

Videolaryngoscopy *versus* direct laryngoscopy for emergency orotracheal intubation outside the operating room: a systematic review and meta-analysis

N. Arulkumaran^{1,*}, J. Lowe², R. Ions³, M. M. Ruano⁴, V. Bennett⁵ and M. W. Dunser⁶

¹Bloomsbury Institute of Intensive Care Medicine, Division of Medicine, University College London, London, UK, ²Department of Anaesthesia, Arrowe Park Hospital, Wirral, Merseyside, UK, ³Department of Emergency Medicine, Musgrove Park Hospital, Taunton, Somerset, UK, ⁴Department of Intensive Care Medicine, Hospital Universitario y Politécnico La Fe, Valencia, Spain, ⁵Department of Intensive Care Medicine, St George's Hospital, Tooting, London, UK and ⁶Department of Anesthesiology and Intensive Care Medicine, Kepler University Hospital, Johannes Kepler University Linz, Linz, Austria

*Corresponding author. E-mail: nisharulkumaran@doctors.org.uk.

Abstract

Videolaryngoscopy (VL) may improve the success of orotracheal intubation compared with direct laryngoscopy (DL). We performed a systematic search of PubMed, Embase, and CENTRAL databases for studies comparing VL and DL for emergency orotracheal intubations outside the operating room. The primary outcome was rate of first-pass intubation, with subgroup analyses by location, device used, clinician experience, and clinical scenario. The secondary outcome was complication rates. Data are presented as [odds ratio (95% confidence intervals); P-values]. We identified 32 studies with 15 064 emergency intubations. There was no difference in first-pass intubation with VL compared with DL [OR=1.28, (0.99–1.65); P=0.06]. First-pass intubations were increased with VL compared with DL in the intensive care unit (ICU) [2.02 (1.43–2.85); P<0.001], and similar in the emergency department or pre-hospital setting. First-pass intubations were similar with GlideScope[®], but improved with the CMAC[®] [1.32 (1.08–1.62); P=0.007] compared with DL. There was greater first-pass intubation with VL compared with DL amongst novice/trainee clinicians [OR=1.95 (1.45–2.64); P<0.001], but not amongst experienced clinicians or paramedics/nurses. There was no difference in first-pass intubation with VL compared with DL during cardiopulmonary resuscitation or trauma. VL compared with DL was associated with fewer oesophageal intubations [OR=0.32 (0.14–0.70); P=0.003], but more arterial hypotension [OR=1.49 (1.00–2.23); P=0.05]. In summary, VL compared with DL is associated with greater first-pass emergency intubation in the ICU and amongst less experienced clinicians, and reduces oesophageal intubations. However, VL is associated with greater incidence of arterial hypotension. Further trials investigating the utility of VL over DL in specific situations are required.

Keywords: laryngoscopy; meta-analysis; emergencies

Editorial decision: December 13, 2017; **Accepted:** December 13, 2017

© 2018 British Journal of Anaesthesia. Published by Elsevier Ltd. All rights reserved.

For Permissions, please email: permissions@elsevier.com

Editor's key points

- The authors conducted a systematic review and meta-analysis comparing video vs direct laryngoscopy for emergency intubations outside the operating theatre.
- They found no clear benefit to the routine use of videolaryngoscopy over direct laryngoscopy besides the possibility of improved rates of first-pass intubation amongst less experienced clinicians.
- Videolaryngoscopy was associated with fewer oesophageal intubations, but more arterial hypotension compared with direct laryngoscopy for emergency intubations.

Failure to secure the airway in a timely manner in the critically ill patient is likely to result in serious complications or death.¹ Videolaryngoscopy (VL) has been proposed as a method to improve glottis visualisation, and improve the success of orotracheal intubation over traditional direct laryngoscopy (DL).² In the operating room, VL appears to reduce the number of failed intubations, particularly amongst patients presenting with a difficult airway.³

The theoretical benefits of VL are appealing in the management of patients who require emergency orotracheal intubation. However, there are circumstances in which DL could be advantageous over VL (e.g. when performed by experienced clinicians). Furthermore, improved glottis visualisation with VL may not necessarily translate into a higher success rate for first-pass intubation, because tracheal intubation under indirect vision may be more challenging.^{4–6} Airway soiling can obscure the camera lens, requiring that the device is removed and cleaned before repeated use, favouring DL in such circumstances. A recent Cochrane review found that, compared with DL, VL reduced failed intubations, including in participants with anticipated difficult airways, reduced laryngeal/airway trauma, increased easy laryngeal views, and reduced failed intubations amongst experienced users. However, majority of the studies were conducted in the operating room, and the authors highlighted ‘a notable lack of studies’ amongst ‘patients in different (high risk) settings such as the emergency department (ED) or ICU’.⁷

Our objective was to compare the rates of first-pass emergency orotracheal intubation rates outside the operating room between VL and DL. We also aimed to evaluate specific circumstances, in which VL may be beneficial over DL, including clinician experience, clinical situation, and the type of videolaryngoscope used. Secondary analyses included the difference in complications between VL and DL use, and time to intubate.

Methods**Information sources and search strategy**

A systematic literature search of MEDLINE (via PubMed), Embase (via Ovid), and the Cochrane Central Register of Controlled Trials (via Wiley) (CENTRAL, Issue 2, 2015) was conducted to identify suitable studies. When possible, we used controlled vocabulary (MeSH) and keywords ([Supplementary Data](#)). Only full articles in the English language were considered. Date restrictions were not applied. The last search update was in October 2017. In addition to searching electronic

databases, previous review articles on the subject were hand searched for further references.

Eligibility criteria

We established inclusion criteria before beginning our search. All studies comparing VL and DL for emergency orotracheal intubations outside the operating room were included. Controls were defined *a priori* as patients who had emergency orotracheal intubations outside the operating room using DL. We included only those trials in which DL or VL was used as the first-line method of intubation in the control or intervention arm, respectively. Thus, we excluded trials in which VL or DL was used as a rescue device. Only studies reporting first-pass intubation rates were included. Studies involving elective and emergency surgery, or paediatric patients (<16 yr) were excluded. We included all randomised controlled trials (RCTs), observational studies (prospective and retrospective), and propensity-matched analyses.

Study selection

Two investigators (J.L. and R.I.) independently screened both the titles and abstracts to exclude non-pertinent studies. Discrepancies were resolved by a third author (N.A.). Relevant full text articles were then retrieved and analysed for eligibility applying the pre-defined inclusion criteria.

Data collection and analysis

Two investigators (J.L. and R.I.) independently extracted information from selected studies using a standardised data-collection form. When we found multiple publications from a research group, we determined whether their reports were from the same study population based on the time frame of data collection and data sources, and we removed duplicates.

We collected data on the following: year of data collection, country of study, type of study, total number of participants, experience of clinician, location of intubation, any particular circumstances [cardiopulmonary resuscitation (CPR) or trauma], and type of videolaryngoscope used. The following data points were collected for patients undergoing emergency orotracheal intubation by VL or DL: number of intubations, number or first-pass intubations, time to intubate, total number of complications, and specific complications (oesophageal intubation, airway/dental trauma, aspiration of gastric contents, hypoxaemia/desaturation, and systemic hypotension).

Primary outcome

The rate of first-pass intubation in different locations was the primary outcome of our analysis. Locations included the emergency room, pre-hospital setting, intensive care unit (ICU), and other locations within the hospital (outside the operating theatre).

Secondary outcomes

We performed *a priori* subgroup analyses to investigate the effect of VL compared with DL in achieving first-pass intubation by (i) the type of videolaryngoscope used, (ii) experience of clinician, and (iii) clinical scenario (CPR or trauma). Studies including >90% of all intubations occurring during CPR were

Download English Version:

<https://daneshyari.com/en/article/8929744>

Download Persian Version:

<https://daneshyari.com/article/8929744>

[Daneshyari.com](https://daneshyari.com)