EDITORIAL

Videolaryngoscopy: Channelizing through Intensive Care Unit Intubations

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Safe airway management in the intensive care unit (ICU) is a fundamental component and an entity distinct from airway management in the operating room (OR) by anesthesiologists. Tracheal intubation (TI) is the most commonly performed life-saving procedure outside OR. In the OR, a controlled environment, a good physiological reserve of the patients, and performance by a skilled anesthesiologist leads to TI with very low rates of complications. This is in stark contrast to major complications occurring during "outside the OR" TI, which is an emergency life-saving procedure.[1]

In ICU, delay during TI, failure of "first pass success" and multiple attempts at laryngoscopy are important factors associated with increased complications, significantly higher than in the OR. As per the Fourth National Audit Project of the Royal College of Anaesthetists and Difficult Airway Society (NAP4) report, factors such as equipment and resources contributed to the occurrence of these complications almost 36% of the time.[2]

One of the important advancements in equipment for endotracheal intubation has occurred with the advent of videolaryngoscope (VL). They offer an excellent view of the larynx and glottis, without needing manipulation to align the laryngeal axis to the eyesight of the intubator. This has led to the inclusion of VL in difficult airway algorithms of various societies.[3,4] Whether to use VL as the first response in all intubations remains debated. Lewis et al., in the Cochrane systematic review in 2017, observed that compared to direct laryngoscope (DL), VL may have fewer failed attempts in an anticipated difficult airway by a skilled anesthesiologist in the OR.[5] This advantage of VL could not be replicated during "outside OR" setting, that is, in the prehospital setting, emergency department, and ICU. Outside OR, improved glottic vision provided by VL did not uniformly translate into a successful first pass intubation in emergency and ICU. In fact, there were more intubation failures in prehospital settings in the hands of experienced professionals.[6] One of the reasons might be, a good successful laryngeal view may increase the possibility of task fixation (repeated unsuccessful attempts of intubation). As for any new instrument, there is a learning curve with VL. A recent Cochrane Review by Hansel et al. gives a till date good summative evidence of the benefits of VL in different settings. It is clear from the review that the use of VL has increased over the last few years and all three designs of VL (channeled, unchanneled, and hyperangulated) are likely to reduce the rate of failed intubation with increased first-pass success rates and improved laryngeal view.[7]

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There is a wide variety of VL available for use. Broadly they can have either Macintosh-shaped or Anatomically (hyperangulated) shaped blades which can be further categorized based on the presence or absence of a tube guide or channel. Channeled-blade VL has provision for preloading of endotracheal tube and mitigates the need for additional adjuvants such as a stylet, bougie which may help in reducing intubation time.

In this journal issue, Dharanindra et al. have compared ICU intubation performance and outcomes of hyperangulated channeled King vision videolaryngoscope (KVVL) in ICU with Macintosh direct laryngoscope (MDL).[8] In this prospective randomized comparative study, the primary endpoint was the glottic view measured by Cormack–Lehane (CL) grading. Baseline characteristics including predictors of difficult airways were fairly matched in both groups. Not surprisingly, all patients in the KVVL group had CL grade I or IIa in contrast to 77.2% in MDL. Second, first-pass success of intubation was significantly higher in the KVVL group compared with the MDL group (96% vs 81.4%). Importantly, the time required to intubate was significantly lower (28.77 ± 2.63 vs 38.84 ± 2.72) in the KVVL group compared with the MDL group.

The study has mentioned some limitations. However, a few more things need to be considered. First, in this study, Dharanindra et al. used CL grading as the primary endpoint. It would be more practical to have a clinical endpoint such as the first-pass success of intubation or the number of failed intubations as the primary

outcome. While it is intuitive that getting a good glottic view should increase the chances of intubation, studies have shown otherwise. Superior glottic view in emergency and critical patients provided by VL compared to DL does not translate into a higher success rate of intubation.[6] Second, the choice of channeled KVVL has its own disadvantages. A comparative study of KVVL vs DL showed improved glottis view compared to DL but had a longer average time to glottic view, longer time to intubation, and the same first pass success rates albeit in hands of an experienced anesthesiologist in the OR.[9] The reason cited for the longer average time to glottic view and hence to intubation was the presence of a large cross-sectional area of the channeled blade, which makes getting a glottic view difficult especially in difficult intubation and limited mouth opening. The preloaded tube in the channeled scope took a long time for the alignment of the tube with the trachea. This observation was consistent with other studies.[10] These technical aspects of channeled KVVL, might be an important factor for consideration, especially in hands of novice intubators. Third, operator experience certainly has a significant role to play. In the above-mentioned study, almost all the intubations were done by a single, experienced operator. Hence, generalizability to intubations in ICU is difficult. However, according to a recent meta-analysis, novices may have a higher initial success rate and faster intubation time while using channeled VL compared to DL.[11] Finally, the authors of this study have used 5-point auscultation instead of the gold standard End-tidal carbon dioxide ($EtCO_2$) waveform for confirmation of endotracheal intubation due to inadequate availability of $EtCO_2$ sensors. We strongly advise the use of $EtCO_2$ both for measurement of "time required to intubate in research setting" and as the standard of care for ICU intubations in clinical settings. Non-availability of capnography is known to be associated with major airway events.[12]

Conclusion

All VL are not the same. One needs to understand different VL designs, their advantages, disadvantages, and limitations before use. It is good to have at least one type of VL in ICU. As with any new instruments, use of VL has a learning curve. Latest meta-analysis shows increasing popularity of VL over DL, and simultaneous improvements in intubation rates and reduced complications, especially outside OR. The present study adds to current knowledge of VL and excites interest in Channeled-blade video laryngoscopes. Further studies are required to make VL the first scope for all intubations across the board in the future.

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