

UAMS Journal Club Summary  
February 2021  
Brach Williams MD, Ben Wagner MD  
Faculty Advisors: Carly Eastin MD

## **Efficacy of Video Laryngoscopy vs Direct Laryngoscopy in Infants and Pediatric Patients**

### **Clinical Bottom Line**

Video laryngoscopy has higher first pass intubation success rates as well as lower serious complications rates when compared to direct laryngoscopy in infants and pediatric patients. These studies included children in the operating room receiving elective surgery and therefore generalizability to the Emergency Department patient population may be limited. Overall, the addition of video laryngoscopy to the pediatric airway algorithm in the Emergency Department is almost certainly of benefit.

Further studies specifically in the Emergency Department will be helpful in elucidating exactly which patient populations will benefit from video laryngoscopy the most.

### **PICO Question**

P-Pediatric Emergency Department patients requiring endotracheal intubation  
I- Standard angulation blade Video Laryngoscopy  
C-Direct Laryngoscopy  
O-First pass intubation success, complication rate

### **Background**

Airway management in pediatric patients is a crucial skill for the Emergency Department provider. Standard intubation procedure has historically been with direct laryngoscopy, typically using a miller blade. Video laryngoscopy has become more popular in all patient populations. Previous studies have raised concerns for potentially longer times to intubation with video laryngoscopy in pediatric patients. As the availability of and provider experience with video laryngoscopy increases, the benefits of this technique in pediatric patients need to be further evaluated.

### **Trial 1**

First-attempt success rate of video laryngoscopy in small infants (VISI): a multicentre, randomized controlled trial. Annery G Garcia-Marcinkiewicz, Pete G Kovatsis, Agnes I Hunyady, et al. The Lancet. 2020; 396;1905-1913

**Pubmed link:** <https://pubmed.ncbi.nlm.nih.gov/33308472/>

## **The Basics:**

This study was an international, two-group, parallel, multicenter, randomized controlled clinical trial performed in operating rooms at four children's hospitals in the United States and one in Australia that evaluated video laryngoscopy versus direct laryngoscopy for endotracheal intubation.

## **Inclusion Criteria:**

Inclusion criteria consisted of age <12 months, undergoing a non-cardiac procedure lasting longer than 30 min that required general anesthesia, and orotracheal intubation by an anesthesiology clinician.

## **Exclusion Criteria:**

Exclusion criteria were history of difficult intubation, history of craniofacial abnormalities, or prediction of difficult intubation that was based on physical examination.

## **Primary Outcome:**

The primary outcome was the proportion of patients with successful orotracheal intubation on the first attempt.

## **Secondary Outcomes:**

Secondary outcomes were number of intubation attempts, time to successful orotracheal intubation, proportion of unsuccessful intubations with the randomly assigned device, and proportion of non-severe and severe complications.

## **Results:**

Between 2018 and 2019, a total of 550 infants were included in per-protocol analysis and 552 patients in the modified intention-to-treat analysis. First attempt intubation was successful in 93% of patients in the video laryngoscopy group and 88% of patients in the direct laryngoscopy group (adjusted absolute risk difference in modified intention-to-treat 5.5% [95% CI 0.7–10.3];  $p=0.024$ , per protocol 5.4% [95% CI 0.6-10.2];  $p=0.028$ ). Subgroup analysis showed that infants under 6.5 kg had greater first-attempt success rate when video laryngoscopy was used (NNT 9, CI 5-25). The number of intubation attempts was lower in the video laryngoscopy group (median 1, range 1-3) than in the direct laryngoscopy group (median 1, range 1-5), adjusted rate ratio 0.94 [95% CI 0.88–0.99];  $p=0.027$ ). Time to successful intubation greater than one minute was higher in the video laryngoscopy group, although not statistically significant, when compared to the direct laryngoscopy group (15% vs 10%, absolute risk difference 5.6% [95% CI -0.1-11.3];  $p=0.053$ ). Fewer severe complications (such as hypoxemia defined as <80% pulse oximetry saturation), occurred in the video laryngoscopy versus direct laryngoscopy group (2% vs 5%, absolute risk difference -3.7 [95% CI -6.5 to -0.9];  $p=0.0087$ ).

**Limitations/Bias:**

- The patients enrolled were undergoing elective cases and were healthy, thereby limiting generalizability to the Emergency Department patient population
- The study does not evaluate the performance of video laryngoscopy in patients with abnormal or difficult airways

**Trial 2**

Efficacy and safety of videolaryngoscopy versus direct laryngoscopy in paediatric intubation: A meta-analysis of 27 randomized controlled trials. X. Hu, et al. J. Clin. Anesth. 2020; 66;109968

**Pubmed link:** <https://pubmed.ncbi.nlm.nih.gov/32645564/>

**The Basics:**

This study was a systematic review and meta-analysis that looked at 27 international randomized control trials performed prior to January 2020 and published in English that compared video laryngoscopy with direct laryngoscopy for tracheal intubation in pediatric patients.

**Inclusion Criteria:**

Inclusion criteria for this analysis were studies that were randomized control trials, studies analyzing patients <18 years requiring tracheal intubation, studies comparing video and direct laryngoscopy, and studies that looked at the outcomes of interest.

**Exclusion Criteria:**

Exclusion criteria for this analysis were studies that did not use live patients, studies that included adults, studies without available statistical data, and studies that looked at identical patient populations as a prior study included.

**Outcomes:**

The outcomes measured included time to intubate, first attempt failure, difficulty of intubation, Cormack-Lehane (C-L) laryngeal view grade, intubation difficulty scale (IDS), percentage of glottic opening (POGO) score, optimal external laryngeal manipulation (OLEM), and complications such as hypoxia, airway trauma, and hoarseness.

**Results:**

The 27 included studies analyzed 1312 patients that underwent video laryngoscopy and 1149 patients that were intubated using direct laryngoscopy. Video laryngoscopy was associated with increased time to intubation overall (weighted mean difference 3.4 [95% CI 1.29-5.53]; I<sup>2</sup> 96.4%), but subgroup analysis did not demonstrate this association in infants (weighted mean difference 1.72 [ 95% CI -1.09-4.54]; I<sup>2</sup> 72.5%). There was no significant difference between the

two groups regarding intubation failure at first attempt (relative risk 1.34 [95% CI 0.68-2.62], I<sup>2</sup> 57.3%), C-L laryngeal grade view (relative risk 1.02 [95% CI 0.86-1.21], I<sup>2</sup> 87.4%), POGO score (weighted mean difference 11.81 [95% CI 4.31-19.32], I<sup>2</sup> 79.6%), IDS (weighted mean difference -0.24 [95% CI -1.08-0.59], I<sup>2</sup> 89.0%), OLEM ((relative risk 0.36 [95% CI 0.15-0.86], I<sup>2</sup> 79.6%) While there were fewer traumatic and hypoxic events while intubating using video laryngoscopy compared to direct laryngoscopy, no statistical significance was observed when analyzing hoarseness (relative risk 1.35 [95% CI 0.77-2.36]; I<sup>2</sup> 0.0%) and oxygen desaturation (relative risk 0.43 [95% CI 0.77-2.36], I<sup>2</sup> 0.0%).

### **Limitations/Bias:**

-A profound amount of heterogeneity was observed among all studies included in this meta-analysis, and as such it is difficult to draw conclusions from the results due to differences in study designs, quality of included studies, and patient characteristics.

-Publication bias is present due to the nature of the included studies being published.

-As analyses were collected and summarized using pooled and not individual data, it does not take into account factors such as which type of video laryngoscopy blade was used. Larger RCTs will be necessary to account for the variability in laryngoscope blades.