

Correspondence

Videolaryngoscopy increases 'mouth-to-mouth' distance compared with direct laryngoscopy

The COVID-19 outbreak has resulted in the consideration of videolaryngoscopy (VL) for tracheal intubation of patients during an outbreak [1, 2]. Benefits of VL compared with a standard curved Macintosh (MAC) blade include: postural advantages; improved view for the laryngoscopist and assistants; enhanced supervision; and easier management of unanticipated difficult airways [3].

Tracheal intubation was a high-risk procedure for transmission of SARS-COV-1 to laryngoscopists in 2003, resulting in a 9% infection rate [4]. Droplet dispersal is complex and depends on droplet size, viscosity, the environment and the nature and direction of expulsion from the airway. Droplets landing on mucus membranes transfer infection [5]. The nature of droplet dispersion during laryngoscopy is likely to vary depending on the technique used and patient factors. This has led to international recommendations that airway management is modified from conventional practice when managing patients suspected of SARS-COV-2 infection [1]. Whereas personal protective equipment (PPE) such as masks, gloves and gowns reduce disease transmission, it is desirable to minimise contamination of PPE, as doffing carries an increased risk and in resource-poor, or emergency settings effective PPE may be limited or unavailable. Asymptomatic patients shed virus and are infectious (2). As the radius of a spherical environment doubles, the surface area increases four-fold and the volume of that environment increases eight-fold, reducing droplet density [5]. Distancing the laryngoscopist's face from aerosolised and expelled droplets reduces the concentration of droplets in direct contact with mucous membranes. We aimed to quantify whether VL has an impact on the mouth-to-mouth distance between the patient and laryngoscopist.

The study was approved by Institutional Research and Development and informed written consent was obtained. Experienced anaesthetists, competent to manage an airway without direct supervision were asked to perform tracheal intubation on a high-fidelity manikin (Laerdal SimMan[®] Essential, Laerdal, Orpington, UK). In a crossover study, the intubator was randomised to using either VL (Venner APA, Venner Medical, Jersey, UK) with a disposable MAC-3 blade or direct laryngoscopy (DL) with a conventional disposable MAC-3 blade (BriteBlade, Flexicare Medical, Mountain Ash,

UK) and re-useable handle (Flexicare Medical). Video cameras (Laerdal SimViewer, Laerdal Medical Ltd., Orpington, Kent, UK) were positioned at 45° to the participant and manikin, enabling calibration and remote measuring of distance of the mouth of the anaesthetist to the mouth of the manikin, providing a 'mouth-to-mouth' distance. Calibration was confirmed with a ruler before and after intubation attempts. Candidates were given instructions to intubate with a 7.5 mm I.D. cuffed tracheal tube (Portex SoftSeal, Portex, Hythe, Kent, UK) as quickly and safely as possible, and were aware that they would be filmed and timed from the laryngoscopy blade passing between the lips until they declared the intubation was completed. The bed height was set to 80 cm from the floor. Video analysis, accurate to ± 2.5 cm, was used to determine 'mouth-to-mouth' distance.

Twenty-five participants were enrolled; nine trainee anaesthetists, seven specialty doctor anaesthetists and nine consultant anaesthetists. The mean (SD) 'mouth-to-mouth' distance using VL was 35.6 (9.9) cm and using DL was 16.4 (11.4) cm. This was statistically significant using a two-tailed paired t-test ($p < 0.0001$). It was observed that DL resulted in a straight line between the simulator laryngeal inlet and the intubators eyes and VL resulted in a line from the laryngeal inlet to the laryngoscopist's chest. Mean time to intubation was 15.5 s vs. 15.4 s, respectively.

We conclude that VL significantly extends the 'mouth-to-mouth' distance from laryngoscopist to patient compared with DL, and places the laryngoscopist's face above the direct line of sight to the pharynx.

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PY is a joint inventor of the Venner APA Laryngoscope. No external funding or other competing interests declared.

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