In the Know

Varying Presentations of COVID-19 Across Different Age Groups

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The clinical symptoms of COVID-19 range from none to life-threatening ARDS, stroke, and myocardial infarction. Age is among the most important risk factors for severe disease and morality. Older adults require longer hospitalizations to recover from COVID-19 (*N Engl J Med* 2020;382:1708-20; *JAMA* 2020;323:1574-1581).

The July 31 edition of the CDC's Morbidity and Mortality Weekly Report (MMWR) reported the results of telephone interviews that were conducted between April 15 and June 25, 2020, among a random sampling of adults age 18 or older diagnosed with RT-PCR as outpatients (*MMWR* 2020;69:993-8). As expected, age was a significant predictor of illness severity among outpatients. When contacted by phone 14-21 days after the diagnosis, only half of patients older than age 50 reported returning to good health. What the CDC found worrisome was that a quarter of the patients younger than 34 years of age were still ill at the time of the call. Given that 90% of outpatients diagnosed with influenza recover within two weeks, the report noted with some concern that "Even among young adults aged 18-34 years with no chronic medical conditions, nearly one in five reported that they had not returned to their usual state of health 14-21 days after testing."

According to a recent MMWR report, there has been a shift in the age distribution for COVID-19 patients (*MMWR* 2020;60;1404-9). The report noted that "During June-August 2020, COVID-19 incidence was highest in persons aged 20-29 years, who accounted for >20% of all confirmed cases. Younger adults likely contribute to community transmission of COVID-19." The report directly addressed the likely role of young adults in driving the surge in deaths this summer: "Across the southern United States in June 2020, increases in percentage of positive SARS-CoV-2 test results among adults aged 20-39 years preceded increases among those aged ≥60 years by 4–15 days."

The CDC has also documented the rise in cases in school-aged children (*MMWR* 2020;69:1410-15). From March 1 through September 19, 2020, there were a total of 277,285 confirmed cases of COVID-19 among school-aged children: 175,782 in adolescents 12-17 years of age, and 101,503 in children 5-11 years of age. Boys and girls were equally affected. As seen in adults, the presence of underlying medical conditions was often associated with more severe COVID-19-related outcomes.

In their conclusions, the authors consider it "important for schools and communities to monitor multiple indicators of COVID-19 among school-aged children and layer prevention strategies to reduce COVID-19 disease risk for students, teachers, school staff, and families." The investigators conclude that their results may serve as a baseline for monitoring COVID-19 trends as well as assessing potential mitigation strategies.

To better understand the varying presentations of COVID-19, we will review several case studies from the *New England Journal of Medicine*.

76-year-old woman

A 76 year-old woman was admitted to Massachusetts General Hospital with symptoms of hypoxemia and confusion (*N Engl J Med* 2020;383:380-7). The patient lived in an assisted-living facility where several other residents had been recently diagnosed with COVID-19. The patient's co-morbidities included asthma, diabetes, and hypertension.

The vital signs on admission included 94% oxygen saturation on 2 L/min oxygen via nasal canula, temperature of 38.8°C, heart rate of 94 beats/min, blood pressure of 176/55 mm Hg, and ventilatory rate of 24 breaths/min. Laboratory studies included creatine kinase of 363 U/L (normal range, 40–150); LDH of 289 U/L (normal range, 110–210); and d-dimer of 3,592 ng/ml (normal, <500). Her chest CT revealed "multifocal consolidative and ground-glass opacities, including some with rounded morphologic features." This has become nearly pathognomonic for COVID-19.

The following day, the patient's temperature rose to 40.3°C, accompanied by worsening hypoxemia and delirium. On the third hospital day, the patient developed atrial fibrillation with a rapid ventricular response. The following day, her respiratory rate increased to 36 breaths/min with an oxygen saturation of 90% despite supplemental O_2 flow of 15 L/min. The patient had recently discussed breathing machine assistance with her primary care physician, indicating that she did not wish to ever be intubated. The family and medical team chose to employ "comfort measures only." The patient died in 36 hours of respiratory distress syndrome due to COVID-19.

66-year-old man

A 66-year-old man residing in a shelter was evaluated for rhinorrhea and a dry cough (*N Engl J Med* 2020;383:170-8). Seven days after initial evaluation, an outbreak of COVID-19 was identified among residents of the shelter. The patient was re-evaluated for the possibility of COVID-19 with a nasopharyngeal swab. Two days later the test came back positive. The patient was transferred to the COVID-19 ward at the Boston Health Care for the Homeless facility for medical isolation.

The patient's prior morbidities included abdominal aortic aneurysm, ischemic stroke, type 2 diabetes mellitus, hypertension, hyperlipidemia, hyperthyroidism, and obesity. The patient also had a history of alcohol and tobacco use but reported stopping both years earlier.

On arrival at the facility, the patient described malaise, cough, sore throat, nasal congestion, headache, and fatigue. Vital signs included oxygen saturation of 98% on room air, temperature of 38.1°C, blood pressure of 110/55 mm Hg, heart rate of 74 beats/min, and ventilatory rate of 20 breaths/min. Over the next five days, the fever continued at approximately 38.1°C, accompanied by a non-productive cough, anorexia, and malaise. Supplemental oxygen was not required, although the oxygen saturations dipped to around 90% several times. Lung auscultation revealed faint bilateral wheezing. By the sixth day, the patient's temperature decreased to 37.3°C, and the oxygen saturation stabilized at 98% on room air. Additionally, the bouts of coughing subsided. However, the patient remained at the facility out of an abundance of caution. On the 17th day, the patient acutely deteriorated, with emesis and diffuse abdominal pain. The patient was transferred to a local emergency department, where laboratory analysis demonstrated severe diabetic ketoacidosis requiring hospitalization in the medical ICU for a continuous insulin infusion. Six days later, following two negative tests for SARS-CoV-2, the patient was discharged in stable condition.

47-year-old woman

A 47-year-old woman was healthy for two months prior to developing wheezing and a non-productive cough with no

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fever chills or dyspnea (*N Engl J Med* 2020;383:665-674). Two days after her symptoms presented, she noted that her cough was worsening, as well as the new onset of shortness of breath. She called her primary care physician who suggested humidification, nasal fluticasone, fexofenadine, and a follow-up phone call in two weeks. The following day, the patient sought medical attention in the emergency department for worsening shortness of breath with ambulation as well as dizziness and myalgias. Her initial evaluation noted rhinorrhea, without fever, chills, sore throat, chest pain, nausea, or diarrhea. Her vital signs were oxygen saturation of 97% on room air, temperature of 38.0°C, heart rate of 100 beats/min, blood pressure of 124/64 mm Hg, and respiratory rate of 18 breaths/min. Laboratory studies included borderline low white cells (4,430/µL, normal range, 4,500-11,000) and lymphocytes (550/µL, normal range, 1,000-4,800).

Her initial chest CT showed a rounded mass in the lower-right lobe. Although initially suspected to be cancer, on further review it was considered to demonstrate ground-glass attenuations and the reversed halo consistent with COVID-19. The ground-glass opacities were focal and mass-like, unlike the more commonly associated fields of ground-glass appearance.

The patient's symptoms diminished on the third day of hospitalization, and consequently she was discharged to home with recommended self-quarantine and a prescribed regimen of cefpodoxime and azithromycin. Symptom resolution was reported by the patient in a follow-up phone report to her primary care physician.

Critical insights

The three cases above give some insight into the range of symptoms among patients at risk. The patient in the assisted living facility died. A disproportionate number of COVID-19 deaths have been among patients in assisted living facilities, particularly in the early days of the pandemic. The homeless man, despite multiple risk factors, weathered the storm. His diabetes complicated the care, but he apparently made a full recovery. The younger woman with shortness of breath went home after only a brief hospitalization.

This presents a very small snapshot of the diversity of clinical outcomes from complex disease. For obvious reasons, the case reports to not include asymptomatic patients, although 90% of COVID-19 cases may be asymptomatic (*Lancet* 2020:S0140-6736:32009-2). According to an analysis of >35,000 patients published in The BMJ, age is the single greatest risk factor of death, followed by elevated BUN, respiratory rate >30, oxygen saturation <92%, and two or more comorbidities (*BMJ* 2020;370:m3339). ■

The Power in Sharing *Why Physician Anesthesiologists Are Made for this Moment*

As the world battles COVID-19, physician anesthesiologists have shared stories of strength, hope, innovation, and leadership from the front lines. You have shared how you've addressed the realities of the pandemic, taking your experience from the OR into a critical care setting to care for the sickest of patients with bravery and compassion. Others have shared why you #maskup. You do it to not only protect your patients, but also everyone around you – and to prevent the spread of the virus.

Stories of moments like these show how physician anesthesiologists make a difference when it matters most. This is not only evident during a pandemic. Just as you were made for this moment, you are made for the ones that happen every day as you safeguard patients and advocate for quality care.

ASA's awareness campaign is helping make sure key stakeholders, including policymakers, health care executives and patients, understand the education, training, and expertise of physician anesthesiologists who are **Made for this Moment**. Telling your story is critical to the success of this campaign.

Kristin Powers, MD, Sajid Shahul, MD, and Mariana Montes, MD, MPH, were the first physicians to staff the COVID ICU at the University of Chicago on March 19, 2020.

The Importance of Telling Your Story

Physician anesthesiologists are considered the "guardians of patient safety" during surgery. But as the pandemic has shown, your leadership, innovation and lifesaving efforts go beyond the OR – from fighting COVID-19, caring for your patients, and ensuring you and your colleagues have the right PPE. It's clear that no other practitioner can match your ability to navigate vital moments of care.

The deeply personal stories you've shared with ASA, on social media, and through the media, highlight just how valuable you and the specialty are to providing quality care to patients and to the health care system overall. By sharing these stories, you play an important role in ASA's effort to reach, engage, and persuade key stakeholders.

While many stories have been shared, ASA needs everyone to join the effort to help us shape perceptions of the specialty.

Advocate for the Specialty

The goal of Made for this Moment is to educate health care executives and policymakers so they will support the specialty when called on to make important policy and administrative decisions.

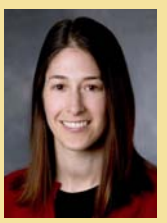
Efforts include digital marketing, direct outreach, and rapid-response efforts. The messaging throughout the campaign is developed to highlight your status as a physician and your unparalleled expertise, education, and training.

But your support and engagement are critical to our success. There's no better advocate for the specialty than you, and the more physician anesthesiologists engage with ASA social media content and share why they're made for this moment, the more impactful the message becomes.

If you're not already, join the conversation by following and engaging with us on social media. Specifically, before the new year starts, ASA is hoping to earn 150 more followers on Instagram to continue advocating for the specialty – and you can help us get there! Follow us today and encourage your colleagues and networks to do the same. ■

Visit the Made for this Moment member page at **www.asahq.org/MFTM-members** to stay up-to-date on the latest campaign activities.

Clarification



Meredith Barad, MD, Clinical Associate Professor of Anesthesiology, Perioperative and Pain Medicine, Stanford University Medical Center, Stanford, California, was inadvertently omitted from the October article she co-authored, **Severe Sequelae, Chronic Headache Linked to PDPH**. We would like to acknowledge Dr. Barad's contribution.