

communication, flattened hierarchies and VL) should be embraced in an effort to prevent it.

Airway management is generally reliable and safe, but when techniques fail it rapidly becomes highly dangerous. I have reviewed several hundred cases of patient harm due to airway management difficulties. Many involve both technical failures (failure to have or use optimal equipment, failure to be trained in or to use it correctly) and non-technical failures. While, quite rightly, there has recently been increased focus on human factors in such cases, it is essential we embrace technological advances and do not abandon technical excellence. It is almost inconceivable that other safety industries would not by now have adopted widespread VL. Those uncertain as to whether they should use VL or DL as a default technique for tracheal intubation might wish to present the above data to patients and, through shared decision-making, let them choose.

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TC's department has been given airway equipment at cost or for free for evaluation or research. In 2015 he spoke at an

educational meeting at Storz GmbH for which travel and accommodation costs specific to the meeting were reimbursed and also in 2015 he attended a round table about capnography during sedation at Covidien. He received no payment for either meeting. Companies within both Storz and Covidien sell videolaryngoscopes. No other competing interests declared.

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Human factors and teaching benefits of videolaryngoscopes are based on evidence

We read with interest Lyons and Harte's editorial [1] regarding videolaryngoscope use. We agree with Professor Cook's response [2] and would like to address several points.

We disagree with Lyons and Harte's statement that there is 'no evidence' for the non-technical skills advantages of using a videolaryngoscope. A survey of all 48 anaesthetic assistants in Bath [3], 7 years after videolaryngoscopes were introduced and with a 100% return rate, reported that using a videolaryngoscope improved the following: ability to see when laryngoscopy was difficult (98%); ability to anticipate the 'next step' (98%); teamwork (96%); patient safety (100%) and ability to call a senior anaesthetist more quickly if needed (94%). By improving teamwork, allowing the intubating team to 'share the view' at laryngoscopy and empowering the team to call for help, using a

videolaryngoscope is likely to flatten the team hierarchy (or 'reduce the authority gradient') and help team members to speak up if they feel that patient safety is compromised [4, 5]. A steep team hierarchy is a recurring theme in airway deaths [2, 4, 5]. Displaying the view at laryngoscopy on a videolaryngoscope screen allows the lead anaesthetist to 'step back' and maintain their situation awareness, improving their leadership skills and communication with the rest of the team [4].

Cognitive overload occurs when the working memory becomes overwhelmed [4, 5] and can result in a move from the 'zone of flow' into the zones of 'frazzle' or 'freeze' [4, 5]. Human factors principles for choosing airway equipment to reduce cognitive overload and improve performance include using the most effective airway equipment as default [5]. Getting it right first time and reducing the

number of attempts at tracheal intubation lowers the risk of progression to a 'cannot intubate, cannot oxygenate' situation due to technical reasons (reduced airway oedema and bleeding) and non-technical reasons (reducing cognitive overload and preventing cognitive bias, confirmation bias, anchoring and omission bias) [2, 5].

Lyons and Harte did not mention the teaching advantages of using a videolaryngoscope. It is important to differentiate between the process of performing direct laryngoscopy and the use of a direct laryngoscope, and to emphasise that a videolaryngoscope with a Macintosh-shaped blade can be used to teach direct laryngoscopy very effectively. Five studies have shown that teaching direct laryngoscopy is better when using a videolaryngoscope with a Macintosh-shaped blade compared with teaching direct laryngoscopy using a standard Macintosh laryngoscope [6]. Our experience is very much in line with this. We suggest that a trainer teaching direct laryngoscopy using a standard Macintosh laryngoscope is no better than a trainer doing so while blindfolded. Tracheal intubation training for anaesthetic assistants is also improved, with 98% of anaesthetic assistants reporting advantages for them and their students [3]. Teaching tracheal intubation can be stressful, and the ability to share the view at laryngoscopy on a videolaryngoscope screen is likely to reduce the trainer's cognitive load, allow the trainee to complete the tracheal intubation without the trainer taking over and enable the trainee to undertake more challenging intubations.

Using a videolaryngoscope every day – by all staff and for all patients – is likely to improve personal and team skills and expertise and result in proficiency in using the most effective device for managing difficult tracheal intubation. As human factors experts teach us, good technical skills 'free up cognitive load' (or 'make room in your head') for good non-technical skills [5].

Patient safety must be the primary concern when selecting any device or technique. As intubators, we may

not 'need' to use a videolaryngoscope for every tracheal intubation, but we believe that there are significant benefits for the patient, ourselves and the whole team if we do.

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