Comparative study of three videolaryngoscopes for nasotracheal intubation with restricted mouth opening: A manikin study

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Background and Goal of Study: Limited mouth open is an important factor when dealing with a difficult airway. The videolaryngoscopy lets us intubate without the need of the three axis alignment and in case of nasotracheal intubation (NTI), can help us pointing the endotracheal tube (ET) towards the trachea. We have realized a comparative study with 3 videolaryngoscopes (C-Mac, Truview and McGrath) in a manikin model whose mouth opening has been limited.

Materials and Methods: We modified a manikin (Ambu® Airway Management Trainer) so we could limitate the mouth open. Seven anesthesists proceeded to NTI 10 times with each videolaryngoscope at the inter-incisor distance (IID) following: 3.5, 2.5, 2.2 and 1.5 cm. We did use a preformed nasal tube. The endpoints collected were: time to view vocal cords, best glottic view by using Cormack & Lehane classification, time to achieve NTI successfully, requirement of cervical hyperextension or other maneuvers and technique difficulty assessed by a 4 items Likert scale. The chi-square and Mann-Whitney tests were used to analyze data. p< 0.05 was considered statistically significant.

Results and Discussion: McGrath is the best to obtain a Cormack Lehane I glottic view in all IID. It also has been the VDL that needed more hyperextension maneuvers. C-Mac and McGrath were the only devices with which we could intubate at an IID of 1.5 cm. When the IID is 3.5 cm, McGrath is clearly faster than C-Mac and Truview to visualize vocal cords. As we restrict mouth opening, Truview requires more time to view them. When NTI time is analyzed, Truview device revealed to be the one that needed more time for mouth opening between 2.5-2 cm. When comparing them, Truview VDL has revealed as the easiest to use when NTI is performed with an IID of 3.5 cm. However, C-Mac gets better results when IID is 2.5 cm.

Blade size is a limiting factor when it is used in patients with restricted mouth opening. The blade angle should improve glottic view. Nasal route enables intubation when the interincisor gap is limited and also permits more ET maneuvers rather than oral route. In many cases the ET headed between vocal cords on its own.

Conclusion(s): Videolaryngoscopy could be a good option when performing NTI with a restricted mouth opening only for emergency cases, not for elective cases. Based on our results, McGrath seems to be the best option of videolaryngoscopes studied, because of its ease of use, its speed and also the glottic view that allows. Nevertheless, these findings are limited by the interpretation of a manikin model.