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CAT Block 9

**Reference:** Lascarrou JB et al. Video Laryngoscopy vs. Direct Laryngoscopy on Successful First-Pass Orotracheal Intubation Among ICU Patients: A Randomized Clinical Trial. JAMA. 2017, 317(5):483-493.

**Question:** In ICU patients requiring intubation, does the use of video laryngoscopy improve the likelihood of first-pass intubation compared with direct laryngoscopy?

**Introduction:** Intubation carries a risk of morbidity and mortality, with the risk being higher in ICU settings than it is in more controlled setting such as the OR. For several decades, intubation via direct laryngoscopy has been common practice. More recently, routine use of video laryngoscopy has been proposed as a means of improving the ease and safety of this procedure.

**Methods:** This study was a non-blinded, 2 parallel-group randomized controlled trial involving 371 total patients. The study was carried out in 7 different ICU's in France between May 2015 and December 2015. ICU patients requiring orotracheal intubation were randomized to either video laryngoscopy or direct laryngoscopy according to a standardized protocol. The primary outcome was proportion of patients in each group with successful first-pass orotracheal intubation (confirmed objectively using waveform end-tidal $CO_2$). This was further broken down by classifying the intubating physicians as "expert" (5+ years ICU experience or 1+ year ICU experience plus 2+ years anesthesiology training) or "non-expert" (all other physicians). Numerous secondary outcomes included overall proportion of successful intubation, total time to successful intubation, grade of view, hypoxemia, ICU and hospital length of stay, ICU and 28-day mortality.

**Results:** For the primary outcome, there was no significant difference between groups in percentage of successful first-pass intubation (67.7% for video laryngoscopy versus 70.3% for direct laryngoscopy). This result held true even after adjusting for operator expertise, however in both groups the majority of first pass attempts were made by non-experts. Non-experts did have a significantly lower first pass success rate (64.6%, n=311) than experts (91.7%, n=60). There were several secondary outcomes showing differences between groups, most notably the rate of severe life-threatening complications (9.5% in video laryngoscopy group versus 2.8% in direct laryngoscopy group, p=0.01). In the video laryngoscopy group, grade 1-2 views were more common than in the direct laryngoscopy group. There were no significant differences between groups when looking at other outcomes such as duration of procedure, ICU length of stay, ICU and 28 day mortality.

**Discussion & Limitations:** There is conflicting literature regarding the success rate and safety of direct laryngoscopy versus video laryngoscopy, which is further complicated by differences in study design, user expertise, routine use of neuromuscular blockade, and model of video laryngoscope. This study found no significant difference between direct and video laryngoscopy in first pass success rate. Interestingly, the most common reason for first pass failure in the direct laryngoscopy group was failure to visualize the glottis, whereas in the video laryngoscopy group first pass failure was most often due to inability to successfully pass the tube after visualizing the glottis. The higher rate of severe complications in the video laryngoscopy group does raise some questions about the routine use of video laryngoscopy, however the absolute number of such complications was quite low (n=17/179 versus 5/179).

**Limitations:** include the use of a single video laryngoscope device (the McGrath Mac Videolaryngoscope), which may give different results than other devices on the market. This study also looks at a setting (ICU) and country (France) that may or may not be translatable to Emergency Departments in the United States. The authors did attempt to control for user expertise by stratifying into

two groups (experts and non-experts), however there may have been further differences in expertise even within these groups.