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Airborne SARS-CoV-2 RNA collected during childbirth and autopsy

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Airborne SARS-CoV-2 is considered to play a major role in covid-19 transmission, and several studies have reported its presence in hospital environments, including corridors, patient rooms, cohort rooms and ICUs (Dinoi *et al.*, 2022). The risk of airborne virus have been associated with a number of factors, such as low ventilation, high patient viral load and in some cases, certain medical procedures (Thuresson *et al.*, 2022).

However, specific medical situations still deserve further investigation. One such situation of interest is childbirth, as respiratory emissions, which could contain virus, are increased due to heavy breathing during labor (Mok *et al.*, 2021). Moreover, patients rarely use face masks in these situations due to the exertion of pushing during delivery. To date, published studies only include small numbers of air samples (<25) from childbirth. Air samples have been collected with both passive and active air samplers, but most fail to detect airborne SARS-CoV-2 RNA (Hawks *et al.*, 2023, Hermesch *et al.*, 2020, Schoen *et al.*, 2022).

Another situation with potential risk for airborne SARS-CoV-2 is autopsy. As many cases of Covid-19 are asymptomatic, there is a risk of unknown infection in the deceased, and many autopsy procedures are potentially aerosol-generating, such as sawing of the skull. At least one study found airborne SARS-CoV-2 during a minimally invasive autopsy expected to generate less aerosols (Amato-Lourenço *et al.*, 2021). Many hospitals followed specific guidelines, or even ceased autopsy of covid-19 patients during the pandemic, due to the unknown infection risk to the personnel.

The aim of the current study was to further explore the presence of airborne SARS-CoV-2 RNA during childbirth and autopsy.

Method

Air was sampled before, during and after childbirth in rooms where the women giving birth had tested positive for covid-19, or during and after autopsy of a deceased patient with confirmed covid-19 at the time of death.

Sampling was done using a liquid cyclone (Coriolis μ, Bertin Instruments, France), operating at 200 L min-1 for 10 min, with 15 mL of phosphate-buffered saline solution as collection liquid. The collection liquid was concentrated using Amicon Ultra-15 centrifugal filter units (50 kDa cutoff, Merck Millipore) and stored at -80 °C until analysis. SARS-CoV-2 RNA was detected by real time reverse transcription polymerase chain reaction (RT-qPCR).

Results and discussion

In total, 56 air samples were collected, whereof 44 during six childbirth occasions and 12 during two autopsies. Six (14%) of the samples collected during childbirths were positive for SARS-CoV-2 in RT-qPCR. Positive air samples were found both before, during and after delivery. One (8%) sample from autopsy was positive. Overall, the concentrations of RNA were low, with Ct values between 37.7 and 40.

These results can increase our understanding about the risk of covid-19 transmission by aerosols at delivery wards and during autopsy, even though the sample material is small. Reports of airborne SARS-CoV-2 in hospital environments contribute to improving guidelines for protective equipment for healthcare personnel working with such patients.

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