Unexpected SARS-CoV-2 positivity in postmortem nasopharyngeal swabs

SARS-CoV-2 is considered a hazard group 3 pathogen (HG3) by the Advisory Committee on Dangerous Pathogens; risk of transmission to mortuary staff is high without appropriate safety precautions. Recent guidance from the Royal College of Pathologists outlines key principles in safe autopsy practice relating to possible cases of SARS-CoV-2.[1] Major recommendations include the use of a fold flat and moulded mask or whole-body suit and a staged postmortem where appropriate. Such measures are only implemented if the autopsy is considered high risk, on the basis of antemortem swab results and/or the clinical history on the coroner's request form. Given both the paucity of community testing and the reticence of patients to attend hospital during the peak of the pandemic, such information may be insufficient in assessing risk of potential SARS-CoV-2 carriage postmortem.[2] We sought to evaluate whether routine postmortem SARS-CoV-2 testing (to date not routine in many centres) helps to guide the implementation of appropriate safety precautions by catching 'missed infections'.

We outline the results of postmortem SARS-CoV-2 testing in a UK-situated district general hospital. From 28 March 2020 to 7 April 2021, we routinely performed postmortem PCR testing for SARS-CoV-2 RNA via nasopharyngeal swabs on all deceased cases prior to postmortem. Overall, 76 of 613 (12%) deceased individuals were positive. Of the postmortem swab-positive cases, 23 (30%) had documented swab positivity antemortem. Five (7%) had documented swab negativity antemortem. Forty-eight (63%) had no documented swab result antemortem. Of the postmortem swab-positive cases with negative or unknown viral status antemortem, over half (28/53, 53%) were not identifiably high risk from the clinical information provided by the coroner. High-risk status was defined as documentation of COVID-19 case-defining symptoms prior to death (a new-onset continuous cough, a high fever or loss or change to smell or taste) and/or exposure to a SARS-CoV-2 positive contact within the 2 weeks preceding death. In all of the 25 'high-risk' cases defind using these criteria, the proximate cause of death was attributed to COVID-19 (part I of the medical certificate of cause of death). In 17 of the 28 (61%) 'low-risk' cases, the proximate cause of death was attributed to COVID-19.

The discrepancy between the number of cases categorised as ostensibly 'low risk' on the basis of a standard risk assessment versus by postmortem swab result is marked. Categorising cases as 'low risk' on the basis of a negative antemortem swab result alone would have missed two-thirds of the cases. Categorising cases as 'low risk' on the basis of negative antemortem swab plus absence of suggestive symptoms and/or contact exposure would have missed one-third of positive cases. Postmortem SARS-CoV-2 testing is important in 'high risk' for infection groups, as previously outlined.[3] Our data support extension of such postmortem testing to include apparently 'low-risk' groups, first to ensure accurate recording of deaths attributable to COVID-19 and second to flag which cases requiring HG3 safety precautions to reduce transmission risk to mortuary staff. Indeed, recent evidence suggests that infectivity may persist in COVID-19 corpses after a postmortem interval of up to 2 weeks.[4]

Melanie Jensen ,[1] **Lutful Wahab**[2]

[1]Department of Cellular Pathology, Northwest London Pathology, Imperial College Healthcare NHS Trust, London, UK
[2]Department of Pathology, Hemel Hempstead General Hospital, West Hertfordshire Hospital NHS Trust, Hemel Hempstead, Hertfordshire, UK

Correspondence to Dr Melanie Jensen, Department of Cellular Pathology, Northwest London Pathology, Charing Cross Hospital, Imperial College Healthcare NHS Trust, London, London W6 8RF, UK; m.jensen@cantab.net

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ORCID iD
Melanie Jensen http://orcid.org/0000-0002-2027-5023

REFERENCES

1 Osborn M, Lucas S, Steward R. *Autopsy practice relating to possible cases of COVID-19 (2019-nCov, novel coronavirus from China 2019/2020)*. V1 edn. The Royal College of Pathologists, 2020. https://asprtracie.hhs.gov/technical-resources/resource/8686/autopsy-practice-relating-to-possible-cases-of-covid-19-2019-ncov-novel-coronavirus-from-china-2019-2020
2 Mulholland RH, Wood R, Stagg HR, *et al*. Impact of COVID-19 on accident and emergency attendances and emergency and planned hospital admissions in Scotland: an interrupted time-series analysis. *J R Soc Med* 2020;113:444–53.
3 El Bouzidi K, Howard M, Ali H, *et al*. 'Test, test, test' even after death: persistence of SARS-CoV-2 RNA in postmortem nasopharyngeal swabs. *J Clin Pathol* 2020. doi:10.1136/jclinpath-2020-207091. [Epub ahead of print: 12 Nov 2020].
4 Plenzig S, Bojkova D, Held H, *et al*. Infectivity of deceased COVID-19 patients. *Int J Legal Med* 2021;135:2055–60.