



HEALTH TECHNOLOGY WALES (HTW) GUIDANCE 037 (April 2022)

Video laryngoscopes for people who require airway management in pre-hospital settings

HTW Guidance:

The routine adoption of video laryngoscopy for people who require intubation in a pre-hospital setting is not supported by the evidence.

The use of video laryngoscopy does not improve overall intubation success rates and there is no evidence to suggest improved clinical outcomes as compared with direct laryngoscopy. Economic analysis estimates that the routine adoption of video laryngoscopy in a pre-hospital setting would be cost incurring and not cost effective.

This recommendation does not preclude the continued use of video laryngoscopy by experts in the pre-hospital setting for patients with difficult airways in services where devices are already available.

Why did Health Technology Wales (HTW) appraise this topic?

Emergency services are required to respond to situations where patients are having difficulty breathing and airway management in the pre-hospital setting is needed. These are usually situations when there has been either major trauma or cardiac arrest. In some cases, airway management can be safely accomplished using basic airway techniques, such as the use of a supra-glottic airway, that may provide temporary provision of oxygenation and ventilation. However, in more severe cases, for example following major trauma, the introduction of a breathing tube into the trachea (pre-hospital intubation) is required to ensure that the patient can be safely transferred to hospital. When intubation is needed, it is acknowledged that ensuring that this is successfully achieved without complications and at the earliest opportunity is a high clinical priority.

During intubation, visualisation of the upper airway (larynx) to allow passage of the tracheal tube is achieved using laryngoscopy. This is usually done using a rigid tool that shines a light into the larynx to provide direct sight of the vocal cords (direct laryngoscopy). However, this can also be achieved using a more flexible device that has a camera incorporated (video laryngoscopy), which relays real-time images onto a display screen. It has been suggested the use of video laryngoscopy in a pre-hospital setting may be associated with higher rates of intubation success and improved patient care.

HTW considered this topic after it was proposed by the Welsh Ambulance Services NHS Trust.

The status of HTW guidance is that NHS Wales should adopt this guidance or justify why it has not been followed. HTW will evaluate the impact of its guidance.

Evidence Summary

Refer to Evidence Appraisal Report 037 (EAR037) for a full report of the evidence supporting this Guidance.

- The EAR aimed to identify and summarise evidence that addresses the following question: What is the clinical and cost effectiveness of intubation using video laryngoscopy for people who require airway management in pre-hospital settings?
- A systematic review and meta-analysis, that included three randomised controlled trials (RCTs), was identified. In addition, three RCTs that were published after the systematic review were considered. HTW researchers noted that observational studies are also available and suggest that video laryngoscopy may provide benefits and, on this basis, guidelines from the Difficult Airway Society recommend that video laryngoscopy should be considered for use. Nonetheless, HTW researchers concluded that this evidence was associated with a high degree of potential bias and uncertainty and was not of sufficient quality to be included in the EAR, especially given the presence of a number of well-performed RCTs.
- HTW researchers conducted a meta-analysis on outcomes for first-pass intubation success and overall intubation success using data extracted from each of the six RCTs. Due to the high level of data heterogeneity when outcomes from all trials were pooled, HTW researchers also conducted subgroup analyses for studies where the population was predominantly cardiac arrest, or predominantly major trauma.
- The overall evidence suggests that use of video laryngoscopes compared to direct laryngoscopes does not lead to improvements in first-pass intubation success rates or overall intubation success and some studies suggest that the use of video laryngoscopes may lead to worse outcomes than direct laryngoscopes. Evidence is mixed on whether the use of video laryngoscopes improves time to intubation, with several studies suggesting no difference and a single study suggesting that video laryngoscopy may be quicker. In the study where video laryngoscopy does appear to deliver improved intubation time, the difference is minimal and is unlikely to be clinically meaningful considering the time needed to wait for emergency medical service attendance.
- There is some evidence that findings for intubation success may differ according to whether video laryngoscopes are used in cohorts of patients requiring intubation due to out-of-hospital cardiac arrest or cohorts requiring intubation after major trauma, with more promise for video laryngoscopes in the latter group. This finding should be interpreted with caution though since sub-group analyses relied on studies where one population was predominant, but data was subsequently aggregated.
- There is evidence that use of video laryngoscopy leads to an improved view of the glottis during intubation and this may explain qualitative evidence and expert opinion that suggests that professionals have a preference for video laryngoscopes. However, this improved view may be counterbalanced for some devices by a higher potential for technical problems, including fogging of the camera and the need for the specific ambient light. In addition, evidence suggests that an improved view does not necessarily lead to changes in professionals' perceived difficulty of intubation.
- The economic analysis shows that video laryngoscopes are considerably more expensive than direct laryngoscopes. Cost minimisation analysis suggests that the use of video laryngoscopy is not a cost-effective intervention. Since pre-hospital airway management in Wales is undertaken in the context of major trauma predominantly by the Emergency Medical Retrieval and Transport Services (EMRTS) but usually by paramedics for out-of-hospital cardiac arrest, a budget impact modelling scenario was undertaken to explore the differential

cost impact of using video laryngoscopy by these different pre-hospital services. The results showed that even when considering the use of video laryngoscopy only by the EMRTS, the technology remains more expensive than conventional direct laryngoscopy, but the additional expense would be less than for routine adoption across all components of pre-hospital airway management service.

- The appropriate mechanism for patient and public input was considered. It was decided that given the nature of major trauma and the necessity of intubation if it is indicated, there would not be value in approaching patient groups for input. Our literature search did not identify any studies on patient issues and patient experience. In line with the view of the PPI standing group, it appears unlikely that this type of evidence would be available.

Appraisal Panel considerations

- The Appraisal Panel were informed by clinical experts that in circumstances of out-of-hospital cardio-respiratory arrest, the use of a supra-glottic airway device is the most commonly used airway management strategy by paramedics in Wales and this reduces the need for intubation. This strategy is usually successful in securing the airway and failure is relatively rare, but can occur, for example if there is vomitus in the mouth. The circumstances when intubation might be considered by a paramedic to avoid the need for escalation to emergency tracheostomy are therefore relatively infrequent.
- The Appraisal Panel were informed by clinical experts that the EMRTS in Wales, which is staffed by senior clinicians with extensive experience of intubation, is usually responsible for managing major trauma patients in a pre-hospital setting and that drug-induced anaesthesia prior to intubation is often undertaken with the accompanying imperative to rapidly secure the airway. The EMRTS in Wales have used video laryngoscopy for several years and currently use the McGrath MAC device. Although the choice of direct or video laryngoscopy is available to EMRTS operators and is based on individual preference, it was reported by the experts that there is a strong preference for video laryngoscopy by those delivering the service and that video laryngoscopy is included in the EMRTS standard operating procedures.
- The Appraisal Panel considered the published evidence presented in the EAR as well as the additional evidence provided verbally and in writing by the clinical experts. They concluded that the evidence does not suggest significant clinical benefits when video laryngoscopy is used routinely in a pre-hospital setting. Furthermore, they noted that the routine provision of video laryngoscopy across emergency pre-hospital services in Wales would require significant financial investment. As a consequence, the Appraisal Panel concluded that video laryngoscopy should not be recommended for routine adoption to support intubation in pre-hospital settings in Wales.
- The Appraisal Panel carefully considered the use of video laryngoscopes by EMRTS in Wales. The Appraisal Panel were informed that this technology is considered, by clinical experts who are highly experienced in intubation, to be particularly valuable to support intubation in the context of difficult airways and in difficult practical circumstances, such as those encountered with major trauma. In these situations, anecdotal evidence suggests that the use of video laryngoscopy may be potentially life-saving and is safe. The Appraisal Panel also noted that investment in this technology by EMRTS has already been made in Wales. Consequently, the Appraisal Panel concluded that while the evidence does not support routine adoption of video laryngoscopy across pre-hospital services in Wales, its continued use by clinical experts in the EMRTS is supported for selected patients and in selected circumstances.

- The Appraisal Panel were informed that the Welsh Ambulance Services NHS Trust (WAST) are currently reviewing the use of pre-hospital intubation by paramedics in Wales. This is in the context of some ambulance services in other parts of the United Kingdom removing intubation from the scope of paramedic practice in their area. The Appraisal Panel noted that the current guidance would therefore be relevant and helpful to WAST with its deliberations about the possible role of video laryngoscopy in the context of pre-hospital airway management.

Responsibilities for consideration of this Guidance

Health Technology Wales (HTW) was established by Ministerial recommendation^{1,2} to support a strategic, national approach to the identification, appraisal and adoption of non-medicine health technologies into health and care settings. The HTW Appraisal Panel comprises senior representation from all Welsh boards with delegated authority to produce guidance 'from NHS Wales, for NHS Wales'. The status of HTW guidance is 'adopt or justify'. There is an expectation from Welsh Government that HTW guidance is implemented with adoption regularly audited by HTW.³

The guidance in this document is intended to assist Welsh care system decision makers to make evidence-informed decisions when determining the place of health technologies and thereby improve the quality of care services.

The content of this HTW guidance was based upon the evidence and factors available at the time of publication. An international evidence base was reviewed and external topic experts and HTW committee members consulted to contextualise available evidence to Wales. Readers are asked to consider the generalisability of the evidence reviewed to NHS Wales and that new trials and technologies may have emerged since first publication and the evidence presented may no longer be current. It is acknowledged that evidence constitutes only one of the sources needed for decision making and planning.

This guidance does not override the individual responsibility of health professionals to make decisions in the exercise of their clinical judgment in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

No part of this guidance may be used without the whole of the guidance being quoted in full. This guidance represents the view of HTW at the date noted. HTW guidance is not routinely updated. It may, however, be considered for review if requested by stakeholders, based upon the availability of new published evidence which is likely to materially change the guidance given.

Standard operating procedures outlining HTW's evidence review methods and framework for producing its guidance are available from the HTW website.

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Declarations of interest were sought from all reviewers. All contributions from reviewers were considered by HTW's Assessment Group. However, reviewers had no role in authorship or editorial control and the views expressed are those of Health Technology Wales.

Chair, Health Technology Wales Appraisal Panel

1. National Assembly for Wales, Health and Social Care Committee. Access to medical technologies in Wales. December 2014.
2. Response to Recommendations from the Health & Social Care Committee: Inquiry into Access to Medical Technologies in Wales. February 2015.
3. Gething, V. Letter to all Health Board Chairs re Funding for Sacral Nerve Stimulation in Wales. VG_01655_17. September 2017.



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