Case Report

C-Mac Videolaryngoscope: A Patient Safety Device and Teaching Tool?

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Introduction

The fundamental responsibility of the anesthesiologists in the teaching hospitals is to teach direct laryngoscopy and intubation a new resident or a novice student. The instructor and the trainee cannot share patient's direct laryngoscopic view while intubating with traditional Macintosh laryngoscopes without great effort and questionable reliability. This is significant source of anxiety for the attending anesthesiologist while teaching direct laryngoscopy and intubation to a trainee. The traditional relationship between attending anesthesiologist and a novice student while performing laryngoscopy and intubation involves blinded verbal feedback to the trainee and/or the instructor "looking over the shoulder" to share the view of the airway [1].

The leading and most dreadful cause of morbidity and mortality in Anesthesiology is difficulty during airway management and inability to intubate. In an attempt to improve the quality of trainee education and patient safety, airway educators have developed methods to share and expand the view of the airway. Videolaryngoscopes appear to have considerable promise in airway management and also as a teaching tool [2]. Education using a video system mounted into a traditional Macintosh blade improves intubation skills in medical students when videolaryngoscopes are used for training [2]. The downside of these systems as described is that the video laryngoscope is still being used as a video laryngoscope, and this approach does not replicate the action of traditional direct laryngoscopy without video assistance. We describe a case involving the intubation of a patient by a trainee with no intubating experience using C-Mac for direct laryngoscopy with video supervision by the attending anesthesiologist.

Case Information

An 86-year-old female patient with a history of multiple diagnoses including hypertension, coronary artery disease status post percutaneous transluminal coronary angioplasty (PTCA), atrial fibrillation, dyslipidemia and stroke presenting with dysphagia and malnutrition arrived for percutaneous endoscopic gastrostomy (PEG). ASA standard monitors were utilized. The patient was pre-oxygenated for 5 minutes per routine and general anesthetic induction was achieved with propofol (1.5mg/kg) and succinylcholine (1.2 mg/kg). Lidocaine, fentanyl and midazolam were avoided given the patient's desire not to have potential long term intubation and her code status. The patient was electively and gently intubated by a novice anesthesia resident who had never performed an intubation. A C-Mac blade was used for direct laryngoscopy and intubation with the attending anesthesiologist monitoring it on a video, with the monitor out of view of the student. The patient was intubated with a 7.0 mm endotracheal tube at 22 cm on first attempt without a change in oxygen saturation (100%). Tube position was confirmed by end tidal CO2 monitor and auscultation. During laryngoscopy, feedback by the attending anesthesiologist suggesting airway manipulation to get a better glottic view was achieved. Proper tube depth was confirmed with placement by the attending anesthesiologist.

Discussion

The C-Mac videolaryngoscope contains a small camera and a light source at the distal third of the blade. The blade is connected to a portable TFT screen (7¢¢) unit. Different sizes of Macintosh shaped blades are available for purchase for the C-Mac. Two different methods of laryngoscopy are possible with the C-Mac. 1) The video feed to the monitor from the

camera or 2) the classic direct view of the glottis using the naked eye. [3] To the authors knowledge approach has only been utilized in the pediatric population. In our case and first view was used by the attending anesthesiologist in order to confirm that the student had a correct view of glottis and done intubation correctly as demonstrated in figure 1.

Figure 1. Layout of anesthesiology team.

Figure 2. C-Mac blade with Macintosh blade, side by side.
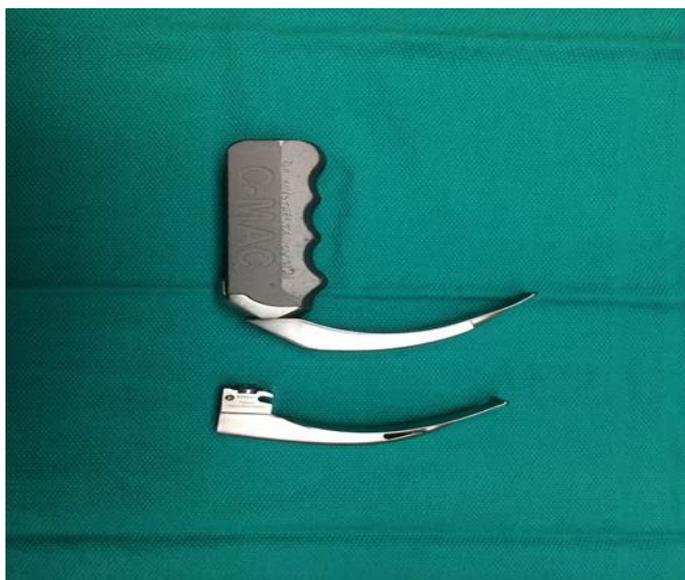
This device not only facilitates visualization of the vocal cords, but also allows an operator assistant/supervisor to follow the intubation process on the monitor, and to help in optimizing the glottic view by external laryngeal manipulations [4]. The C-Mac videolaryngoscope has already been used as a teaching tool for tracheal intubation in children, however pediatric airway anatomy is significantly different than that of adults [1,4,5]. The technique as we describe it is materially different from other comparable adult videolaryngoscopes in that the blade can potentially be used for traditional laryngoscopy without video assistance. The

blade morphology and laryngoscopic technique used for C-Mac facilitated direct laryngoscopy is nearly identical to laryngoscopy performed with a Macintosh laryngoscope. A similar technique would likely not be possible or safe with other videolaryngoscopes. In our opinion, such an approach maximizes patient safety and can serve to minimize supervising anesthesiologist anxiety in the teaching setting. Prospective studies assessing the efficacy of this technique on a wide variety of learners should be conducted to in order to verify these findings.

Acknowledgement

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