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Title

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Journal

Proceedings of UCLA Health, 24(1)

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Publication Date

2020-11-02

CLINICAL VIGNETTE

Interpretation of COVID-19 Laboratory Tests in Correlation with the Clinical Presentation

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Background

Severe Acute Respiratory Syndrome, Coronavirus 2 (SARS CoV-2) causes the disease known as COVID-19. The virus spreads rapidly, with new symptoms that were reported by the Centers for Disease Control and Prevention (CDC) even as late as May of 2020. Through our clinical experience at a long-term care facility, the authors are aware that there are individuals who are asymptomatic and receive a COVID-19 diagnosis when routinely tested for ongoing monitoring and surveillance of a long-term care facility (LTCF).

Availability of Tests

The CDC recommends prioritizing testing for “residents in long-term care facilities or other congregate living settings, including prisons and shelters, with symptoms.”¹ The CDC also recommends collecting an upper or lower respiratory specimen for testing. For upper respiratory testing, a nasopharyngeal or an oropharyngeal swab may be utilized. The long-term care facility in this discussion tests residents by obtaining a nasopharyngeal swab specimen. A laboratory-confirmed diagnosis of COVID-19 is based on reverse transcriptase polymerase chain reaction (RT-PCR) assay that detects viral RNA from the samples taken. Our facility utilized its own laboratory as well as a VA affiliate facility, which both used an RT-PCR when specimens are collected and tested. When a resident is symptomatic, they are immediately isolated and tested. Symptoms consistent with COVID-19, typically include fever or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body aches, and headache. Less frequent symptoms include: new loss of taste or smell, sore throat, congestion or runny nose, nausea or vomiting, and diarrhea. While the CDC also reports that the above list does not include all possible symptoms, our experience shows that there are infected residents who are asymptomatic.

Recovered COVID-19 residents in this specific long-term care setting were defined as residents who; after testing positive, no longer had symptoms or if were initially asymptomatic, remained asymptomatic 14 days from the original diagnosis date, and had two consecutive tests 24 hours apart.²

During ongoing monitoring and screening two residents tested positive for SARS CoV-2 virus while asymptomatic and twenty-six days after recovering from COVID-19. Tests were completed at the laboratory at our affiliate facility. Both

residents had been discharged from the COVID recovery unit in our long-term care facility and were moved to a regular (non-COVID) unit within the same facility.

Case One

Patient is a 69-year-old male LTCF resident who tested positive for COVID-19 on 3/31/2020. He complained of fatigue and hoarseness, and denied any chills, fever, nausea, vomiting, diarrhea, change in appetite, or loss of sense of taste or smell. He was placed in enhanced respiratory precaution isolation in the COVID unit. His past medical history included diabetes mellitus, with neuropathy and severe peripheral artery disease with below the knee amputation for osteomyelitis 9 months prior. He also has post-traumatic stress disorder, depression, tinnitus, bipolar disorder, chronic low back pain, neurogenic bladder, and obstructive sleep apnea.

Patient remained COVID-19 positive on 4/15/2020, 4/16/2020, and 4/19/2020. He subsequently had negative tests for COVID-19 on 4/22/2020 and 4/24/2020 and was transferred out of the COVID recovery unit to our regular long-term care unit where he remained asymptomatic.

During regular surveillance testing in our LTCF on 5/19/2020, the resident’s surveillance swab was a presumptive positive. Although asymptomatic, the resident was re-admitted to the COVID designated area. Patient had repeat nasopharynx COVID-19 tests that were negative on 5/22/2020 and 5/26/2020. From the time of hospital discharge, the patient had remained asymptomatic with no recurrence of symptoms.

Case Two

A 62-year-old male LTCF resident was noted to have positive COVID-19 test on 03/29/2020 on surveillance screening. His past medical history included cerebrovascular accident, progressive supranuclear palsy, left lower extremity dystonia, left-sided weakness, functional paraplegia, history of positive QuantiFERON test for tuberculosis, diabetes mellitus type II, degenerative disc disease, major depressive order, peripheral neuropathy, and history of alcohol use, tobacco dependency, and amphetamine abuse. Patient was initially asymptomatic but was admitted to the hospital on 4/1/2020. Shortly after admission he developed acute hypoxic respiratory failure most likely

due to COVID-19 pneumonia. He required supplemental oxygen up to 5 L/min on 4/3/2020 and was tapered down to room air by 4/6/2020. Patient was treated with a 5-day course of hydroxychloroquine and was discharged back to the nursing home on 4/10/2020 and had repeat COVID-19 tests on 4/14/2020 and 4/18/2020, both of which were positive. He was retested on 4/21/2020 and 4/23/2020 with negative results. Patient had repeat surveillance testing on 5/19/2020 and was positive but he remained asymptomatic. He was readmitted to the COVID Recovery Unit; however, repeat testing on 5/22/2020 and 5/25/2020 were negative for COVID-19. During this period, this resident remained asymptomatic.

Discussion

As discussed by Wu J et. al,³ the COVID-19 pandemic has created a tidal wave of new clinical and public health data. While considering the implications of recurrent positive testing in a long-term care setting, this raises concerns whether this denotes prolonged viral shedding which in turn would lead to the concerns of re-infectivity of the patient and or a persistent carrier state with the possibility of continued spread to others. Although some research has concluded PCR may still show some viral shedding at one month - with 88% PCR negative by day 28. Overall, it is felt that viral RNA detection by PCR does not equate to infectiousness or viable virus.⁴ It appears the infectious period of SARS-CoV-2 may start 2 days prior to symptom onset and declines within 7 days. By day 11 the virus could not be isolated or cultured.⁴ Another study by Van Kampen et al found patients with more severe or critical COVID-19 may shed infectious virus for longer periods of time compared to what has been reported in patients with mild COVID-19, where the probability of detecting infectious virus dropped below 5% after 15.2 days post onset of symptoms.⁵ This research is consistent with the recent CDC COVID-19 guideline changes in which a test-based strategy is no longer recommended to determine when to discontinue isolation which is based on symptom onset and severity.⁶

This information is helpful in long term care setting. Patients re-testing positive after a defined period of time do not need isolation or require further testing. Nor require facility admissions be held, or surveillance testing for other patients or staff. As COVID is a costly public health concern with intermittently limited resources such as PPE, this finding can improve allocation of resources to those with active or infectious illness. Additionally, it can increase patient safety to allow for the least restrictive treatment setting and not unnecessarily expose to other nosocomial infections. This finding allows our hospitals to not overflow with stable COVID patients and allow the healthcare professionals to direct care to the more acutely ill or infected patients.

Despite promising implications, the studies so far are limited to small samples that utilize RT-PCR. The question remains if the isolation of viable virus in a patient with recurrent positivity in the context of SARS-CoV-2 antibodies help in ongoing management. Epidemiological models to predict the burden

and pattern of spread of COVID-19 rely on several parameters that remain uncertain. There is still much to learn regarding this disease, including how many people have symptoms, whether people who have been infected are immune to reinfection, and — crucially — how many people have actually been infected so far, considering the range of asymptomatic patients range from 17-78%.⁴ In the absence of reliable virologic testing data, we cannot fit models accurately, or confidently plan for the future of this pandemic.

This pandemic has been studied intensely in a short amount of time and we hope to continue to learn more about SARS-CoV-2 within the days, weeks, and years to come in order the best address long care settings, which pose some of the highest risk for SARS-CoV-2 incidence and recurrence.

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