

RESPIRATION AND THE AIRWAY

A national survey of videolaryngoscopy in the United Kingdom

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Abstract

Background. There are increasing numbers of videolaryngoscopes marketed and increasing interest in the technology. The Difficult Airway Society's 2015 guidelines recommend that videolaryngoscopes should be immediately available at all times and that all anaesthetists should be trained and skilled in their use.

Methods. An electronic survey was sent to all UK National Health Service hospitals to examine availability, use, and attitudes to videolaryngoscopy, and closed in January 2014.

Results. The return rate was 67%. Videolaryngoscopy was available in 91% of operating theatres, ~50% of intensive care units (ICUs) and obstetric theatres, with lower availability in emergency departments (EDs), paediatric anaesthesia, and independent sector hospitals. The most widely available devices were the Airtraq, the GlideScope, and C-MAC. Approximately one in seven respondents reported availability of videolaryngoscopy in all clinical areas. Most departments imposed restrictions on videolaryngoscopy use, especially the ICU and ED. Device selection was only infrequently based on published literature or formal trial. Structured introduction of videolaryngoscopy into practice was uncommon. Penetration of videolaryngoscopy was highly variable; fewer than a third reported widespread use or enthusiasm, although this increased where the C-MAC and GlideScope were widely available.

Conclusions. Videolaryngoscopy is available in most hospitals' main operating departments, but in fewer than half of other locations. There is marked variation in device, methods of introduction, usage, and clinical adoption. Most hospitals need to change practice to comply with current guidelines. Selection and implementation vary widely.

Key words: airway; anaesthesia; equipment; training; videolaryngoscopy

Videolaryngoscopy is an expanding technology, which has led to numerous publications in the last few years. There are increasing numbers and distinct designs of videolaryngoscopes marketed. Their use has been advocated for both difficult airway management and routine intubation in a number of settings, including critical care units, obstetric units, and in the emergency department (ED).^{1–3} Publications report numerous albeit variable benefits, but it is not known to what degree this new technology has penetrated into routine practice or the distribution of devices in use. Understanding what technology is being adopted and how it is being used is potentially useful in

understanding the evolution of practice, facilitators, and barriers to further development, and has practical value to the authors of guidelines and those involved in training and curriculum setting. For this reason, we undertook a survey designed to capture national data on videolaryngoscope availability, introduction into practice, and patterns of use in the UK. Of note, more recently, the Difficult Airway Society (DAS) Difficult Intubation Guidelines 2015 have recommended that videolaryngoscopy is taught to all anaesthetists and immediately available wherever intubation is performed.⁴ We used a wide definition of videolaryngoscope, including the Airtraq, C-Trach,

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Editor's key points

- Videolaryngoscopes are useful in patients with difficult airways, but it is not known whether or not a device is available in the operating rooms and outside the operating rooms.
- Videolaryngoscopes are available in most hospitals' main operating departments, but in fewer than half of other locations.

and optical stylets in the devices survey. The survey was part of a larger survey that also examined provision in airway training, which has been published separately.⁵

Methods

A survey was designed by the authors and discussed with our local Research and Development department, who confirmed that it did not meet current National Health Service (NHS) definitions of research and that formal approval by an Ethics Committee was not required.

Questions relevant to the availability, use, and introduction of videolaryngoscopy are shown in Supplementary Appendix 1.

The survey was conducted in conjunction with the Health Service Research Centre (HSRC) of the National Institute of Academic Anaesthesia at the Royal College of Anaesthetists, who used their own database to identify all UK NHS anaesthetic departments and Departmental Airway Leads. The survey was not formally piloted but was reviewed by the HSRC executive board before being distributed. The survey was distributed by email (one to each department), requesting completion on-line. The email was first sent to Departmental Airway Leads and then if no response was received, serially to the anaesthetic departmental Quality Audit and Research Coordinator and then the department Clinical Director. In this way, multiple attempts were made to elicit a single response from each hospital or group of hospitals (Trust or Board—the terms for a group of hospitals in England/Wales/Northern Ireland and Scotland, respectively). The survey was conducted during 2013 and closed in January 2014. Responses were collected independently by the HSRC staff, manually checked to ensure that only one response per anaesthetic department was counted, and responses then de-identified.

We are not aware of an agreed definition of 'videolaryngoscope' and we therefore pragmatically included all such rigid intubation devices that use digital or optical imaging with the intent of facilitating tracheal intubation. The videolaryngoscopes included specifically in the survey were as follows:

- Airtraq (Prodol Meditec, Guecho, Spain)
- AP Venner (Venner Medical GmbH, Dänischenhagen, Germany)
- Bonfils (Karl Storz, Slough, UK)
- Bullard (Circon, ACMI, Stamford, CT, USA)
- C-MAC (Karl Storz, Slough, UK)
- C-MAC D-blade (Karl Storz, Slough, UK)
- Coopdech (Daiken Medical, Osaka, Japan)
- C-Trach (previously, Laryngeal mask company, Henley-on-Thames, UK)
- GlideScope (Verathon UK, Amersham, UK)
- King Vision VL (Ambu, St Ives, UK)

- Levitan FPS (Clarus Medical, Minneapolis, MN, USA)
- McGrath 5 (Aircraft Medical, Edinburgh, UK)
- McGrath Mac (Aircraft Medical, Edinburgh, UK)
- Pentax AWS (Pentax, Tokyo, Japan)
- Shikani intubating stylet (Clarus Medical, Minneapolis, MN, USA)
- Upsherscope (Mercury Medical, Clearwater, FL, USA)
- Wuscope (Pentax Precision instruments, Orangeburg, NY, USA)

Respondents were also given the option to report use of other videolaryngoscopes.

Data were entered in a Microsoft Excel 2010 (Microsoft Corp., Redmond, WA, USA) spreadsheet and frequencies are reported.

Results

Surveys were distributed to 335 hospitals. In total 184 forms were returned, and after removing blanks and duplicates there were 164 completed forms, with many respondents responding for a Trust or Board. Responses were received from 96 Trusts/Boards and 68 hospitals (covering 223 hospitals; 67% response rate), although it is likely that some hospitals surveyed that did not respond do not undertake surgery. Results are presented as the percentage of respondents for each question, and where hospitals indicated that a service was not provided at their hospital these data were removed from analysis; for example, when asking questions about use, restrictions, and attitudes to videolaryngoscopy in operating theatres, responses were considered only from those departments that reported availability of videolaryngoscopes in the operating theatres.

Responses were received from hospitals in all training regions of the UK. Of the 164 responding departments, 146 (89%) had an airway lead. Of the 164 forms, 160 (98%) were returned by consultants, three by associate specialists (1.8%), and one by a senior specialist registrar (0.6%). The distribution of hospitals or hospital groups was as follows: teaching hospital 46/164 (26%), district general hospital (DGH) with teaching hospital affiliation 79/164 (44%), DGH 28/164 (16%), specialist paediatric hospital 5/164 (3%), and other specialist hospital 6/164 (3%).

Availability of videolaryngoscopy

One hundred and fifty-one (92%) respondents reported availability of a videolaryngoscope in at least one clinical area (two reporting availability in the intensive care unit (ICU) only, one in the ED only, and 149 in main theatres with or without other areas; Fig. 1). In NHS hospitals, of 149 respondents with all services, 20 (13%) had videolaryngoscopy at all locations, 27 (18%) at four of five, 203 (15%) at three, 37 (25%) at two, 32 (21%) at one, and 10 (7%) at no location. All specialist paediatric hospitals had a videolaryngoscope. Availability in main theatres by hospital type varied little [teaching hospital 43/46 (93%), DGH 26/28 (93%), DGH with teaching hospital affiliation teaching hospital 71/79 (90%), and specialist hospital 9/11 (82%)]. Of the 20 hospitals reporting availability of videolaryngoscopy in all five locations, 15 reported availability of an Airtraq in all locations, three a GlideScope, one a C-MAC (both standard and D blades), and one an AP Venner.

In main theatres, 50% of respondents reported availability of more than one type of videolaryngoscope (mode 1, median 1.5, range 0–6), and in other locations, as follows; obstetrics 15%, paediatric anaesthesia 6%, intensive care 15%, ED 9%, and independent sector hospital 3%.

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