Clinical pathology selected abstracts

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Use of rapid antigen tests for postmortem evaluation of SARS-CoV-2 carriage

November 2021—Detecting SARS-CoV-2 in deceased patients is important when considering safety measures for preventing infection during postmortem examinations. Rapid antigen tests are approved for testing and are widely used to mitigate the spread of the virus. The performance of such tests has been widely validated in clinics. The authors of this study compared the performance of SARS-CoV-2 rapid antigen tests with that of quantitative reverse transcription PCR (qRT-PCR) in the setting of an autopsy to help guide safety practices. They performed a prospective cohort study to evaluate the Roche/SD Biosensor SARS-CoV-2 rapid antigen test in 30 consecutive deceased COVID-19 patients at the University Hospital, Medical University of Graz, in Austria. The authors tested each corpse with nasopharyngeal swabs for rapid antigen tests and ESwabs (Copan Diagnostics) for qRT-PCR. They also collected samples from lung tissue for an additional cohort of deceased COVID-19 patients to compare molecular detection and virus cultivability. The patients were a median age of 78 years and 51.2 percent were female. The median disease duration (interval between the first positive SARS-CoV-2 PCR test and death) was 11 days, while the median postmortem interval (time between death and specimen sampling) was 23 hours. In the authors' cohort, qRT-PCR targeted to the viral envelope *(E)* gene showed the highest sensitivity. Therefore, this was used as the reference target. QRT-PCR was positive in 80 percent of cases and rapid antigen tests in 56.7 percent. The rapid antigen test-negative cases had significantly higher cycle threshold (Ct) values in qRT-PCR compared with the rapid antigen test-positive cases. Furthermore, when qRT-PCR values were compared with culture performed from lung tissue swabs, cultivability was observed in cases with Ct values of 23.7 or less, which is determined to be below the threshold of false-negative rapid antigen test cases. The authors noted that since lung tissue is known to show increased SARS-CoV-2 viral loads, it represents a major source of infection during autopsy. The study found that although rapid antigen tests have an overall lower sensitivity than qRT-PCR, viral loads of false-negative rapid antigen test cases are most likely below the threshold of cultivability. Because culture is a measure of viral infectivity and viability, these corpses likely pose only minimal risk of SARS-CoV-2 transmission during autopsy. However, the authors noted that each corpse is potentially infectious and, therefore, should be subject to appropriate autopsy safety measures. They concluded that rapid antigen tests may be an additional worthwhile tool for postmortem testing strategies, especially when qRT-PCR is not readily available, but should not be viewed as a replacement for such strategies. Rapid antigen tests may be particularly useful in identifying the most infectious corpses, which should be examined under special conditions, when qRT-PCR is not available.

Zacharias M, Stangl V, Thuringer A, et al. Rapid antigen test for postmortem evaluation of SARS-CoV-2 carriage. *Emerg Infect Dis*. 2021;27:1734–1737.

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A sample pooling strategy for detecting SARS-CoV-2 using real-time PCR

The COVID-19 pandemic has dramatically increased real-time reverse transcription polymerase chain reaction (RT-PCR) testing, which is used to confirm the presence of SARS-CoV-2. The high demand for SARS-CoV-2 testing has also elevated turnaround times and led to a shortage of testing kits and supplies. A potential solution to these problems is sample pooling, which is a strategy used to test for such infectious diseases as syphilis and HIV. The United States' experience with sample pooling for SARS-CoV-2 testing remains limited, and the College of American Pathologists has expressed concerns about pooling. The FDA has provided guidelines and recommendations for implementing pooled COVID-19 testing in laboratories processing large volumes of samples.

The authors reported on the experience of the clinical microbiology and immunology lab at the University of Chicago Medical Center with validating and implementing a pooling protocol for SARS-CoV-2 testing. The lab tested pools of five nasal and five nasopharyngeal samples, which were grouped separately on the Roche Cobas 6800 analyzer. The samples were from COVID-19 low-positivity (no more than five percent) regions of Chicago and northwest Indiana. The authors monitored SARS-CoV-2 RT-PCR turnaround times between sample collection and result reporting and compared this with turnaround times recorded before sample pooling was implemented. The lab tested 4,131 sample pools during the three-month period of July 31, 2020 to Oct. 31, 2020. The results showed that pooling allowed the laboratory to save 13,824 tests, which is a conservation rate of 35 percent. Even with pooling, a 48-hour or less turnaround time was maintained during the study period. Based on these results, the authors viewed the pooling program as a success. However, they found that additional resources were required for sorting, aliquoting, reporting, repeat testing, and tracking and maintaining records for each pool. The authors also noted that pooling would not be an option if COVID-19 or influenza, or both, were widely circulating in the community. They concluded that sample pooling offers a viable means to mitigate supply shortages of PCR testing supplies without significantly compromising turnaround times. This strategy is particularly effective in areas with lower SARS-CoV-2 prevalence rates since fewer resources may be saved in areas with higher prevalence rates.

Chan CW, Kwon S, Matushek SM, et al. Implementation of a sample pooling strategy for the direct detection of SARS-CoV-2 by real-time polymerase chain reaction during the COVID-19 pandemic: an institutional experience. *Am J Clin Pathol*. 2021;
156:15–23.

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