S-050

COMPARISON OF MACINTOSH LARYNGOSCOPE, VIDEOLARYNGOSCOPE AND 3D-PRINTED VIDEOLARYNGOSCOPE ON MANIKIN IN ACQUISITION OF ENDOTRACHEAL INTUBATION SKILLS FOR INEXPERIENCED PRACTITIONERS

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OBJECTIVE: Videolaryngoscopy, which has become increasingly important with the Covid-19 pandemic, stands out with its advantages over direct laryngoscopy (DL) in both normal and difficult airway scenarios and becomes a standard. However, with their costs reaching thousands of dollars, videolaryngoscopes(VL) seem far from being a standard option in both health care delivery and educational activities in low-income countries. Therefore, in places where resources are limited or in low-income countries; we investigated whether the much lower cost three-dimentional printed laryngoscopes(3D-PVL) can replace the conventional VLs when the VL is not available. For this purpose, we compared Macintosh laryngoscope (MCL), VL and 3D-PVL on the manikin in both normal and difficult airway scenarios in the hands of the last year medical students who are inexperienced users. Our hypothesis is that in the hands of inexperienced practitioners, the performance of the 3D-PVL will be superior to the conventional MCL and will be non-inferior to the the conventional VL.

MATERIAL and METHODS: 126 participants (last year medical student) were included in the study. Each participant attempted endotracheal intubation 6 times in total, first on the normal airway manikin and then on the difficult airway manikin using MCL, VL, and 3D-PVL in a randomization order. At the end of the study, three laryngoscopes were compared in terms of intubation time, Cormack-Lehane classification, ease of use, endotracheal tube (ETT) placement and success rate.

RESULT: In difficult airway scenario, intubation time was significantly longer with the MCL (MCL: 28,54 sec; VL: 26,68 sec; 3D-PVL: 26,64 sec); while there was no difference between 3D-PVL and VL, and both devices were superior to MCL (Wilcoxon test, $p<0.016$ Bonferroni correction). In both normal and difficult airway scenarios, Cormack-Lehane grades of SVL and 3DPVL were similar, while both devices were superior to MCL in glottic imaging (Wilcoxon test, $p<0.016$ Bonferroni correction). The mean Cormack-Lehane grade of MCL was higher than VL and 3D-PVL (MCL: 1.73; VL: 1.29; 3D-PVL: 1.25). In the normal airway scenario, the easiest (1-very easy, 5-very difficult) device to use was the VL, while the most difficult device was MCL, and 3D-PVL was between both devices (MCL: 2.64; 3DPVL: 1.98; SVL:1, 49). In the difficult airway scenario, there was no significant difference between 3D-PVL and other devices in terms of ease of use. There was no statistically significant difference between 3D-PVL and the other two devices in terms of ETT placement and success rate.

CONCLUSION: 3D-PVL was noninferior to MCL in all the variants we investigated. 3D-PVL was equivalent to VL and superior to MCL in terms of intubation time in the difficult airway scenario and glottic imaging in both normal and difficult airway scenarios. In conditions where resources are limited, 3D-PVL can be a good educational and clinical alternative to conventional VL with its low cost.

Keywords: airangel, videolaryngoscope, endotracheal intubation, 3D printing, medical student