

Peer Review File

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Reviewer A

Comment 1:

Local population: Authors' patient population studied are likely Chinese patients who typically likely have a different average body habitus than Western population. These could have influenced the inference. For example, neck-circumference, obesity etc can play a major role in predicting DI (unfortunately commonly seen in Western civilization).

Reply 1:

This is a reasonable point. Differences in population characteristics indeed affect the generality of research results. We added the related comment in the limitation part.

Changes in the text:

We added the related comment in the limitation part. See page 14, lines 277-280 "The study recruited only Chinese subjects who may have a different average body habitus than the Western population. Differences in population characteristics may affect the generality of research results."

Comment 2:

Authors comment on three aspects (Pg#2; Ln#36,37): mask ventilation (8.2%), glottic exposure (6.8%); intubation (2.1%). They do acknowledge specialized instruments for visualization may have influenced. Typically, Cormack-Lehane score (as mentioned by authors in Pg#6, Ln#102,103) was developed for direct laryngoscopy and not video-laryngoscopy. With videolaryngoscopy, often glottic exposure (visualization) is really good but extremely difficult to negotiate the ETT through it.

Reply 2:

Glottic exposure is a traditional prerequisite for tracheal intubation, and its classification under direct laryngoscopy can be divided into four grades(8). However, the recent guideline did not emphasize the equipment used for evaluation (3).

With the gradual popularization of visualization equipment, there are certain differences in the interpretation of the definition of the difficult airway. Risk predictors associated with direct laryngoscopy may not necessarily apply to video-laryngoscopy. Therefore, this study divided patients into a video laryngoscope and a direct laryngoscope intubation group. We calculated the predictive value of the evaluation index in different groups.

Changes in the text

We added related explanations in Page 6 lines 109-112, “Glottic exposure is a traditional prerequisite for tracheal intubation, and its classification under direct laryngoscopy can be divided into four grades(8). However, the recent guideline did not emphasize the equipment used for evaluation (3).”

Also in Page 13-14 lines 259-268, “With the gradual popularization of visualization equipment, there are certain differences in the interpretation of the definition of the difficult airway (22, 23). Risk predictors associated with direct laryngoscopy may not necessarily apply to video-laryngoscopy (24). Therefore, this study divided patients into a video laryngoscope and a direct laryngoscope intubation group. The results showed that the video laryngoscopy group had a higher predictive value, especially in predicting difficult endotracheal intubation. In the past, there were many studies on the predictive indicators of difficult airways under the condition of direct laryngoscopy intubation (25, 26). In recent years, related research is also increasing with the widespread application of video laryngoscopy (27, 28).”

Comment 3:

Definition of failed intubation: Difficult airway has been defined multiple ways in the literature. In the literature it has been defined numerically by number of attempts, duration of time spent trying to intubate. Granted, this definition should be interpreted in the context of circumstances as well, eg, elective perioperative case with proper planning and airway preparedness, versus, emergent airway for an emergency department admission with borderline physiology. Authors defined failed intubation as those needing more than two attempts, which may be suitable for the study, but may be a little too generous to be labeled for failed intubation.

Reply 3:

Thank you for your advice. We added the corresponding content to the paper.

Changes in the text 3:

We added the corresponding interpretation in Page 6-7 lines 114-119, “Elective perioperative case with proper planning and airway preparedness, versus, emergent airway for an emergency department admission with borderline physiology. Authors defined failed intubation as those needing more than two attempts, which may be suitable for the study, but may be a little too generous to be labeled for failed intubation.”

Comment 4:

Videolaryngoscope usage: Authors report this as 80.6% (Pg#11 Ln221). Are or were

the physical exam techniques for diff airway valid for videolaryngoscope? I believe they were developed during the era of direct laryngoscopy.

Reply 4:

The physical exam techniques were indeed developed during the era of direct laryngoscopy. However, with the popularity of video laryngoscopes in our emergency departments, it is vital to test optimal physical exam techniques for this situation. Our paper divided patients into a direct laryngoscopy group and a video laryngoscope group. Also, we calculated the predictive value for the two groups respectively. These physical exam techniques were appropriate for the video laryngoscope group patients.

Changes in the text 4:

We added some data in table 3 and table 5. Also the related discussion see page 13-14 lines 259-270, “With the gradual popularization of visualization equipment, there are certain differences in the interpretation of the definition of the difficult airway (22, 23). Risk predictors associated with direct laryngoscopy may not necessarily apply to videolaryngoscopy (24). Therefore, this study divided patients into a video laryngoscope and a direct laryngoscope intubation group. The results showed that the video laryngoscopy group had a higher predictive value, especially in predicting difficult endotracheal intubation. In the past, there were many studies on the predictive indicators of difficult airways under the condition of direct laryngoscopy intubation (25, 26). In recent years, related research is also increasing with the widespread application of video laryngoscopy (27, 28). Although the evaluation indicators of the difficult airway of different types of laryngoscopes overlap, there are still differences. This phenomenon is consistent with the different predictive values of the two groups of evaluation indicators in this study.”

Reviewer B

Comment 5:

Your study quotes the limitations well in lines 250-258. It does not account for all the factors we use to assess difficult intubation (you only mention 4). If you used other determinants, your sensitivity and predictive value might have been higher.

Reply 5:

Thank you for your advice. We added the relevant content in the limitation part.

Changes in the text 5:

We added the relevant content in the limitation part in page 14-15 lines 283-285 “Our study only selected four commonly used physical tests for difficult airway assessment. The sensitivity and predictive value might change if investigators used other determinants.”

Comment 6:

Line 221 states that more than 80% used video laryngoscopy which might have falsely lowered your difficult intubation rates (2.1% that you report)

Reply 6:

The latest difficult airway guidelines do not, by definition, emphasize the device used for intubation. Widespread use of video laryngoscopes is the trend. It is relatively common for video laryngoscopy to provide a better view. But whether the use of video laryngoscopy could reduce the intubation attempts has not been proven true. reference:

[1] Bradley J A, Urman R D, Yao D. Challenging the traditional definition of a difficult intubation[J]. *Anesthesia & Analgesia*, 2019, 128(3): 584-586.

[2] Apfelbaum J L, Hagberg C A, Connis R T, et al. 2022 american society of anesthesiologists practice guidelines for management of the difficult airway[J]. *Anesthesiology*, 2021, 136(1): 31-81.

Comment 7:

It is unclear what you are trying to accomplish with this study (improvement in intubation rates) ? Are you planning to train ED docs to use varied criteria to assess risk?

Reply 7:

This article mainly includes two aspects: the incidence of difficult airways in China and the predictive value of difficult airway assessment in emergency patients. Understanding the incidence of difficult airways can help identify problems in difficult airway management and provide directions for follow-up research. The assessment of a difficult airway is an important assessment in determining preintubation preparation and intubation procedures. Current guidelines do not establish uniform standards for how to perform intubation assessment. The purpose of this study was to explore the applicability of evaluation methods commonly used in the domestic emergency department for emergency intubation patients.

Changes in the text 7:

We added relevant content in the introduction part in Page 4-5 line 73-80, “This study aimed to identify the incidence of difficult airways in mainland Chinese EDs, as well as the diagnostic validity of the commonly used physical examination techniques. Understanding the incidence of difficult airways can help identify problems in difficult airway management and provide directions for follow-up research. While the assessment of a difficult airway is an important assessment in determining pre-intubation preparation and intubation procedures. The second purpose of this study was to explore the applicability of evaluation methods commonly used in the domestic

emergency department for emergency intubation patients.”

Comment 8:

In line 207, you describe that difficult intubation occurred more often in patients with difficult masks but you don't describe the reasons or differentiate if it is causation vs association (Factors associated with difficult mask are different than those associated with difficult intubation).

Reply 8:

Studies have shown that patients with difficult masks are more likely to have difficulty intubation, and both share common risk factors, such as obesity, sleep apnea, etc. However, the relationships between difficult mask ventilation and difficult intubation still need more high-quality research to validate.

Changes in the text 8:

We delete the related description because it is not the key question we focused on.

Comment 9:

Most ED patients are deemed full stomach warranting a rapid sequence induction without mask ventilation, which you don't describe in the article.

Reply 9:

This study only focused on patients who had undergone mask ventilation. The reasons like a full stomach that hindered others were not involved in our survey. It was one of our limitations. We added the corresponding discussion in the limitation part.

Changes in the text 9:

We added relevant discussion in Page 14 line 280-282, “Fourthly, most ED patients are deemed full stomach warranting a rapid sequence induction without mask ventilation. However, our study did not explore this further.”

Reviewer C

Comment 10:

Introduction:

The authors should summarize the initial hypothesis under study, primary aim and secondary aims.

Reply 10:

We added corresponding description in the background part.

Changes in the text 10:

We added corresponding description in page 4-5 line 73-80 “This study aimed to

identify the incidence of difficult airways in mainland Chinese EDs, as well as the diagnostic validity of the commonly used physical examination techniques. Understanding the incidence of difficult airways can help identify problems in difficult airway management and provide directions for follow-up research. While the assessment of a difficult airway is an important assessment in determining pre-intubation preparation and intubation procedures. The second purpose of this study was to explore the applicability of evaluation methods commonly used in the domestic emergency department for emergency intubation patients.”

Comment 11:

Methods.

The authors must clearly present in this section the primary variable and the secondary study variables.

P6L98..." and difficult front of neck access". Definitions should be more precise. The sensitivity, specificity, positive predictive value, and negative predictive value should be calculated for video laryngoscopy and direct laryngoscopy, as they are different techniques.

Reply 11:

We detailed primary and secondary variables and supplemented the concept of the difficult front of neck access and the data of predictive value in different equipment groups in the result part.

Changes in the text 11:

We detailed primary and secondary variables in page 7 lines 130-135 “The primary variable was the incidence of difficult airways. The secondary variables, including four physical examinations, were performed at the time of intubation (neck mobility, airway stenosis, facial appearance, and the “3-3-2” evaluation (mouth opening greater than three fingers, chin to mandibular hyoid bone more than three fingers, and mandibular hyoid bone to superior thyroid fossa more than two fingers)), and patients were divided into two categories based on the ease of the intubation process.”

We supplemented the concept in page 6 lines 104-106 “The difficult airway is a broad concept (7), which includes difficult face mask ventilation, glottic exposure, tracheal intubation, or difficult front of neck access. This paper only focused on difficult airway patients under non-invasive management.”

We added the data of predictive value in different equipment groups in table 3 and table 5.

Comment 12:

Discussion. The authors do not compare the results of the used tests with the recently

published meta-analyses. This section could be more elaborate.

Reply 12:

Thank you for your advice. We have added the corresponding content in the discussion part.

Changes in the text 12:

We compare the results with 2 high quality meta-analyses in Page 13 lines 243-255

“ This study showed the diagnostic value of this assessment formula under challenging airway conditions in Chinese EDs. Our results identified a sensitivity of 0.44 and a specificity of 0.75 for the combined assessments compared with previous studies’ 0.22-0.67 sensitivity and 0.8-0.95 specificity for difficult laryngoscopy. This suggests that the combined test is on-par with other studies but does not seem particularly better or worse as far as its sensitivity. As for difficult intubation, our data showed a sensitivity of 0.71 and a specificity of 0.79. In contrast, other assessments ranged from 0.24 to 0.51 in sensitivity and 0.87 to 0.91 in specificity (20). The LR+ was 3.4 vs. 14 compared with the upper lip bite test (5). This suggests a better sensitivity to the combined technique for finding difficult airways without sacrificing too much specificity. In addition, the predictive value (AUC) in difficult laryngoscopy (0.62) and intubation (0.79) presented certain value but were not ideal when compared with recent evidences (14, 21).”

We added the discussion about the predictive value of different devices for difficult airways in page 13-14 lines 263-270, “The results showed that the video laryngoscopy group had a higher predictive value, especially in predicting difficult endotracheal intubation. In the past, there were many studies on the predictive indicators of difficult airways under the condition of direct laryngoscopy intubation (25, 26). In recent years, related research is also increasing with the widespread application of video laryngoscopy (27, 28). Although the evaluation indicators of the difficult airway of different types of laryngoscopes overlap, there are still differences. This phenomenon is consistent with the different predictive values of the two groups of evaluation indicators in this study.”