Section: Anaesthesiology

Original Research Article

TO ASSESS THE EFFICACY OF STYLET ANGULATION AT THE HOLDING POSITION DURING ENDOTRACHEAL INTUBATION USING C-MAC VIDEO LARYNGOSCOPE

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ABSTRACT

Background: C-MAC videolaryngoscope provides excellent laryngoscopic views. This good laryngeal view of Videolaryngoscope (VL) does not always guarantee faster or successful intubation and directing an endotracheal tube can be difficult. The objective of this study is to assess the efficacy of 60° stylet angulation at the holding position during Endotracheal intubation (ETI) using C-MAC videolaryngoscope. **Materials and Methods:** This prospective interventional study was conducted after obtaining clearance from institutional ethical committee and trial registration on 40 patients belonging to American Society of Anaesthesiologists Physical Status (ASA-PS) class I &II, aged between 18 to 65 years undergoing elective surgeries under general anaesthesia by ETI. Patients were randomly assigned into 2 groups-stylet angulation group (AG) and non-angulation group (NAG) of 20 each after obtaining written informed consent. Patients with previous history of difficult intubation, BMI>30kg/m^2 were excluded from the study. The Primary outcome was time for successful intubation in both groups were recorded. Secondary outcomes like First pass success rate for ETI, Number of optimization maneuvers required, Number of attempts, complications like mucosal injury, dental,lip, gums injury were also recorded. **Result:** The mean time for successful intubation in AG was 41.6±4.42sec (95%CI 32-48) and in NAG was 71.1±6.20sec (95%CI 62-89) (p<0.001) with mean difference of -29.48(95%CI -32.54-26.41) (P<0.001). First pass success rate in AG was 100% and in NAG was 60% (P=0.001). The number of intubation attempts, optimization maneuvers required and complications were more in NAG than AG (15/10, 25/0, P=0.001) which was statistically significant. **Conclusion:** 60° stylet angulation at the holding position provides faster and successful intubations with CMAC Videolaryngoscope.

INTRODUCTION

The C-MAC videolaryngoscope is a novel intubation device that incorporates a camera system at the end of its blade, thereby facilitating a view of glottis without the need for alignment of the oral, pharyngeal and tracheal axes.[1] Although video laryngoscopes initially designed primarily as a teaching tool, it may be useful device in the clinical setting tool.[1] Its efficacy in both normal, emergency and difficult airways has well been described in the previous studies.[2]

Failed or difficult tracheal intubation impact patient safety.[3] Difficulties during routine intubation in the operating room usually occurs in 1-6% of cases and intubation failure occurs in 0.1-0.3% of cases.[2,3] Videolaryngoscope provides excellent laryngoscopic views, reduces intubation failure and makes intubation easier and faster compared with conventional direct laryngoscopy.[3] However, good laryngeal view doesnot always guarantee successful or easy intubation.[1-3] Although gaining a view of the glottis is easy part when using a C-MAC videolaryngoscope, tube delivery to the glottis is often difficult because, oral, pharyngeal and laryngeal axes are not straightly aligned.[4] Hence, the tip of the endotracheal tube (ETT) must pass around an acute angle to enter the larynx.[4]

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Therefore, routine use of stylet is recommended to facilitate handling of the endotracheal tube when intubating with VL.[5]

Stylet is a malleable metal rod covered with a clear plastic sheath.[6] The endotracheal tube introducer or the gum elastic bougie is made up of braided polyester base with a resin coating and is flexible but stiff at room temperature.[7] These additional airway devices were very often required to accomplish oral endotracheal intubation with VL. The shape of the stylet is very important for smooth atraumatic intubation.[8]

There are knowledge lacunae whether angulating the stylet at holding position should be done routinely when performing tracheal intubation with C-MAC video laryngoscope. We thus carried out this study to assess the efficacy of stylet angulation at the holding position and hypothesized that stylet angulation at the holding position would contribute to faster and successful tube delivery while using C-MAC videolaryngoscope during endotracheal intubation in adults.

Hence this study was conducted to determine the efficacy of 60°stylet angulation at the holding position during endotracheal intubation using c-mac videolaryngoscope in adults for elective surgery.

MATERIALS AND METHODS

This prospective interventional study was conducted in patients scheduled for elective surgeries under General Anaesthesia at Dr. B. R. Ambedkar Medical College and hospital, Bengaluru, Karnataka. After Institutional Ethics Committee approval(EC-451) and clinical trial registration of India (CTRI/2024/03/064867), 40 patients aged between 18-65 years of either sex belonging to the American Society of Anaesthesiologists Physical Status (ASA-PS) I and II scheduled to undergo elective surgery were enrolled in this prospective interventional study.

Inclusion Criteria:

- All the patients posted for elective surgeries under general anaesthesia with Oro – tracheal intubation.
- Patients aged between 18- 65 years of age.
- Patients belonging to American Society of Anesthesiologists physical status(ASA-PS)I and II.

Exclusion Criteria:

- Patients with known predictors of difficult intubation.
- BMI >30kg/m2.
- Patients with previous history of difficult intubation.

Sample Size Calculation: Sample size was calculated based on previous study by Ryo Wakabayashi and others, wherein the Time for placement of the tracheal tube in Non-angulation and Angulation groups were 21.3±5.6 and 16.9±3.8 respectively. With confidence interval of 95% and Power of 80%, sample size of 36 participants were required (18 in each group).

$$n=\frac{2*(Z_{\alpha}+Z_{(1-\beta)})^2*(\sigma)^2}{(d)^2}$$

Where

Z_{α}= Standard table value for 95% CI = 1.96

$Z_{(1-\beta)}$ = Standard table value for 80% Power = 0.84

σ = Standard Deviation =4.7

d=effect Size=4.4

$$n=2*\frac{(1.96+0.84)^2*(4.7)}{(4.4)^2}$$

n=18 each group

Considering the possible 10% dropouts, 40 participants (20 in each group) were studied.

Written informed consent was obtained from all patients for participation in the study and use of the data for publication. The study was conducted according to the principles of the Declaration of Helsinki and good clinical practice from March 2024 to August2024 in a tertiary care hospital. The eligible patients were randomized using computer generated random numbers into two groups. Group AG (Stylet Angulation Group n=20) and Group NAG (NonAngulation Group n=20). The allocation was sealed in an envelope and a study assistant opened the sealed envelope before induction of anaesthesia and provided the designated styletted ETT according to the group allocation. Because of the difficulties with blinding of the styletted ETT formation, intubation operators and study assistants could not be blinded.

After pre-anaesthetic evaluation and nil per oral status confirmation, Standard ASA monitors were established on arrival of patients at the operation theatre and baseline vitals were recorded. Patients were premedicated with inj glycopyrrolate 0.004mg/kg, inj midazolam 0.02mg/kg, inj ondensetran 0.1mg/kg. Patients were preoxygenated with 100% 0xygen for 3 minutes and General anaesthesia was induced with intravenous fentanyl 2mcg/kg and propofol 2mg/kg body weight. After 3 minutes of bag and mask ventilation of patient with 100% oxygen in the sniffing position and complete muscle relaxation with IV injection atracurium 0.5mg/kg, an appropriate sized cuffed endotracheal tube was used to intubate the trachea as per group allocation. Malleable stylet with an outer diameter of 4.0mm preformed into hockey stick configuration was used in all patients.

In Group AG (Angulation Group)- Stylet was angulated at the holding position 8cm below the machine end and was secondarily angulated 60°in patient end [Figure 1 A&B]. Distal segment of the stylet was curved as in the group NAG (arrowheads, figure A).Group NAG (Non Angulation Group)- there is no stylet angulation at the holding position, but the stylet was only curved from the patient end to 15cm in the alignment with the curvature of a laryngoscope blade (arrowheads, figureB).All Laryngoscopies were performed using C-MAC video laryngoscope by a single anaesthesiologist who had performed at least 50 intubations with C-

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MAC videolaryngoscope earlier. For both the groups, tracheal tubes were held at 8.0cm below the machine end with right thumb, index finger and middle finger in the same way.

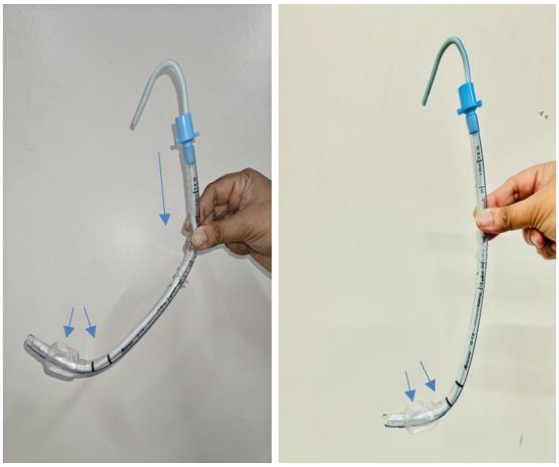

Figure 1: A- Group with stylet angulation at the holding position and B- Group without stylet angulation at the holding position.

The choice of laryngoscope blade size was at the discretion of attending anaesthetist. When an optimal view of the glottis was visualized, the Cormack- Lehane grade and percentage of glottic opening (POGO) score was recorded and a cuffed endotracheal tube of appropriate size was passed through the glottis. After bilateral air entry was checked and confirmed, the cuff was inflated and secured. Hemodynamic variables such as Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure, Mean Arterial Pressure, oxygen saturation (SPO2) and End Tidal carbon dioxide (ETCO2) were documented at 1, 2, 4, 6,8, and 10minutes following intubation.

The primary outcome of the study was to assess the time needed for successful placement of endotracheal tube (defined as the time from passage of the distal tip of the tracheal tube past the incisors to the appearance of ETCO2 trace). First-pass success rate for tracheal intubation, Number of optimization maneuvers required, Number of attempts, complications if any were recorded as the secondary outcomes. First pass successful attempts without any external laryngeal manipulation required and with external laryngeal manipulation applied during the procedure in the form of BURP maneuver were documented. Number of intubation attempts defined as any single insertion of the airway scope past the patient's lip was considered an intubation attempt. Complications like mucosal trauma- blood detected on the laryngoscope blade, gums, tongue, lip or dental injury was noted. Failed attempt was defined as any time the video laryngoscope had to be withdrawn from the mouth either due to Oxygen desaturation below 95% or intubation requiring over 120 seconds. If successful intubation was not achieved in two attempts of laryngoscopy, the alternative device was used for intubation and the intervention was excluded from the analysis.

Statistical Analysis: Data was analyzed using the statistical package SPSS 26.0 (SPSS Inc., Chicago, IL) and level of significance was set at $p<0.05$. Descriptive statistics was performed to assess the mean and standard deviation of the respective groups. Normality of the data was assessed using Shapiro Wilkinson test. Inferential statistics to find out the difference between the group was done using Independent T Test.

RESULTS

A total of 45 patients were assessed for eligibility, wherein 40 patients were randomized following the exclusion of 5 patients as per the study protocol [Figure 2]. The demographic and airway characteristics were comparable between the two groups [Table 1].

The mean time for successful intubation in AG was 41.6±4.42sec (95%CI 32-48) and in NAG was 71.1±6.20sec (95%CI 62-89) ($p<0.001$) with mean difference of -29.48(95%CI -32.54-26.41) ($P<0.001$). [Table 3]. First pass success rate in AG was 100% and in NAG was 60% (P=0.001). The number of intubation attempts, optimization maneuvers required and complications were more in NAG than AG (15/10, 25/0, P=0.001) which was statistically significant [Table 4].

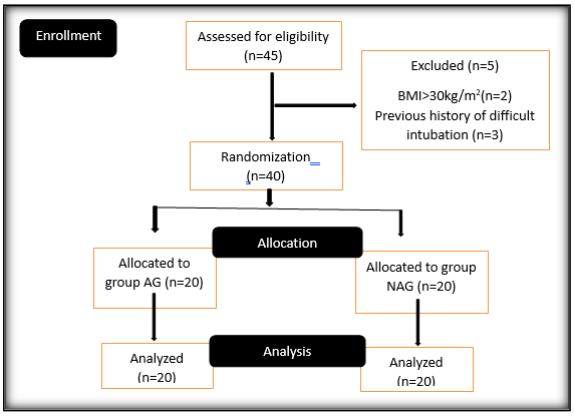

Figure 2: Consort Flow Chart

Table 1: Demographic and Airway characteristics of study patients. Data are expressed as mean, Standard deviation, number (proportion).

Parameters	Angulation group (n=20)	Non angulation group (n==20)
Age (yr)	41.04±12.79	41.40±10.77
Sex (M/F)	11/09	7/13
Height (cm)	163±7.3	164.68±6.7
Weight (kg)	66.68±9.3	68.0±9.3

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BMI (kg.m2)	24.69±1.8	25,01±1.6
Mallampatti grade (1/2)	11/14	10/15
Upper lip bite test grade (1/2	19/6	20/5
Neck circumference (cm)	33.2±2.50	32.8±1.47
SMD (cm)	11.8±0.62	12.3±0.50
TMD (cm)	6.92±0.32	7.19±0.32
TMHT (mm)	56.9±2.18	57.2±1.90

Demographic and airway characteristics of patients were well balanced between treatment groups (20 patients in each group). The average ages were comparable for the 2 groups, with the Angulation group at 41.04 years and the Non-angulation group at 41.40 years. There were 11 males and 9 females in the Angulation group, and 7 males and 13 females in the Non-angulation group. Heights and weights were also similar, with the Angulation group averaging 163 cm at 66.68 kg (147.73 lbs) and the height and weight of the control, slightly larger groups being approximately 164.68 cm and 68 kg (149.91 lbs). Body mass index was similarly matched between groups, for Angulation, it was approximately 24.7; for Non-angulation 25. There were no significant differences in airway assessments including Mallampatti grade and Upper Lip Bite test, suggesting that comparable patients were selected. Neck circumferences and airway distances measured as Sterno Mental Distance (SMD), Thyro Mental Distance (TMD), and Thyro Mental Height (TMHT) differences were again small but comparable overall.

Table 2: Mallampati Classification

GROUP		Frequency	Percent
Angulation	1	8	40
	2	12	60
	Total	20	100
No Angulation	1	7	35
	2	13	65
	Total	20	100

Mallampati classification, which is used to predict the ease of intubation was evaluated in study among participants in both the groups. Out of 20 subjects from the Angulation group, 8 (40%) had a Mallampati score of 1, and 12 (60%) had a Mallampati score of 2. Furthermore, the No Angulation group also consisted of 20 individuals, out of which 35% (7 individuals) were in Mallampati class 1 and 65% (13 individuals) in class 2. This distribution shows that the visibility in the throat slightly differed between both groups although both groups were in a majority in Mallampati class 2, denoting that there was a moderate difficulty in airway visibility that was not vastly different through both groups.

Table 3: Primary outcome- time taken for intubation

Variable	Group	Mean	SD	95% confidence interval		Mean difference	P value
				Lower bound	Upper bound		
Intubation time (Sec)	Angulation	41.6	±4.42	32	48	-29.48	0.0001*
	Non angulation	71.1	±6.20	62	89		

The study's main outcome measure was the time to intubation in the Angulation group versus the Non-angulation group. The findings showed a statistically significant difference between the time taken to successfully intubate in either group. However, the Angulation group had a significantly faster time to intubation with a mean of 41.6 seconds (SD 4.42 seconds) which is within the 95% confidence interval of 32 to 48 seconds. Instead, the one of the Non-angulation group observed a prolonged mean intubation time (71.1 seconds — 6.20 seconds) and CI from 62 to 89 seconds. The difference (between the groups) in mean intubation time was -29.48 seconds (statistically significant; p = 0.0001), which suggests that angulating the stylet at the holding position significantly decreased the intubation time with the C-MAC videolaryngoscope.

Table 4: Secondary outcomes. Data expressed as numbers and proportions * highly significant

Variable		Group		P value
		Angulation	Non angulation	
First Pass Success Rate	YES	20	15	0.0001*
	NO	0	5	
No of Intubation Attempts	1	20	15	0.0001*
	2	0	5	
Optimization Maneuvers required	NIL	20	15	0.0001*
	BURP Maneuver	0	5	

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Complications	NIL	20	13	0.0001*
	Blood stain+ on laryngoscope blade	0	7	

All 20 subjects in the Angulation group had a first pass success rate with no failures while 15 subjects in the Non-angulation group achieved first pass success with 5 subjects requiring additional attempts. Consequently, this result was proven statistically with P criterion equal to 0.0001, which suggests that stylet angulation is an effective way of successful intubation in the first attempt.

With respect to the number of intubation attempts, all the participants in the Angulation group were successfully intubated in the 1st attempt while 5 participants in the Non-angulation group required the second attempt yielding a highly significant p-value of 0.0001. Thus, this leads to fewer complications and an easier one-handed entry of the stylet with less angulation.

Optimization maneuvers were unnecessary in the Angulation group, and 5 cases in the Non-angulation group needed the BURP maneuver to improve the laryngeal view, which confirms the advantage of angulation with a corresponding p-value of 0.0001.

Complications occurred in 0 out of 20 Angulation group participants compared to 7 in the Non-angulation group (blood stains on the laryngoscope blade) with a p-value of 0.0001.

Table 5: Sensitivity, specificity and predictive values of first pass success rate

	Value	**95 % CI**	
		Lower limit	**Upper limit**
Sensitivity	100%	98.5%	100%
Specificity	93.3%	78.5%	97.7%
Positive predictive value	93.3%	45.6%	98.2%
Negative predictive value	100%	97.4%	100%

Diagnostic accuracy of first pass success rate for endotracheal intubation with stylet angulation using the C-MAC videolaryngoscope. This means that the sensitivity of the approach is 100%, and the first pass is positively identified in all cases of true positive. 93.3% specificity reflects the capacity of the method to identify the cases in which the first pass would fail without angulation. PPV = 93.3% denotes that whenever a successful first attempt is predicted, it is actually successful 93.3% of the time. The wide confidence interval for PPV — between 45.6% and 98.2% indicates substantial variability, which could stem from different underlying rates of success in different settings or populations.

Table 6: Correlation between Mallampati score and other variables.

		Mallampatti Grading
AGE	Correlation Coefficient	.252
	P VALUE	.078
Height	Correlation Coefficient	-.052
	P VALUE	.720
Weight	Correlation Coefficient	.119
	P VALUE	.409
BMI	Correlation Coefficient	.228
	P VALUE	.112
UPPER LIP BITE TEST GRADE	Correlation Coefficient	.354*
	P VALUE	.012
NECK CIRCUMFERENCE	Correlation Coefficient	.279*
	P VALUE	.050
STERNO MENTAL DISTANCE (SMD)	Correlation Coefficient	-.073
	P VALUE	.613
THYRO MENTAL DISTANCE (TMD)	Correlation Coefficient	.160
	P VALUE	.277
THYRO MENTAL HIGHT (TMHT)	Correlation Coefficient	.049
	P VALUE	.733

[Table 6] investigates the interrelationships among the Mallampati score and several other variables. When considering the age, it has a marginal positive correlation with Mallampati score (r = 0.252, p = 0.078), however, this is non-significant. Mallampati score is weakly negatively correlated with height: coeff = -0.052, p = 0.720. In the same manner, weight has a weak positive correlation coefficient of 0.119 with the Mallampati score (p-value of 0.409) meaning that there is a poor, non-significant association between weight and the Mallampati score.

The correlation coefficient between the Mallampati score and Body Mass Index (BMI) was also found to be positive, 0.228 but was not significant statistically with a p-value of 0.112. Conversely, the Upper Lip Bite Test grade demonstrates a stronger positive correlation with higher Mallampati grades (r = 0.354, p = 0.012), indicating that higher scores on the Upper Lip Bite Test correspond to higher

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Mallampati scores. Neck circumference was also positively correlated with the Mallampati score (correlation coefficient 0.279, p=0.050).

The correlations with SMD and TMHT, however, are weak and negative, with correlation coefficients of −0.073 and 0.049, and P values of 0.611 and 0.733. Thyro Mental Distance (TMD) is reported to have a positive correlation of a coefficient of 0.160 with a p value of 0.277 (not significant), indicating a negligible correlation. These findings show that although there is a moderate correlation between the Upper Lip Bite Test grade and Mallampati score and a moderate correlation between neck circumference and Mallampati score, most other physical measures had little or statistically insignificant correlation with the Mallampati score.

DISCUSSION

Failed tracheal intubation remains a leading cause of the anaesthetic morbidity and mortality despite improved strategies to manage the failed intubations C-MAC videolaryngoscope may be the useful alternative device particularly in such situations. Video laryngoscopes with higher curvature blades have been the most controversial as additional airway devices such as stylet or bougie were very often required to accomplish oral endotracheal intubation and hence blunting of the stress response is possible.[6] However, it has been documented that the time taken for intubation is usually longer with video laryngoscope, as the easy visualization of the glottis which can be attributed to the higher curvature of blade, does not always guarantee easy passage of ETT to the larynx. It has been shown that use of styletted endotracheal tubes significantly reduced the intubation difficulty while using C-MAC video laryngoscope during intubation in patients with cervical spine surgery with neck stabilization.[9-15]

The findings of this study illustrate that stylet angulation at the holding position at the line of endotracheal intubation with the C-MAC videolaryngoscope provides a major benefit in the efficacy of the intubation effort. In particular, the angulated stylet led to shorter intubation times, better first pass success, fewer aids to optimization and less complications compared with non-angulated stylet. Interestingly, these results are supported by a growing body of literature demonstrating that, when used alongside suitable adjuncts like the appropriately angulated stylet, video laryngoscopes can significantly enhance intubation success and decrease related adverse outcomes.[8,9,16-20]

The mean intubation time in the Angulation group was significantly shorter (41.6 seconds) compared to the Non-angulation group (71.1 seconds), with a mean difference of nearly 30 seconds ($p < 0.001$). This substantial reduction in intubation time is consistent with previous studies which have reported that stylet angulation helps guide the endotracheal tube more smoothly into the trachea, reducing the difficulty and time required for tube insertion.[3] The shorter intubation time is clinically relevant, as it may contribute to better patient outcomes by reducing the duration of hypoxia and minimizing the risk of aspiration and other complications associated with prolonged intubation attempts.[21-24]

The angle of vision of C-MAC video laryngoscope Macintosh blade numbered 3&4 is 72º&60º respectively.[8] The compatibility with anatomy of oropharynx is possible due to elliptic & narrow shape of C-MAC VL blade. Many studies stated that, C-MAC VL is superior compared to conventional laryngoscope and other VL, yet stylet is necessarily required for insertion of ETT due to 60º distal curvature of the VL blade. Because the blade of the C-MAC VL is inserted through the midline without shifting the tongue to the left, shaping and angulating the stylet similar to the blade rather than simply bending it at the tip might be more optimal to overcome the non-straight oral-pharyngeal axis.[5] The ETT stylets have many possible angles and angulation points. The shape and angulation of stylet is very important for smooth, atraumatic intubation. Thus, stylet is to be prepared in appropriate shape within the ETT before oral endotracheal intubation. Insertion of ETT on the first attempt is important to provide adequate oxygenation and ventilation. An inappropriate stylet angle or shape may lead to failed intubation and multiple attempts of laryngoscopy can cause tissue injury, airway edema, bleeding, and difficulty of mask ventilation, hypoxemia, esophageal intubation, regurgitation and cardiac arrest. Hence, the optimal design for VL assisted intubation has yet to be identified.

First pass success is another critical outcome, and the Angulation group achieved a 100% success rate, while the Non-angulation group had a significantly lower first pass success rate of 60% ($p = 0.001$). First pass success is a key indicator of intubation efficiency and safety, as failed first attempts are associated with increased complications, including airway trauma, hypoxemia, and patient discomfort.[9] The finding that stylet angulation contributed to a 100% first pass success rate supports previous research indicating that angulation optimizes the alignment of the tracheal tube with the laryngeal inlet, facilitating smoother and more successful intubations.[7]

Very scant literature is available regarding such interventional study to assess the efficacy of 60º stylet angulation at the holding position during ETI using C-MAC videolaryngoscope. Previous studies have reported that a McGrath VL with 60º styletted tube is an effective aid to airway management considering the significantly high intubation success rates and faster in securing the airwaythan that with 90º styletted tube.[4] In our study, the patient end of the styletted ETT was angulated as hockey stick in

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both the groups and the machine end of the styletted ETT was angulated at the holding position of the tracheal tube at 60º in angulation group which followed the shape of the VL blade. Thus, the machine end of 60º angled stylet at the holding position may facilitate easier introduction of the ETT into the area viewed on the C-MAC VL monitor and minimize the obstruction of glottic view compared with non- angulated stylet at the holding position of ETT. In our study we observed that, time taken for successful placement of ETT was lesser in angulation group than that of non-angulation group. The intubation was easy, less time consuming with styletted ETT while using C-MAC videolaryngoscope. We had chosen time taken for placement of the tracheal tube as primaryoutcome as we predicted that stylet angulation at the holding position would be easier and reduce the time for intubation using C-MAC video laryngoscope. Also, we assumed that high first pass success rate, a less number of intubation attempts which will reduce the airway related problems in the post-operative period, less external laryngeal maneuvers required and less complications observed with stylet angulation at the holding position of the ETT while using C-MAC video laryngoscope during ETI.

Moreover, the number of intubation attempts, optimization maneuvers, and complications were all significantly lower in the Angulation group. These secondary outcomes are important because multiple attempts at intubation are a known risk factor for airway trauma and other complications such as mucosal injury, dental trauma, and sore throat.[1] Our study found no complications in the Angulation group, whereas the Non-angulation group experienced mucosal trauma and blood staining on the laryngoscope blade, highlighting the safety benefits of stylet angulation during intubation.

The correlation analysis in [Table 6] suggests that certain physical characteristics, such as the Upper Lip Bite Test grade and neck circumference, were moderately correlated with the Mallampati score. This finding is consistent with existing literature that supports the use of these anatomical predictors in assessing the difficulty of intubation.[2] However, the lack of significant correlations between the Mallampati score and other variables such as BMI, age, and height in this study indicates that these factors may not provide a strong predictive value for intubation difficulty, at least in the context of using the C-MAC videolaryngoscope.

Our study has some limitations. We enrolled only ASA I and II patients and not the patients with anticipated difficult airway. Also, we conducted our study on electively posted cases not on emergency cases. In our study we could not do blinding and the Hawthorne effects might have affected the performance of the operator during ETI. Finally, we used only C-MAC video laryngoscope in our study and the efficacy of such angulation is unclear while using other models of video laryngoscopes or conventional direct laryngoscopes.

CONCLUSION

Our results suggests that stylet angulation at the holding position would contribute to faster ET tube placement while using C-MAC video laryngoscope with high first pass success, lesser number of attempts and minimal number of optimizations needed and there was no complication observed. Further studies are required to assess the efficacy of stylet angulation at the holding position during ETI using C-MAC video laryngoscope in difficult airway scenarios and in emergency department.

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Conflicts of interest
There are no conflicts of interest.

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