Facemask ventilation of patients for surgery does not increase the risk of spread of COVID-19

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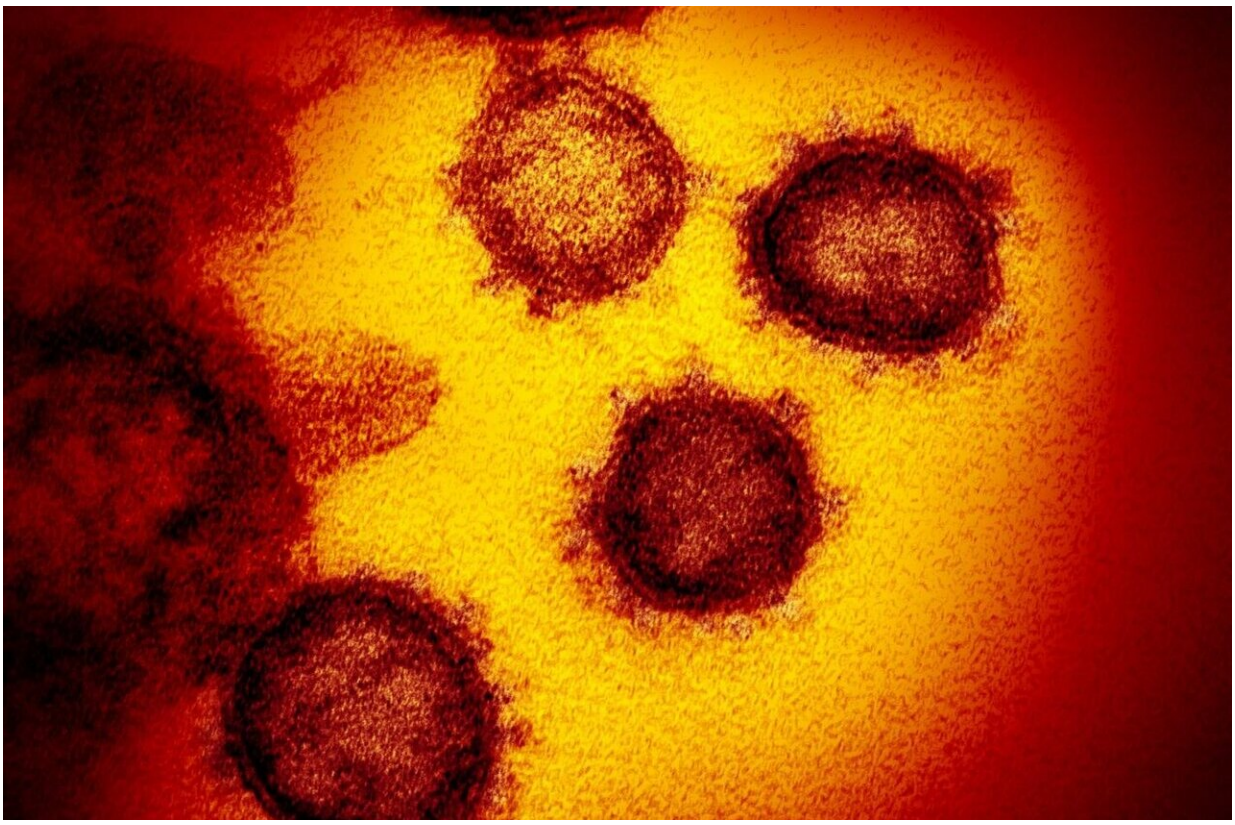

Transmission electron microscope image of SARS-CoV-2, the virus that causes COVID-19, emerging from human cells. Credit: NIAID

New research published in *Anaesthesia* (a journal of the Association of

Anaesthetists) says that the use of facemask ventilation during routine surgery should not be classed as an aerosol-generating procedure and does not increase the risk of COVID-19 transmission compared with normal breathing/coughing of patients.

Thus this procedure is not high risk and can be performed confidently for both routine surgery and emergency airway management. Its use should neither slow down operations or necessitate the use of extra personal protective equipment for medical teams.

Facemask ventilation is an essential intervention used by anaesthetists as part of the 'life support' of most anaesthetised patients having surgery. Its designation as an 'aerosol-generating procedure' (AGP) by the World Health Organization has had a major impact on operating theatre efficiency and processes. However, there is no direct evidence to indicate whether facemask ventilation is a high-risk procedure for aerosol generation. No study to date has measured the aerosol generated during facemask ventilation and the evidence for its AGP classification is based largely on one study of infections in anaesthetists dating back to the previous SARS-1 epidemic in 2003.

As a result of this AGP designation, current guidance dictates that anaesthetists performing facemask ventilation in a patient at risk of having COVID-19 would have to wear a respirator mask, eye protection and additional personal protective equipment. This would also apply to nearby theatre staff. In addition, extra time (up to half an hour per case) had to be added to each operation to allow sufficient air changes in theatre to remove any of the presumed infectious aerosol. This greatly reduces the number of cases that can be done each day, especially for urgent or emergency surgery, and is contributing to the backlog in the healthcare system.

In this new study, the authors conducted aerosol monitoring in

anaesthetised patients during standard facemask ventilation, and facemask ventilation with an intentionally generated air leak—to mimic the worst-case scenario where aerosol might spread into the air. Recordings were made in ultraclean operating theatres (at Southmead Hospital, North Bristol NHS Trust, UK) and compared against the aerosol generated by each patient's normal breathing and coughing.

Respiratory aerosol from normal breathing was reliably detected above the very low background particle concentrations with median aerosol concentration of 191 particles per litre. The average aerosol concentration detected during facemask ventilation without a leak (3 particles per litre) was 64-times less than that for breathing. When an intentional leak was introduced the aerosol count was 17 times lower than breathing (11 particles per litre).

When looking at peak particle concentrations the team found that a patient coughing produced a spike of 1260 particles per litre, compared to the peak of 60 per litre (20 times lower) for regular facemask ventilation and 120 per litre with an intentional leak introduced (10 times lower).

Dr. Andrew Shrimpton, the lead author of the study, commented: "This study demonstrates that facemask ventilation, even when performed with an intentional leak, does not generate high levels of bioaerosol."

The authors add: "The low concentration of aerosol detected during facemask ventilation even with an intentional leak is also reassuring given that this represents a worst-case scenario. Both normal breathing and a voluntary cough generate many-fold higher quantities of aerosol than facemask ventilation… On this basis, we believe facemask ventilation should not be considered an aerosol-generating procedure. Accumulating evidence demonstrates many procedures currently defined as aerosol-generating are not intrinsically high risk for generating

aerosol, and that natural patient respiratory events often generate far higher amounts."

They conclude: "The emerging evidence from quantitative clinical aerosol studies is yet to be incorporated into clinical guidance for aerosol-generating procedures and we believe this needs urgent reassessment. Declassification of some of these anaesthesia-related procedures as aerosol-generating would seem appropriate due to their lack of aerosol generation. Our findings also raise the broader question of whether the term 'aerosol-generating procedure' is still a useful concept for anaesthetic airway management practice in the prevention of SARS-CoV-2 or other airborne pathogens."

Dr. Mike Nathanson, President of the Association of Anaesthetists said: "This important work will allow clinicians to better understand the risks of general anaesthesia in patients with COVID. As we enter another winter, and with a high prevalence of COVID, the backlog of surgical cases is increasing. Anaesthetists will wish to carry on working for as many of their patients as possible. As the authors suggest, this research will inform the debate on how we can work safely."

This study is the result of a collaboration between Anaesthetic and Aerosol research groups based in Bristol, UK and Melbourne, Australia as part of the NIHR funded AERATOR study. The results reinforce the findings of similar studies performed by the AERATOR group demonstrating many anaesthetic procedures are not high risk for aerosol generation.

Provided by AAGBI