

Cormack and Lehane Prediction of Difficult Airway Study in a Tertiary Care Hospital

Dr. N. Chandra Shekar*

Associate Professor, Department of Anesthesia, Rajiv Gandhi Institute of Medical Sciences, RIMS, Adilabad, Telangana State, India

*Corresponding author: Dr. N. Chandra Shekar

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Abstract

Original Research Article

There are various methods for assessment of difficult intubation with changing sensitivity and specificity. The aim of the present study to utilize the Cormack and Lehane scoring system and compare it with Mallampati classification for the prediction of difficult intubation in the patients undergoing elective surgical procedures in Rajiv Gandhi Institute of Medical Sciences [RIMS], Adilabad a Tertiary Care Hospital. Methods: This study was conducted in the Department of Anesthesia, Rajiv Gandhi Institute of Medical Sciences, Adilabad. Inclusion criteria were Adult patients > 18 years of either sex, those undergoing elective surgical procedures that require endotracheal intubation, Those belonging to ASA- I and II categories. Excluded patients were those less than 18 years of age, pregnant females, patients with unstable cervical spine, patients with tumor of the larynx, and those cases that did not require endotracheal intubations. Based on the inclusion and exclusion criteria during the study period, a total of (n=112) patients were studied. They were evaluated for Mallampati classification before the surgery and during the laryngoscopy for Cormack and Lehane the grades were recorded for each patient and the result were evaluated. Results: The Cormack & Lehane Grades were compared with Mallampati classification and the overall (n=75) were included in Cormack & Lehane Grade I, (n = 27) was included in Cormack & Lehane Grade II, (n=3) were included in Cormack & Lehane Grade III, and (n=2 were) included in Cormack & Lehane Grade IV. Similarly, the total number of patients with Mallampati Class I were (n=76), Mallampati Class II were (n=23), Mallampati Class III were (n=11) and Mallampati Class IV were (n=2) Out of n=112 cases 12 (10.71%) were difficult intubations and out of the total 12 difficult intubations n=6(50%) were in Cormack and Lehane Grade II, n=1 (8.33%) in grade I, n=3 (25%) in grade III and n=2 (16.67%) in grade IV. Conclusion: Within the limitations of the present study it can be concluded that the Cormack and Lehane classification have issues for identification of difficulty of prediction especially with grade II and Modified Cormack and Lehane appear to be better in predicting the difficult intubations.

Keywords: Cormack and Lehane, difficult airway, Mallampati classification.

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INTRODUCTION

Difficult tracheal intubation increases the chances of morbidity and mortality during obstetric and other surgeries [1-4]. If a prior identification of difficult intubation is anticipated then the anesthetist can be prepared in advance to tackle the problem [5]. Mallampati classification, sternal distance, thyromental distance, inter-incisor gap and the different grades of mandibular protrusion are some of the tests applied for prediction of difficult laryngoscopy and intubation [6-8]. Various studies have pointed out different sensitivity and specificity for different tests [9]. The measurement of thyromental distance, the Wilson scoring system has also shown to be specific in the prediction of difficult airway [10-13]. A study by Frerk CM predicting difficult intubation found Mallampati test along with measurement of the

thyromental distance to be sensitive and highly specific for use as a predictor of difficult intubation [14]. The Cormack Lehane scoring system has been widely used for describing the appearances at the direct laryngoscopy. [15] Some investigators have suggested a modification of Cormack and Lehane grading [16, 17]. Yentis and Lee have proposed a modification of Cormack and Lehane that involved subdivision of grade 2 without the change in the definition of the rest of the grades [18]. With this background, we in the present study tried to evaluate the Cormack and Lehane prediction of difficult airway in patients undergoing various operative procedures requiring tracheal intubations.

MATERIALS AND METHODS

This prospective cross-sectional study was conducted in the Department of Anesthesia, Rajiv

Gandhi Institute of Medical Sciences [RIMS] Adilabad. Institutional Ethical committee permission was obtained for the study. Written consent was obtained from all the participants of the study after explaining the nature of study in their local language. Inclusion criteria were Adult patients > 18 years of either sex, Those undergoing elective surgical procedures that require endotracheal intubation, Those belonging to ASA- I and II categories. Excluded patients were those less than 18 years of age, pregnant females, patients with unstable cervical spine, patients with tumor of the larynx, and those cases that did not require endotracheal intubations. Based on the inclusion and exclusion criteria during the study period, a total of n=112 patients were identified. The evaluation of patients was done one day before the surgery for Mallampati classification. The patients were seated and asked for opens the mouth fully and protrude the tongue as far as possible without phonation. The examiner inspects the pharyngeal structures with adequate light (Pen Torch). The view will be graded as I if the soft palate, uvula, and pillars are visible, II if the soft palate, uvula, fauces are visible but pillars obscured. III when the soft palate is only visible, IV=soft palate is not visible. The second test was performed after induction of anesthesia and administration of neuromuscular blocking agent, The

laryngoscopy was performed by an anesthetist using a Macintosh blade and best view was obtained and a good view was obtained by application of laryngeal pressure for classification of Cormack and Lehane [19] I= vocal cords visible; II = only posterior commissure or arytenoids visible; III = only epiglottis visible; IV = none of the foregoing visible. All the results were recorded for difficulty; Cormack and Lehane grade III or IV are generally regarded as difficult [20]. The data were analyzed by SPSS version 17 on windows format.

RESULTS

A total of n=112 adult patients were included in the study. Out of 112 n=67(59.82%) were male and n=45(40.18%) were female patients. The following were the characteristics of the patients involved in the study n=32 (28.57%) were of ENT surgeries, n=3 (2.6%) cancer surgeries, n=44 (39.28%) abdominal surgeries, n=26 (23.21%), Orthopedic Surgeries and n=7 (6.25%). A total of n=49 patients were classified in Cormack & Lehane Grade I and n=21 were classified as grade II as per Cormack & Lehane and n=23 were included in Grade III as per Cormack & Lehane and n=19 were in Cormack & Lehane Grade IV given in table 1.

Table-1: Showing the different categories of patients involved in the study according to the Cormack & Lehane classification

	ENT Surgeries		Cancer Surgeries		Abdominal surgeries		Orthopedic surgeries		Oral Surgeries	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Cormack & Lehane Grade I	10	5	1	1	12	8	5	3	3	1
Cormack & Lehane Grade II	2	4	1	0	3	4	6	1	0	0
Cormack & Lehane Grade III	6	2	0	0	5	3	3	2	2	0
Cormack & Lehane Grade IV	2	1	0	0	4	5	2	4	0	1
Total	20	12	2	1	24	20	16	10	5	2

The Cormack & Lehane Grades were compared with Mallampati classification and the overall (n=75) were included in Cormack & Lehane Grade I, n= 27 were included in Cormack & Lehane Grade II, n=3 were included in Cormack & Lehane Grade III and n=2 were included in Cormack & Lehane Grade IV.

Similarly, the total number of patients with Mallampati Class I were n=76, Mallampati Class II were n=23, Mallampati Class III was n=11 and Mallampati Class IV was n=2 the overall overlapping of the classification and grades have been shown in table 2.

Table-2: Comparison between Cormack & Lehane Grades and Mallampati classification of the patients included in the study

	Mallampati Class I	Mallampati Class II	Mallampati Class III	Mallampati Class IV	Total
Cormack & Lehane Grade I	59	13	2	1	75
Cormack & Lehane Grade II	12	9	6	0	27
Cormack & Lehane Grade III	3	1	2	1	7
Cormack & Lehane Grade IV	2	0	1	0	3
Total	76	23	11	2	112

The total number of intubations were n=112 out of which n=76 were classified as Mallampati classification I and all the 76(100%) were easy intubations. In Mallampati classification II n=23 were included and out of which n=21(91.30%) were easy intubations and n=2 (8.96%) were difficult intubations

and they were 2(25%) of total n=8 difficult intubations. Similarly, in Mallampati class III, n=11 patients were identified out of which n=7 (63.63%) had easy intubation and n=4(36.36%) had difficult intubation and Mallampati grade III had 4(50%) of total difficult intubations. In Mallampati grade IV n=2 patients were

present and both cases were difficult intubation that is

25% of the total difficult intubation given in table 3.

Table-3: Showing the distribution of cases by Mallampati classification

Distribution of cases by Mallampati classification	I	II	III	IV	Total
Total Intubations	76	23	11	2	112
No. of easy intubations	75	20	5	0	104
No. of difficult intubation	1	3	6	2	12
Percentage Distribution of all difficult intubations	8.33	25	50	16.67	100

A total number of intubations were n=112 out of which n=76 were classified as Cormack & Lehane Grades I out of which n=1 (8.33%) of the total found to be difficult intubation. The Grade II were n=23 and No. of easy intubation were n=20 and n=3 were difficult intubations. In Grade III n=11 and No. of easy

intubations were n=5 and n=6 were found to be difficult intubations. Similarly, Cormack & Lehane Grades IV had n=2 patients and n=2 were difficult intubations and it was 16.67% of total difficult intubations given in table 4.

Table-4: Showing the distribution of cases by Cormack & Lehane Grades

Distribution of cases by Cormack & Lehane Grades	I	II	III	IV	Total
Total Intubations	75	27	7	3	112
No of easy intubations	74	21	4	1	100
No of difficult intubation	1	6	3	2	12
Percentage Distribution of all difficult intubations	8.33	50	25	16.67	100

Out of n=112 cases 12 (10.71%) were difficult intubations and out of the total 12 difficult intubations n=6(50%) were in Cormack and Lehane Grade II, n=1 (8.33%) in Grade I, n=3 (25%) in Grade III and n=2 (16.67%) in Grade IV.

DISCUSSION

The level of difficulty of intubation is shown to correspond to the proportion of the laryngeal inlet visualized. The widely accepted Cormack and Lehane scoring system [19] was used to describe the view at direct laryngoscopy. In the present study out of n=112 cases and n=12 were found to be difficult intubations. The various difficult intubations are shown in table 4. There were difficult intubations in Cormack and Lehane II and III comprising of 75% of total difficult cases. Although jaw opening is an important requirement for the successful intubation under direct vision there should also be adequate flexion of the lower cervical vertebrae, and extension of the head at the atlanto-occipital joint which brings the oropharyngeal cavity into the line with pharyngolaryngeal cavity [21]. The ability to open the mouth is essential for permitting the introduction of the laryngoscope as well as pharyngeal cavity adequate to facilitate laryngoscope view [22, 23]. Difficult laryngoscopy is defined as the inability to visualize the vocal cords. With the original Cormack-Lehane scoring system, difficult includes only Grade III and Grade IV [17]. The true incidence of difficult laryngoscopy by conventional Cormack and Lehane scoring system is underestimated as it excludes a subgroup of the Grade 2 which is difficult to manage. The Modified Cormack and Lehane system tends to be better as it includes grade 2B, 3 and 4. Wu *et al.* in their study have shown that the thickness of soft tissues in the anterior neck area can predict difficult

laryngoscopy. They also found that the skin to hyoid distance as well as skin to epiglottis distance is good predictors of difficult laryngoscopy [24]. In the present study, we found 8.33% of the patients with difficult intubations as per Cormack and Lehane were in Grade I which is considered to be an easy group. As it is clear that no single screening test can be 100% sensitive, therefore it is inevitable that some cases with difficult may be missed. There may other factors relating to the difficulty and the treating anesthetist must understand these limitations. In the present study we have found the sensitivity and specificity of difficult intubations and easy intubations in Cormack and Lehane Grade I and IV when compared to Mallampati Class I and Class IV as both had a similar number of easy intubations and missed difficult intubations. However, when Cormack and Lehane Grade II and III when compared to Mallampati Class II and III had different numbers of difficult intubations whereas C&G grade II had 6(50%) of all the difficult intubations in grade II the Mallampati has only 25% in Class II. Therefore there are some concerns in Cormack and Lehane II, as a result, the modified Cormack and Lehane with sub-classification of Grade 2 in 2B appears better. There are also the other areas of concern and the intra and inter-observer reliabilities of CL classification and reproducibility has been found to be poor and only fair-with inter-observer [25]. The Cormack and Lehane grade III and IV which are classified as difficult intubations many patients underwent successful intubation by simple maneuvers like upward pressure on epiglottis with the tip of the blade.

CONCLUSION

Within the limitations of the present study, it can be concluded that the Cormack and Lehane

classification have issues, especially with grade II and Modified Cormack and Lehane, appear to be better in predicting the difficult intubations.

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