



# Video versus direct laryngoscopy for tracheal intubation of critically ill adults

Kathleen O'Connell<sup>1</sup> · Andy Pan<sup>1</sup> · Jeffrey J. Perry<sup>1</sup>

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**Article Type:** Randomized Controlled Trial

**Ratings:** Methods 4/5 Usefulness 3.5/5

## Introduction

### Background

Multiple previous studies comparing video vs direct laryngoscopy have had differing results regarding rates of intubation success and peri-procedural complications.

### Objectives

This study aimed to determine if first-pass success was greater with video compared to direct laryngoscopy, with secondary outcomes assessing complications.

## Methods

### Design

Multicenter, unblinded, randomized parallel group trial at 7 emergency departments and 10 ICUs in the United States. Group allocation concealment utilized opaque envelopes, stratified by site.

### Eligibility criteria

Critically ill adults (age  $\geq 18$  years) undergoing tracheal intubation with laryngoscope. Excluded patients who needed “immediate need for tracheal intubation”.

### Outcomes

Primary outcome was rate of first-pass intubation success. Secondary outcomes included severe complications during and up to 2 min post intubation. These included: hypoxemia ( $< 80\%$ ), BP  $< 65$  mmHg systolic, new or increased use of vasopressors, cardiac arrest, or death.

## Main results

The study was stopped early due to pre-defined stopping criteria. 1417 patients were included in final intention-to-treat analysis. Primary outcome showed 85.1% (600/705) first-pass success with video laryngoscopy and 70.8% (504/712) with direct laryngoscopy (absolute risk difference, 14.3%; 95% confidence interval [CI], 9.9–18.7;  $P < 0.001$ ). NNT for primary outcome is 7. 91.5% of the intubations were performed by an emergency medicine resident or critical care fellow. Severe complications occurred in 21.4% of the video laryngoscopy group and 20.9% in the direct laryngoscopy group (absolute risk difference, 0.5 percentage points; 95% CI,  $-3.9$  to 4.9). There were no significant differences in safety outcomes.

✉ Jeffrey J. Perry  
jperry@ohri.ca

<sup>1</sup> Department of Emergency Medicine, University of Ottawa, Ottawa, ON, Canada

## Appraisal

### Strengths

- Knowing which technique to intubate patients is better is an important research question
  - Robust methodology and recruitment
  - Relevant to the ED—69.7% of patients in this study were intubated in the ED
  - Intention-to-treat analysis
  - Negligible loss to follow-up
- Although trial was stopped early, it was done so at a pre-determined interim analysis

### Limitations

- Use of surrogate primary outcome, procedural complications are likely clinically more important to measure
- Excluded patients with “immediate need for intubation” which lead to 225 patients excluded
- 134 patients not enrolled due to provider judgement or preference for certain intubating method
  - Unblinded outcome assessments

### Context

Previous studies have tried to determine which laryngoscopy measure is superior to varying effects. Silverberg et al. [1] showed similar results to this study, Janz et al. [2] found improved glottic visualization with video laryngoscopy but no difference in first-pass success or complications in the ICU setting, and Trimmel et al. [3] found worse first-pass success with video laryngoscopy in the prehospital setting. Future research could aim to power their study to assess for clinically important outcomes rather than first-pass success.

Dr. Andy Pan, emergency and critical care physician, concludes that this study continues to support the use of VL devices for intubation, especially by providers with less

experience. Of note, the study was not set out to look at blade geometry, and the majority of patients in the VL group had intubation with a normal angulation blade geometry. One of the biggest advantages for a VL device in the context of an inexperienced operator is the ability to provide real-time feedback to help optimize first-pass success. This is challenging with a DL device. His clinical practice is to always use VL first (typically with a hyperangulated blade), but have DL readily available as backup.

### Bottom line

Video laryngoscopy should likely be used as the preferred intubating method, especially for less experienced operators. However, this study did not show any benefit in rates of complications between laryngoscopy methods, and increased video laryngoscopy use may risk downstream effects on skill attrition for direct laryngoscopy. The primary outcome in this study was a process measure and not necessarily patient oriented.

### Declarations

**Conflict of interest** The authors do not have any conflicts of interest to declare.

### References

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