



CORRESPONDENCE

Recent trends in airway management: we are not ready to give up fiberoptic endoscopy [v1; ref status: indexed, <http://f1000r.es/35y>]

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v1 First published: 16 May 2014, 3:114 (doi: [10.12688/f1000research.3829.1](https://doi.org/10.12688/f1000research.3829.1))
 Latest published: 16 May 2014, 3:114 (doi: [10.12688/f1000research.3829.1](https://doi.org/10.12688/f1000research.3829.1))

Abstract

The purpose of this correspondence is to discuss recent findings related to current trends in airway management and to discuss the utilization rates of video laryngoscopes *versus* traditional techniques in USA, UK, and Canada. To highlight the increased use of video laryngoscopes in difficult airway situations, data on the use of alternative airway devices at our institution collected from 2008 to 2010 are presented alongside the results of previously published surveys collected from 2002 to 2013.

Article Status Summary

Referee Responses

Referees	1	2	3
v1 published 16 May 2014	<input checked="" type="checkbox"/> report	<input checked="" type="checkbox"/> report	<input checked="" type="checkbox"/> report

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- 2 **Suzanne Karan**, University of Rochester Medical Center USA
- 3 **Ronald Pearl**, Stanford University Medical Center USA

Latest Comments

No Comments Yet

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How to cite this article: Cattano D, Chaudhry R, Callender R *et al*. **Recent trends in airway management: we are not ready to give up fiberoptic endoscopy [v1; ref status: indexed, <http://f1000r.es/35y>]** *F1000Research* 2014, 3:114 (doi: [10.12688/f1000research.3829.1](https://doi.org/10.12688/f1000research.3829.1))

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Grant information: The study was sponsored by an educational grant from the Foundation for Anesthesia Education and Research (FAER). Davide Cattano has received grant support from Karl Storz Endoskope Inc. Dr Carin A. Hagberg has received grant support from AMBU, Covidien, and Karl Storz Endoskope Inc.

The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing interests: Davide Cattano has received grant support from Karl Storz Endoskope Inc. Dr Cattano serves on the speaker bureau for Cadence and is a paid consultant for Smiths Medical. Dr Carin A. Hagberg has received grant support from AMBU, Covidien, and Karl Storz Endoskope Inc. She serves on the speaker bureau for Covidien, LMA North America, and Ambu A/S.

First published: 16 May 2014, 3:114 (doi: [10.12688/f1000research.3829.1](https://doi.org/10.12688/f1000research.3829.1))

First indexed: 11 Jul 2014, 3:114 (doi: [10.12688/f1000research.3829.1](https://doi.org/10.12688/f1000research.3829.1))

Correspondence

Education and research in anesthesia have increasingly focused on the management of difficult airways, leading to the development of new devices that are gradually becoming available and part of routine use across the globe. It is rather interesting to assess whether we have made much progress in using such devices over the past decade.

We read with great interest the letter ‘Should we really consider to lay down the Macintosh laryngoscope?’¹, in which Merli G. *et al.* discuss the present and future roles of video laryngoscopes and the continued value of older instruments, *i.e.* the Macintosh direct laryngoscope. We agree with the authors that over the past two decades, a large number of airway devices have been introduced into clinical practice.

Data from the early 2000s suggest that, despite the widespread availability of newer airway equipment, traditional techniques (direct laryngoscopy, laryngeal mask airway (LMA), and flexible fiberoptic endoscopy) were the preferred techniques for intubation (Table 1). Ezri *et al.*² reported in 2003 that US attending anesthesiologists preferably used flexible fiberoptic endoscopy (75%) for difficult airway management and preferred LMA (81%) in failed intubation/ventilation scenarios. Similarly, in 2004, fiberoptic endoscopy (64%) and some form of blind technique (26%) were used by anesthesiologists in the UK⁴. In 2005, practitioners in Canada preferred fiberoptic endoscopy (34%) and direct laryngoscopy (48%)⁵. In most surveys, lack of availability and training with newer equipment was of concern²⁻⁵.

Table 1. Outcomes of surveys completed regarding the preference of alternative airway management devices by geographical area and year completed.

Geographical area of survey	Year	Alternative device outcomes
Canada ³	2002	Fiberoptic (34%) and direct laryngoscopy (48%)
USA ²	2003	Fiberoptic (75%) for difficult airway management LMA (81%) in failed intubation/ventilation scenarios
UK, Oxford Region ⁴	2004	Fiberoptic (64%) and blind technique (26%)
Canada ⁶	2013	Video laryngoscope (90%)

We analyzed the utilization rates of alternative airway devices using data collected between 2008 and 2010 at our institution, the University of Texas Medical School at Houston, Memorial Hermann Hospital – Texas Medical Center (Table 2).

The most commonly used alternative airway devices were oral fiberoptic intubation (OFOI), (n=318, usage rate=3.69%, first attempt success rate=92.5%), the Glidescope® video laryngoscopy system (Verathon Inc, USA), (n=223, usage rate=2.59%, first attempt success rate=95.5%), the Storz C-MAC® video laryngoscopy system (Karl Storz, Germany), (n=154, usage rate=1.79%, first attempt

Table 2. Alternative airway device usage rates and first attempt success rates at our institution, Memorial Hermann Hospital – Texas Medical Center at Houston, TX, USA: n, number of responders that prefer the use of a particular device for the majority of cases; usage rate, the percentage of responders that prefer the use of a particular device for the majority of cases; first attempt success rate, number of cases in which successful intubation was achieved in the first attempt.

Alternative airway device	(n)	Usage rate	First attempt success rate
Oral Fiberoptic (OFOI)	318	3.69%	92.5%
Glidescope® video laryngoscope (Verathon Inc, USA)	223	2.59%	95.5%
Storz C-MAC® video laryngoscope (Karl Storz, Germany)	154	1.79%	94.8%
Aintree intubation catheter (Cook Critical Care, USA)	106	1.23%	96.2%
Bougie	92	1.07%	85.9%
Nasal fiberoptic (NFOI)	92	1.07%	85.9%

success rate=94.8%), the Aintree Intubation Catheter (Cook Critical Care, USA), (n=106, usage rate=1.23%, first attempt success rate=96.2%), bougie (n=92, usage rate=1.07%, first attempt success rate=95.7%) and nasal fiberoptic intubation (NFOI), (n=92, usage rate=1.07%, first attempt success rate=85.9%). Among these devices, OFOI and NFOI most likely required multiple intubation attempts, while the other devices had relatively high rates of success on the first intubation attempt.

When comparing our results with those obtained by Ezri *et al.*², the most striking difference is the increased use of video laryngoscopes. Ezri *et al.*, reported fiberoptic intubation and the LMA as the most popular in management of the difficult airway; no data was reported on the utilization rates of video laryngoscopes. The results of a similar survey completed by Canadian Anesthesiologists were recently presented at the Society of Airway Management Meeting 2013, where Mehta *et al.*⁶ showed that the preferred alternative airway technique in difficult intubation situations was video laryngoscope. In a 2005 survey⁵ the same authors found that the preferred devices were lighted stylet, bronchoscope, and intubating laryngeal mask airway (Table 1).

There has been a rapid acceptance of video laryngoscopy as an important technique in the management of difficult airway situations. It is our opinion though, that while video laryngoscopy is preferred for ease of use and a faster learning curve, the technique of flexible fiberoptic endoscopy offers invaluable advantages: nasal and oral intubation, double lumen tube or bronchial blocker placement for thoracic surgery, therapeutic bronchoscopy, and it is preferred for awake technique intubation. The device versatility also makes it economical not to mention the greater value of education and training of future anesthesiologists.

Author contributions

DC, PVK, and CAH initiated the study. RC and PVK performed the analysis. RC and RAC wrote the abstract and main body of the article. DC supervised the process. All authors critically edited the correspondence and agreed to the final content.

Competing interests

Davide Cattano has received grant support from Karl Storz Endoskope Inc. Dr Cattano serves on the speaker bureau for Cadence and is a paid consultant for Smiths Medical. Dr Carin A. Hagberg has received grant support from AMBU, Covidien, and

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The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Supplementary materials

Pre-operative assessment form and post-operative evaluation used in the survey on alternative airway devices at the Memorial Hermann Hospital – Texas Medical Center at Houston, TX, USA.

[Pre-operative Airway Assessment Form pdf file.](#)

[Post-operative Evaluation pdf file.](#)

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[Publisher Full Text](#)

Current Referee Status:

Referee Responses for Version 1



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Approved: 16 July 2014

Referee Report: 16 July 2014

doi:[10.5256/f1000research.4102.r5326](https://doi.org/10.5256/f1000research.4102.r5326)

This report from one of the leading institutions in airway management confirms the rapid growth in the use of alternative airway devices, especially video laryngoscopes, but emphasizes that, on one hand, the majority of patients are still intubated using direct laryngoscopy, and, on the other hand, there remains an important role for fiberoptic intubation. The report documents a large number of available alternative airway devices but does not address the issues of how many different devices are required for the potential range of airway issues and how many devices can the standard practitioner be trained to use and maintain competency in their use.

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Competing Interests: No competing interests were disclosed.



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Approved: 11 July 2014

Referee Report: 11 July 2014

doi:[10.5256/f1000research.4102.r5327](https://doi.org/10.5256/f1000research.4102.r5327)

This article represents a growing body of research which will hopefully inform the appropriate education and training of our residents. The authors present data regarding the reported use of a variety of devices to manage the difficult airway. The venue of using *F1000Research* to quickly and more widely disseminate this information is highly valuable. The granularity of knowing user rate and first attempt success rate for these devices is a constructive addition that should be incorporated in future surveys to allow for comparison. With more data, it will be interesting to note whether the lower first attempt success for FOI (nasal or oral) stays the same or even drops compared with video laryngoscopy as the latter becomes more prevalently used and taught. The authors are commended in adding their research findings and their thoughtful opinions for review.

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Competing Interests: No competing interests were disclosed.



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Approved: 30 May 2014

Referee Report: 30 May 2014

doi:[10.5256/f1000research.4102.r4807](https://doi.org/10.5256/f1000research.4102.r4807)

Excellent and insightful information about approaches to intubation

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Competing Interests: No competing interests were disclosed.
