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COVID-19 CORRESPONDENCE

Personal protective equipment, airway management, and systematic reviews. Comment on *Br J Anaesth* 2020; 125: e301–5

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Editor—We read with interest the paper by Sanfilippo and colleagues[1] on simulated airway management whilst wearing personal protective equipment (PPE). The role of simulation in the setting of PPE is crucial given the coronavirus disease 2019 (COVID-19) pandemic. Airway management with PPE carries significant challenges, including restricted movement, limited communication, impaired vision, loss of tactile sensitivity, and wearer discomfort. We thus agree with the need for a systematic review on this subject; however, we wish to highlight some concerns regarding this study.

Firstly, the search reported by Sanfilippo and colleagues[1] appears to have missed some relevant and critically important studies. Although Sanfilippo and colleagues located only a single study examining anaesthetists as subjects, five other studies, all authored by and including anaesthetists, met the inclusion criteria and would have been expected to be included in their analysis, three of which focused on the COVID-19 pandemic. These include two randomised crossover trials,[2,3] one crossover trial,[4] and two observational studies.[5,6] A further study in a cardiac arrest setting might have been included also.[7] These omissions could reflect an incomplete search strategy, inadequate screening, or unclear inclusion criteria, and significantly undermine the validity and reliability of the results and interpretation.

Secondly, for the outcome metrics sought, success rate, and time to successful tracheal intubation, critical operator characteristics were not considered. In particular, the background and experience of airway operators must be factored in as different levels of experience can cause poor performance[8] rather than the PPE itself. The authors did not examine or report this key element of the included studies.

Thirdly, the authors compared a highly variable and diverse PPE baseline (in diverse population studies). For example, one study compared outcomes after tracheal intubation of a manikin with either a GlideScope (Verathon Medical, Bothell, WA, USA) or a Macintosh laryngoscope with participants wearing hazmat suit and PPE,[9] and another examined the AirwayScope (Pentax, Tokyo, Japan) with participants wearing 'chemical, biological, radiation, and nuclear PPE'.[10] In the first study, a complete hazmat suit with a powered air-purifying respirator (PAPR) was used by first to third yr emergency medicine residents, whereas in the second a group of 19 volunteers with 'some prior experience of tracheal intubations on human patients using a Macintosh laryngoscope (mean number of intubations, 1.13+/−1.31)' was using 'nylon shirt and pants, antigas mask, gloves and rubber boots', which are intuitively less cumbersome compared with a full hazmat suit. This variation is emphasised in the legend of Table 1 in the paper of Sanfilippo and colleagues,[1] which reveals the diversity of the included PPE, ranging from respirator masks to PAPRs, which would have significant differences in their influence on technical performance.

The importance of simulation and training in airway management, particularly in combination with the physical and cognitive challenges imposed by PPE, has been reported elsewhere.[11–14] We agree with the authors that training is of utmost importance; in contrast, we want to emphasise other priority factors, such as the need to identify dedicated airway teams and intubation spots,[15] the need for team preparedness and pre-procedural planning (including cognitive aids and airway management and PPE donning/doffing checklists),[12–14] and the need for clear indications for correct PPE and operative instructions to improve user compliance and acceptance.[16] We cannot underestimate the additional mental workload imposed by the clinical scenario and by the fear of self-infection, which could never be reproduced even in the highest-fidelity simulation.

It is encouraging that Sanfilippo and colleagues[1] have attempted to synthesise data on this practice. However,

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significant limitations in their data hamper our ability to interpret the evidence base, but their data do highlight that the real concern is not measuring how limited airway management is by PPE, but rather the need for better understanding of PPE diversity; correct use of PPE; and development and training in new techniques, protocols, and devices to overcome such difficulties. Otherwise, as with the Chinese proverb, 'When the wise points the moon, the fool looks at the finger'.

Declarations of interest

MS has received paid consultancy from Teleflex Medical, Verathon Medical, and DEAS Italia. MS is a patent co-owner (no royalties; DEAS Italia), and received lecture grants and travel reimbursements (MSD Italia and MSD USA). KE has received educational funding and research support from Ambu, Fisher & Paykel Healthcare Ltd, and GE Healthcare. IA has received educational funding from Ambu, Verathon, Fisher & Paykel Healthcare Ltd, and BioMarin. JS declares no competing interests.

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Use of HEPA filters to reduce the risk of nosocomial spread of SARS-CoV-2 via operating theatre ventilation systems

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