Original Research Article

Indian Journal of Anesthesia and Analgesia
2018; 5(7): 1222-1225
DOI: http://dx.doi.org/10.21088/ijaa.2349.8471.5718.21

Comparative Study of Stylet Angulation of 60° and 90° for the Ease of Endotracheal Intubation with McGrath Videolaryngoscope

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Abstract

Introduction: Videolaryngoscopes facilitate the tracheal intubation by enabling anaesthetists to have a superior vision of the larynx with minimal manipulation of the oral-pharyngeal-laryngeal structures. Studies have indicated that video laryngoscopes improve the success rate of intubation and significantly reduce intubation difficulties. However, an improved view is not always an assurance of intubation success due to the nature of oral-pharyngeal-laryngeal axis. For this reason, Endotracheal tube be must be at an angle between 450 and 900 to enter the larynx. *Aim:* This study was conducted to determine the optimal angles (between 600 and 900) of the stylet when using McGrath video laryngoscopes for the ease of intubation. *Methods:* This study involved 100 patients of both male and female who were undergoing elective surgeries that required endotracheal intubation. The patients involved were aged between 19 years and 70 years. Patients were indiscriminately divided into two equal groups, 50 patients for 600 (n=50) and 50 patients for 900 (n=50). This study excluded patients that required rapid sequence intubation; ASA III, IV, and V; patients that required emergency surgeries; and patients who had a scored four in the mallampati test. The following parameters Intubation time (Sec), Glottic opening Grade, Failure of First Attempt, Ease of Intubation, the presence of Bleeding were assessed. *Results:* Category variables were analyzed using the Chi-square test while continuous variables were analyzed using the independent t-test between 600 and 900 groups. All the selected 100 patients completed this study. All the patients in 600 group intubated successfully with 1st attempt and within 50 seconds. In contrast, intubation of six patients failed in the group 900. *Conclusion:* The results of this study indicated that the level intubation difficulty and glottic grade were not significantly different between two groups.

Keywords: Stylet Angulation; McGrath; Videolaryngoscopes; Airway.

How to cite this article:

Ravi Kerur & Navyasri C. Comparative Study of Stylet Angulation of 60° and 90° for the Ease of Endotracheal Intubation with McGrath Videolaryngoscope. Indian J Anesth Analg. 2018;5(7):1222-25.

Introduction

Management of the patient's airway is an essential skill for anesthetists. Even though severe airway complications are rare during anaesthesia, the adverse complications can be life-threatening. According to the Fourth Audit Project of the anaesthetists reported that out of the 133 reported airway complications, 16 led to death and three patients sustained brain damage. Therefore, to minimize mortality and morbidity, it is essential that anaesthetists the endowed with essential airway management techniques [1,14].

The McGrath Videolaryngoscope provides laryngoscopic views. However, it is difficult to direct the endotracheal tube [1,7,8]. The

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Received on 01.06.2018, **Accepted on** 22.06.2018

videolaryngoscope facilitates the tracheal intubation by enabling anaesthetists to have a superior vision of the larynx with minimal exposure of the oral-pharyngeal-laryngeal [8]. Studies have indicated that videolaryngoscope improve the success rate of intubation and significantly reduce intubation difficulties. The McGrath, like other videolaryngoscopes, offers a superior laryngeal view together with better airway management for patients [5,13]. However, an improved view is not always an assurance of intubation success due to the nature larynx axes. For this reason, the tip of endotracheal duct must pass through an angle between 45° and 90° to enter the larynx. Manufacturers recommend an angle between 45° and 90° to have an optimal view of the larynx. This study was conducted to determine the optimal angles (between 60° and 90°) of the stylet when using McGrath videolaryngoscopes.

Methods

This study involved 100 patients of both male and female who were undergoing selected surgeries that required endotracheal intubation. Approval by the institutional officials and written permission was obtained from the participating patients. The patients involved were aged between 19 years and 70 years. This study excluded patients that required rapid sequence intubation; ASA III, IV, and V; patients that required emergency surgeries; and patients who had a scored four in the mallampati test.

Patients were indiscriminately divided into two equal groups, 50 patients for 60° (n=50) and 50 patients for 90° (n=50). Standard monitors (ECG, SpO_2, and NIBP) were attached after patients arrived in the operation room. A standardized anaesthetic was introduced. Patients were also premeditated with midazolam 0.05mg/kg, glycopyrrolate 0.005mg/kg, and fentanyl 2 micrograms/kg. Patients were also induced with propofol 1-2 mg/kg. The participant patients were given the neuromuscular blocking drug vecuronium 0.1 mg/kg to aid tracheal intubation. Laryngoscopy was done using McGrath video laryngoscope, and the Glottic opening was visualized. For the 90° group, intubation was done with 90°-angled stylet ETT while for the 60° group; intubation was done with 60°-angled stylet ETT. Time of intubation was recorded for each patient. Other outcomes recorded were as follows: ease of intubation failed intubation at first attempt, Glottic grade, and presence of oropharyngeal bleeding. If the change of tube was necessary, only the time of the first tube was noted (Table 1).

Statistical Analysis

Category variables were analyzed using the Chi-square test while continuous variables were analyzed using the independent t-test between 60° and 90° groups. $p \leq 0.05$ was considered statistically significant for 95% confidence level. The table below summarizes the study findings (Table 2).

Table 1: Demographic Data of Patients that Participated in the Study

Patient Characteristics	Group 60^0	Group 90^0	P Value
Male: Female	22:28	24:26	0.532
Age in Years	42 ±13	43 ±13	0.824
Weight (kg)	65± 12	68±12	0.679
Height (cm)	168± 8	170±8	0.457
ASA 1/2	42/8	44/6	0.820
Mouth Opening (cm)	5.4 ±1.1	5.2± 0.9	0.318
Mallampati Grade 1/2/3	41/8/1	40/9/1	0.841

Table 2: Summary of study findings

Parameters	Group 60^0	Group 90^0	P Value
Intubation time (Sec)	28.2 ±6.8	33.5± 9.8	0.022
Glottic Grade 1/2a/2b/3/4	38/8/2/2/0	32/10/8/0/0	0.658
Failed First Attempt	50/0	38/12	0.116
Ease of Intubation Easy/Intermediate/Difficult	45/5/0	38/6/6	0.070
Bleeding Yes/No	48/2	43/7	0.718

Results

All the selected 100 patients completed this. All the patients in 60° group intubated successfully with 1st attempt and within 50 seconds. In contrast, intubation of six patients failed in the group 90°. The results of this study indicated that the level intubation difficulty and glottic grade were not significantly different between two groups.

Discussion

Currently, the incidence of difficulties direct intubation in intensive care units is as high as 20%. Video technology in the healthcare sector has facilitated the development of video laryngoscopes like the McGrath to help in difficulties in airway management [8,9,10,11]. Videolaryngoscopes have improved safety by avoiding preventable intubation attempts. Videolaryngoscopes make it possible for the entire anaesthesia team to assess the progress congruently [15,16]. This facilitates cohesion and communication of the team and improving coordination between the operator and the assistant(s) [4].

According to Ömür et al. [6], the correct use of stylet leads to efficient use of the D-blade stylet, C-MAC D blade, hockey stick stylet, and CoPilot stylet; decreased intubation time and painless passage of the vocal cords [16]. Various studies on the best angle-stylet for indicating intubation with 60⁰-Glidescope and 60⁰-malleable stylet provides the best outcome [12]. It is also easier to pass the TTI and tube with 60⁰ compared to 90⁰ tubes. Previous studies indicate that the 90⁰ stylet has a tendency bend inwards making it hard to pass the tube through the trachea at the vocal cord [3].

Conclusion

In the present study, it was found that the 60° stylletted tube McGrath videolaryngoscopes were an effective aid for airway management with a high intubation success rate and its ability to quickly secure the patients' airways. According to this study, the intubation time in 90⁰ was significantly longer than in 60°. Therefore, it is logical to conclude that it was difficult to use 90°-stylet than the 60°-stylet when using the McGrath. Hence, McGrath videolaryngoscope, 60° angled stylet is more efficient than 90°angled stylet as it allowed for faster orotracheal intubation.

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