (intubation)	No	Dry cough (onset few hours post procedure)	Yes, negative	Yes
HCP2	Anesthesiologist	Yes (extubation)	Yes	No	No	No
HCP3	CRNA	Yes (intubation)	No	No	No	Yes
HCP4	CRNA	Yes (extubation)	Yes	No	No	No
HCP5	CRNA	No	No	No	No	No
HCP6	Circulator	Yes (intubation)	No	No	No	Yes
HCP7	Circulator	No	No	No	No	No
HCP8	Orthopedic surgeon	No	No	No	No	No
HCP9	Orthopedic resident	Yes (not involved in intubation, not at head end of the table)	No	No	No	No
HCP10	Scrub technician	No	No	No	No	No
HCP11	Scrub technician	Yes (not involved in intubation, not at head end of the table)	No	No	No	No

AGP, aerosol-generating procedure; CRNA, certified registered nurse anesthetist; HCP, health care personnel; OR, operating room; .

temperature monitoring and symptom check (cough, shortness of breath, and sore throat). The other 8 HCPs were not deemed to have had a high-risk exposure (they were not present or involved in intubation) and were allowed to continue working with temperature monitoring and symptom check (cough, shortness of breath, and sore throat) for 14 days.

A single HCP (1/11) who assisted with intubation developed a dry cough a few hours postprocedure; no other symptoms were reported. SARS-CoV2 testing was performed and returned negative. This HCP recovered and returned to work 14 days later without issues. The other 10 of 11 HCPs remained asymptomatic throughout the 14-day monitoring period. Due to testing capacity limitations at the time, those asymptomatic HCPs were not offered SARS-CoV2 testing. Both asymptomatic quarantined HCPs returned to work 14 days later without issues. At the time of submission (32 days after the exposure event), we have not identified any suspected nosocomial transmission of SARS-CoV2 in our institution.

Protecting HCPs must be one of the main priorities for both health care institutions and federal, state, and local public health officials.⁷ It is known that patients with SARS-CoV2 infection can shed viable virus in their nasopharynx prior to onset of symptoms.⁸ The exact frequency of asymptomatic SARS-CoV2 infections remains unknown, but has been estimated to be at least 20%.⁹ In the context of known shortages of PPE, a safe optimization strategy should be implemented so supplies can be extended and available when needed most. A key part of this strategy is to reserve filtering respirators (eg, N95 masks) for aerosol generating procedures, which carry the highest risk of exposure.

Here, we report a significant event in which several HCPs who were not using respirators were exposed to an asymptomatic patient with laboratory-confirmed SARS-CoV2 infection and abnormal chest imaging without developing clinical illness suggestive of SARS-CoV2. The major limitation of our report is that we were not able to test for SARS-CoV2 infection in 10 of 11 HCPs, however, it is reassuring that

all remained asymptomatic during the period of observation. It is very unlikely that the cough developed by a single HCP was related to the exposure incident. Given testing limitations at the time, we were unable to test asymptomatic patients for SARS-CoV2 infection prior to surgical interventions, though we are now adopting this practice in our institution. Additional studies are needed to better understand the transmission risks in the perioperative environment during the current pandemic, which will be key not only to ensure the protection of health care personnel, but also to provide evidence for a responsible use of PPE.

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