



TITLE: Video Laryngoscopy in the Pre-Hospital or Emergency Department Setting: Clinical Effectiveness and Cost-Effectiveness

DATE: 08 December 2015

RESEARCH QUESTIONS

1. What is the comparative clinical effectiveness of video laryngoscopy versus traditional airway intubation in the pre-hospital or emergency department setting?
2. What is the cost-effectiveness of video laryngoscopy versus traditional airway intubation?

KEY FINDINGS

Two systematic reviews, two randomized controlled trials, and 15 non-randomized studies were identified regarding the comparative clinical effectiveness of video laryngoscopy versus traditional airway intubation in the pre-hospital or emergency department setting.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, ECRI Institute, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit retrieval by study type for a search that included the emergency concept. For a second search that did not include the emergency concept, a methodological filter was used limit retrieval to health technology assessments, systematic reviews and meta-analyses. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2010 and November 23, 2015. Internet links were provided where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

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SELECTION CRITERIA

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Population	Adults in pre-hospital settings or emergency departments who require intubation
Intervention	Video laryngoscope (of interest: McGrath)
Comparator	Standard of care (traditional airway intubation with lighted laryngoscope) Other video laryngoscopes
Outcomes	Clinical effectiveness (e.g., rate of successful intubations, incidence of traumatic airway injuries, time required to intubate); Cost-effectiveness
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations

RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and economic evaluations.

Two systematic reviews, two randomized controlled trials, and 15 non-randomized studies were identified regarding the comparative clinical effectiveness of video laryngoscopy versus traditional airway intubation in the pre-hospital or emergency department setting. No relevant health technology assessments or economic evaluations were identified.

Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

One systematic review¹ compared Macintosh laryngoscopy with other intubation techniques for patients with cervical spine immobilization. The risk of intubation failure was lower with the other intubation techniques (Airtraq, Airwayscope, C-Mac, Glidescope, McGrath) than with Macintosh. Other than Airtraq, there were no significant differences in intubation failure or time to intubation when compared to traditional laryngoscopy.¹ In a second systematic review,² video and traditional laryngoscopy were compared for use in emergency conditions. Video laryngoscope did not result in high rates of successful intubation. In addition, glottic view and time to intubation were not significantly different between devices.²

Two randomized controlled trials³⁻⁴ and 15 non-randomized studies⁵⁻¹⁹ were identified. The results of these studies are summarized in Table 1. Most of the included studies found intubation with video laryngoscopy to be either similar or superior to direct laryngoscopy. No relevant economic evaluations were identified.

Table 1: Summary of Findings

Author, Year, Setting	Interventions	Results and Conclusions
<i>Randomized Controlled Trials</i>		
Arslan (2015) ³	Face-to-face approach with: <ul style="list-style-type: none"> • Airtraq • GVL • Fastrach 	Intubation success rates were similar between groups. Intubation time was significantly shorter in the Airtraq group.
Yeatts (2013) ⁴ Trauma unit	Direct laryngoscope GVL	No significant difference in mortality between groups. Median intubation time (in seconds) was significantly greater in the GVL group.
<i>Non-Randomized Studies</i>		
Boehringer (2015) ⁵ Helicopter transport	CMAC	Use of CMAC resulted in improved overall intubation success, first pass success, and decrease in mean number of intubation attempts.
Choi (2015) ⁶ ED	CMAC GVL	Overall first attempt success and failure rates were not significantly different between groups.
Hossfeld (2015) ⁷ Helicopter EMS	Direct laryngoscopy CMAC	An airway was successfully secured in 100% of cases. For patients with a glottic view rated as Cormack and Lehane grade II to IV with direct laryngoscopy, visualization was significantly improved by using CMAC.
Michailidou (2015) ⁸ Trauma centre	Direct laryngoscopy Video laryngoscopy	Overall success rate was greater in the video laryngoscope group. Direct laryngoscopy was associated with higher risk of intubation failure.
Park (2015) ⁹ Out-of-hospital	Direct laryngoscopy GVL	When used by novice emergency physicians during CPR for out-of-hospital cardiac arrest, first attempt success rate was significantly greater in the GVL group.
Sakles (2015) ¹⁰ ED	Direct laryngoscopy CMAC	After a failed first attempt at intubation, CMAC resulted in a greater number of successful intubations than direct laryngoscopy.
Burnett (2014) ¹¹ Pre-hospital setting	CMAC King Vision video laryngoscope	CMAC resulted in significantly greater overall success, and success by attempt, when compared to King Vision. The type, and frequency, of complications were similar between groups.
Sakles (2014) ¹² ED	Direct laryngoscopy Video laryngoscopy	Video laryngoscopy was associated with higher odds of first pass success for patients with difficult airway characteristics ranging from zero to three or more.

Table 1: Summary of Findings

Author, Year, Setting	Interventions	Results and Conclusions
Guyette (2013) ¹³ Critical care transport	Direct laryngoscopy CMAC	There was no significant difference between groups in regards to total number of airway attempts or use of rescue airways. Laryngoscopic view was improved in the CMAC group.
Mosier (2013) ¹⁴ ED	GVL CMAC	The type of video laryngoscope used did not result in a significant difference in first-pass or overall successful intubation rates.
Mosier (2012) ¹⁵ ED	Direct laryngoscopy GVL	First attempt success rate was significantly greater in the GVL group and significance was maintained after adjusting for difficult airway predictors.
Sakles (2012) ¹⁶ ED	Direct laryngoscopy CMAC	The use of CMAC resulted in higher rates of successful intubation than the direct laryngoscope. CMAC was also associated with a greater proportion of Cormack-Lehane grade I or II views.
Sakles (2012) ¹⁷ ED	Direct laryngoscopy GVL	First attempt success was significantly higher in the GVL group. Direct laryngoscopy demonstrated significantly higher success when more than one intubation attempt was required. Significantly fewer esophageal intubations were observed in the GVL group.
Brown (2010) ¹⁸ ED	Direct laryngoscopy Video Macintosh Laryngoscope	Good visualization was obtained in significantly more video laryngoscopies than direct laryngoscopies.
Wayne (2010) ¹⁹ Out-of-hospital	Direct laryngoscopy Video laryngoscopy	Average time to intubation was shorter, and the average numbers of attempts were significantly fewer, in the video laryngoscopy group.

CMAC = C-MAC video laryngoscope; ED = emergency department; EMS = emergency medical services; GVL = GlideScope video laryngoscope; MAC = Macintosh laryngoscope.

REFERENCES SUMMARIZED

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

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Randomized Controlled Trials

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Non-Randomized Studies

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Economic Evaluations

No literature identified.

PREPARED BY:

Canadian Agency for Drugs and Technologies in Health

Tel: 1-866-898-8439

www.cadth.ca

APPENDIX – FURTHER INFORMATION:**Randomized Controlled Trials – Simulation Studies**

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