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LETTER

Video laryngoscopy for ICU intubation: a meta-analysis of randomised trials

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Dear Editor,

Endotracheal intubation for patients in the intensive care unit (ICU) carries high risk of complications due to limited physiological reserve of these patients and variability in the expertise of ICU physicians. Multiple attempts at intubation have been associated with increased risk of severe complications. Video laryngoscopes can provide indirect visualization of the glottis via a camera towards the tip of the blades. A 2014 meta-analysis found that, compared with direct laryngoscopy, video laryngoscopy improved glottis view and first-attempt success for orotracheal intubation in ICU [1]. However, both randomised controlled trials (RCT) and observational studies were included in that study, and evidence from RCTs was limited. In the past months new RCTs have debated the application of video laryngoscopy in airway management in ICU [2, 3]. Here, we perform a meta-analysis of RCTs to evaluate the effects of video laryngoscopy on first-attempt success and complications related to intubation in ICU patients.

PubMed, EMBASE and the Cochrane Library were searched for RCTs comparing video laryngoscopy with direct laryngoscopy for endotracheal intubation in ICU patients. Trials reporting at least one outcome of interest (see below) were included; trials in emergency, trauma or anaesthesia settings were excluded. The primary outcome was first-attempt success. Secondary outcomes included poor glottis visualization (defined as Cormack–Lehane grade 3/4 on first attempt), oesophageal intubation, time for successful intubation, severe hypoxemia (defined as saturation less than 80%), hypotension (as defined by study authors), mechanical ventilation duration and ICU mortality. We calculated risk ratios (RR) or mean differences (MD) and 95%

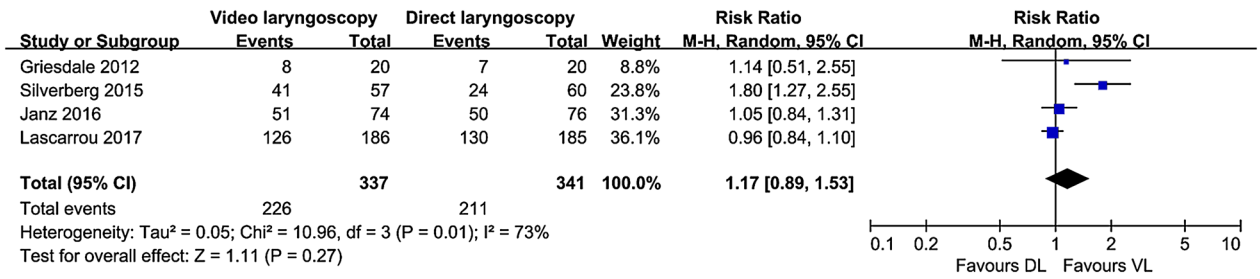

Fig. 1 Forest plot of four randomized controlled trials that compared video laryngoscopy versus direct laryngoscopy on success of first-attempt intubation. Heterogeneity was assessed using both the I^2 statistics and the Q test with associated P value. Random-effects analysis was used to estimate the summarized relative risk

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confidence intervals (CI) with the fixed- or random-effects model according to study heterogeneity using RevMan 5.3.3 (Cochrane Collaboration). For the primary outcome, trial sequential analysis was conducted using specific software (Copenhagen Trial Unit 2011). The quality of evidence was evaluated using the grades of recommendation, assessment, development and evaluation (GRADE) approach.

Four RCTs enrolling 678 patients were included [2–5]. Main characteristics of the included trials are presented in Table S1 (ESM). Three trials have low risk of bias and one has high risk (Table S2). Compared with direct laryngoscopy, video laryngoscopy did not significantly improve first-attempt success rate (RR 1.17, 95% CI 0.89–1.53, Fig. 1). In video laryngoscopy groups, poor glottis visualization was less common (RR 0.30, 95% CI 0.14–0.64, Fig. S1), and incidence of oesophageal intubation was lower (RR 0.31, 95% CI 0.11–0.90, Fig. S2). However, video laryngoscopy did not reduce the time for successful intubation and other outcomes, including severe hypoxemia, hypotension, mechanical ventilation duration and ICU mortality (Figs. S3–S7). Trial sequential analysis showed that the current evidence on the use of video laryngoscopy is still inconclusive (Fig. S8). The GRADE quality of evidence for each outcome was summarized in Table S3. Explanations and limitations of current evidence and implications for future research are discussed in the ESM.

In summary, video laryngoscopy did not improve the rate of successful intubation on first attempt. Until more high-quality evidence is available, routine use of video laryngoscopy for all ICU intubations should not be recommended.

Electronic supplementary material
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Compliance with ethical standards

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Conflicts of interest
The authors declare that they have no conflict of interest.

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