



ORIGINAL RESEARCH PAPER

Anesthesiology

CLINICAL ASSESSMENT OF MODIFIED MALLAMPATI SCORE TO PREDICT DIFFICULT INTUBATION AND ITS CORRELATION WITH CORMACK LEHANE GRADING

KEY WORDS: Anaesthesia, Difficult intubation, Cormack Lehane Laryngoscopy Grading, Modified Mallampati test

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ABSTRACT

BACKGROUND AND AIMS: Difficult intubation is a major concern for the anesthesiologist and becomes more serious when it is unexpected. The preoperative assessment for recognition of difficult airway in advance is the best method of preventing damage caused by the inability to maintain the airway. The aim of this study was to correlate primarily the Mallampati modified score with laryngoscopic view in order to predict a difficult airway.

MATERIAL AND METHODS: 80 adult patients of age group 18-75 years of either sex of ASA Class I and II, requiring endotracheal intubation were included in this study. Preclinical evaluation was carried out by Modified Mallampati test and were then correlated with laryngoscopic grading as per Cormack and Lehane. Chi-square test and Kappa statistics were applied for the statistical analysis.

RESULTS: It was observed that 10% of the difficult intubations were predicted to be easy. There was no case of difficult intubation which was predicted as difficult. 10% cases were easy intubations which were predicted to be difficult.

CONCLUSION: Mallampati classification did not correlate grade-to-grade with Cormack & Lehane grading on direct laryngoscopy.

Introduction

Airway management is of prime importance to the anaesthesiologists. For securing airway, tracheal intubation using direct laryngoscopy remains the method of choice in most of the cases. No anesthetic is safe unless diligent efforts are made to secure and maintain an intact airway.

The reported incidence of difficult laryngoscopy and tracheal intubation occurs in 1.5% to 8% of patients in general anaesthesia.

Difficult laryngoscopy and intubation cause increased risk of complications to the patient ranging from sore throat to airway trauma. Of all the anaesthetic deaths 30% to 40% are attributed to the inability to manage a difficult airway. If we are able to predict potential difficult intubation during the pre-anesthetic visit, an alternative approach to the airway may be used from the very beginning of anesthesia, so that the risk of hypoxemia associated with difficult intubation is reduced.

The Mallampati test, is one of the most frequently used clinical scoring systems to predict difficult intubation. The ease of tracheal intubation is determined by many factors, with the laryngoscopic view being the most important one. The Cormack-Lehane (CL) classification is used to describe laryngeal view during direct laryngoscopy. This study assessed the value of the Mallampati test as a single parameter for predicting impaired glottic exposure during direct laryngoscopy.

Materials and Methods

This study was conducted in the Department of Anesthesiology, Yenepoya Medical College, Mangalore. It involves the airway assessment of 80 patients of age group 18 years to 75 years of either sex, and who had to undergo either routine or emergency procedure requiring endotracheal intubation. Patients having obvious adverse anatomical, pathology or congenital factors were excluded from the study. Data were collected in a standard form and following main features of the patient were noted age, weight, body mass index (BMI). Modified Mallampati test was performed by same person for airway evaluation of all patients. This was then correlated to laryngoscopic grading (of Cormack and Lehane) using Macintosh laryngoscope of blade size 3. In this study, difficult endotracheal intubation was defined as less than adequate exposure by direct laryngoscopy, i.e., Grade III and Grade IV, while Grade I and Grade II are considered adequate. The direct laryngoscopy is done in the sniffing position. (i.e., neck

flexed and atlanto occipital joint extended). Data were analysed using Chi-Square and Kappa statistics.

Results:

The observations are based on the study conducted on 80 patients who required general anesthesia for their surgery or required intubation and mechanical ventilation planned electively in ICU. The demographic profiles of the patients in both groups were comparable with regard to age, body mass index and gender distribution. For the purpose of assessment, Mallampati and Cormack Lehane grades 1&2 were regarded as easy predictors and intubation, and 3&4 were regarded as difficult.

- True positive = a difficult intubation that had been predicted to be difficult
- False positive = an easy intubation that had been predicted to be difficult.
- True negative = an easy intubation that had been predicted to be easy.
- False negative = a difficult intubation that had been predicted to be easy.
- Sensitivity = the percentage of correctly predicted difficult intubations that was truly difficult (true positives/ true positives + false negatives).
- Specificity = the percentage of correctly predicted easy intubations as a proportion of all intubations that were truly easy (true negative/true negatives + false positives).

Table 1 Mallampati and Cormacke Lehane assessment of easy/difficult intubation.

Test	Disease		n	n		Total
	Present	Absent		Present	Absent	
Positive	True Positive	a=0	False Positive	c=8	a + c = 8	
Negative	False Negative	b=8	True Negative	d=64	b + d = 72	
Total		a + b = 8		c + d = 72		

It was observed that 10% of the difficult intubations were predicted to be easy. There was no case of difficult intubation which was predicted as difficult. 10% cases were easy intubations predicted to be difficult. However, the study found that 80% of the easy intubations were predicted as easy. Hence, there was null sensitivity but specificity was 88.8% for the test.

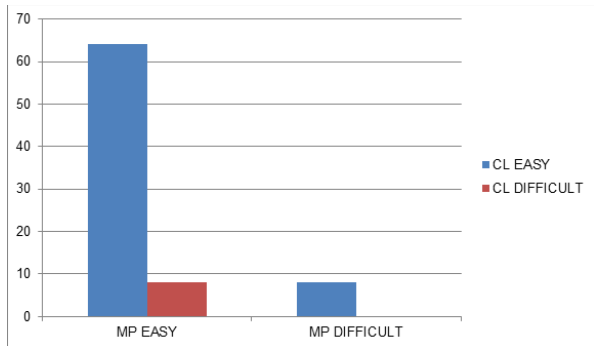


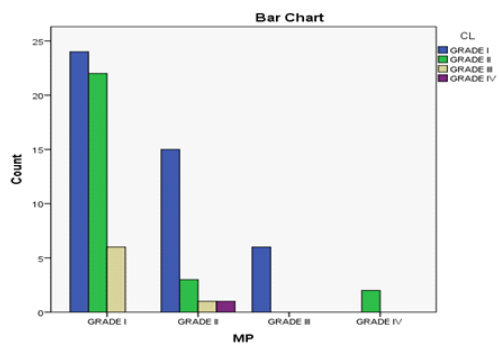
Fig. 1 Mallampati and Cormacke Lehane assessment of easy/difficult intubation.

Table 2: Mallampati and Cormack Lehane Crosstabulation

MP* CL Crosstabulation			CL				Total
			Grade I	Grade II	Grade III	Grade IV	
MP	GRADE I	Count	24	22	6	0	52
		% within CL	53.3%	81.5%	85.7%	0.0%	65.0%
	GRADE II	Count	15	3	1	1	20
		% within CL	33.3%	11.1%	14.3%	100.0%	25.0%
	GRADE III	Count	6	0	0	0	6
		% within CL	13.3%	0.0%	0.0%	0.0%	7.5%
	GRADE IV	Count	0	2	0	0	2
		% within CL	0.0%	7.4%	0.0%	0.0%	2.5%
Total		Count	45	27	7	1	80
		% within CL	100.0%	100.0%	100.0%	100.0%	100.0%

It was found by Kappa statistics for comparison that 53.3% of Grade 1 CL corresponded to Grade 1 MP whereas 13.3% of Grade 1 CL was of Grade 3 MP. Also, 81.5% of Grade 2 CL had MP Grade 1, 11.1% had MP Grade 2, and 7.4% had MP Grade 4.

85.7% of Grade 3 CL had MP Grade 1, 14.3% had MP Grade 2, none of them had MP grade 3. It was noted that 65% of Grade 1 had MP 1, 25% had MP Grade 2, 6% had MP grade 3 and 2% had MP 4.



Number of observed agreements: 27 (33.75% of the observations)

Number of agreements expected by chance: 36.6 (45.69% of the observations)

Kappa= -0.220

SE of kappa = 0.073

95% confidence interval: From -0.362 to -0.078

The strength of agreement is worse than what you expect to see by chance alone.

Discussion:

Difficult intubation is a major concern for the anesthetist and becomes more serious when it is unexpected. Difficult laryngoscopy and intubation continue to cause morbidity and mortality associated with anesthesia. The reason for difficult laryngoscopies are not completely identified. Although the incident of difficult and failed tracheal intubation is comparatively low, unexpected difficulties and poorly managed situation may

produce life-threatening conditions such as cerebral damage or even death. Iohom *et al.* performed a study in Ireland and noted that the validity of positive predictive value of MMT increased from 27 to 100% after combining other predictors. In contrast, the combination of MMT and TMD was not an adequate predictor of a difficult intubation in a study by Koh *et al.*

Our assessment demonstrated that the prognostic value of the modified Mallampati score was poorer than that estimated by previous meta-analyses by Lundstrom *et al* as well as the meta-analyses by Lee A *et al.* The modified Mallampati score is inadequate as a stand-alone test of a difficult laryngoscopy or tracheal intubation.

Conclusion:

The modified Mallampati test is a simple clinical assessment to predict inadequate exposure of the glottis and consequently difficult tracheal intubation. Mallampati classification did not correlate grade- to-grade with Cormack & Lehane grading on direct laryngoscopy Hence, when used alone, it is of limited value and cannot be relied on. Thus, anaesthesiologists must always be prepared with a variety of preformulated and practiced plans for airway management in the event of an unanticipated difficult airway.

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