



A COMPARISON STUDY OF THE MODIFIED MALLAMPATTI CLASSIFICATION WITH THE PATIENT'S HEIGHT TO THYROMENTAL DISTANCE AND UPPER LIP BITE TEST IN PREDICTING DIFFICULT INTUBATION.

Anaesthesiology

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ABSTRACT

This study was designed to compare the modified mallampatti classification with the patient's height to thyromental distance and upper lip bite test in predicting difficult intubation. Airway management is prime importance to anaesthesiologist. If the anaesthetist can predict which patients are likely to prove difficult to intubate, he/she may reduce the risk of anaesthesia considerably.

KEYWORDS

INTRODUCTION

Anesthesia is branch related to airway procedures, every anaesthesiologist is worried when he or she first realise that anatomical structures of larynx cannot visualized^[1]. Airway management is prime importance to anaesthesiologist^[2]. Tracheal intubation using direct laryngoscopy remains the method of choice of securing airway in most of cases in general anaesthesia. The recorded incidence of difficult laryngoscopy and tracheal intubation is 1.5% to 8.5% in general anaesthesia^[3].

Hence pre operative assessment and prediction of difficult laryngoscopy is very essential. There are many tests to predict difficult laryngoscopy and intubation. Mallampatti et al (1885) introduced screening test that classifies the visibility of oropharynx^[3]. Patil Aldreti measured the distance of thyroid notch to the mentum and distance of manubriumstreni to the mentum, that is thyromental distance and sternomental distance respectively. The recently introduced test is upper lip bite test which assess the ability of patient to cover the mucosa of upper lip bite with lower incisors. This new test assess jaw subluxation and presence of buck teeth in a single test which improve its reliability and reduce inter observer variability. Our aims is to compare the ability of tests to predict the visualization of larynx using modified Mallampatti classification, ratio of patient's height to Thyromental distance and upper lip bite test.

No single test has been proved to be effective for predicting difficult intubation^[2]. In routine pre operative examination combination of more than 2 tests has been used.

AIMS AND OBJECTIVES

To study sensitivity, specificity, positive predictive value, negative predictive value and accuracy of modified mallampatti classification, Patient height to thyromental distance test, Upper lip bite test.

To compare sensitivity, specificity, positive predictive value, negative predictive value and accuracy of each test.

MATERIALS AND METHOD

Prospective study was conducted in 100 patients, after obtaining ethical committee approval.

Inclusion Criteria

Age between 18-65 years, ASA grade I-III, patients posted for elective surgeries

Exclusion Criteria:

- ASA status IV-V
- Uncooperative and unwilling patients, not following verbal command.

- History of burns, trauma or surgeries to airway.
- Tumours or mass in the neck or the airway.
- Patients with restricted mobility at neck and mandible.
- Patients with inability to sit, edentulous or need awake intubation

Following three tests were performed in preoperative examination room before induction of anesthesia.

Modified Mallampati Test (MMT):

Sampson and Young's modification of Mallampatti test recorded oropharyngeal structures visible upon maximal mouth opening. Each patient when seated is asked to open mouth maximally and to protrude the tongue without phonation^[9]. The view is classified as following,

Class I: Good visualization of palate, fauces, uvula and tonsillar pillars.

Class II: Bony point Pillars obscured by the base of the tongue but the soft palate, fauces and uvula visible.

Class III: Soft palate and base of the uvula visible.

Class IV: Soft palate not visible.

Class I and II consider as easy intubation.

Class II and IV consider as difficult intubation.

The Mallampati Score

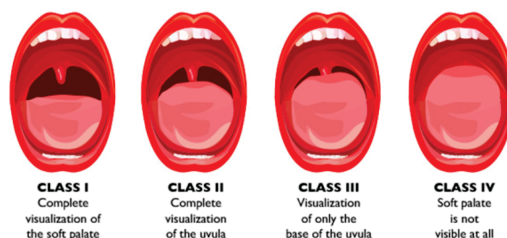


Figure-1^[11]

Ratio Of Patient's Height To Thyromental distance (RHTMD):

Thyromental distance is measured from the the mentum to thyroid notch while head is fully extended and mouth closed. Then the ratio of height to thyromental distance is calculated.

<23.5 –easy intubation

>23.5 –difficult intubation

Upper Lip Bite Test (ULBT):

It is done by assessing the ability of the patient to cover the mucosa of the upper lip with lower incisors^[10]. This test is rated as

Class I: If the lower incisors could bite the upper lip above the vermillion line.

Class II: If the lower incisors could bite the upper lip below the vermillion line.

Class III: If the lower incisors could not bite the upper lip.

Class I & II- easy intubation and Class III- difficult intubation

- In operation theatre, monitors attached are ECG, NIBP, Pulse oximeter, EtCo2.
- Premedication: Inj. Ondansetron 0.15mg/kg i.v., Inj. Glycopyrolate 0.004mg/kg i.v. and Inj. fentanyl 2mcg/kg i.v. was given.
- Patient was preoxygenated with 100% oxygen.
- Induction of anaesthesia was done with Inj. Thiopentone sodium 4mg/kg body weight given iv bolus and succinylcholine inj. 2mg/kg iv.
- Laryngoscopy was done using Macintosh blade size 3 (female), 4 (male) by an experienced anaesthesiologist and the view was classified as per Cormack-Lehane's scale, without any external laryngeal manipulation.

This scale has been graded as:

Grade 1 : Vocal cords visible.

Grade-2 : Only posterior commissure or arytenoids visible.

Grade-3 : Only epiglottis visible.

Grade-4 : None of the above visible.

- Difficult visualization is described as grade 3 & 4 classification. Easy visualization is described as class 1 & 2 classification.
- Confirmation of intubation is done by bilateral auscultation of lung fields and capnography.
- In case of difficult laryngoscopy, extrinsic manipulation of larynx and stylet or bougie may be required.

Grading Of Easy Intubation:

I. No extrinsic manipulation of larynx

II. Extrinsic manipulation of larynx

III. With stylet

IV. Failed intubation

- Using this clinical data; sensitivity, specificity, positive predictive value and negative predictive value of each test are calculated.

Patients data and value of the airway predictors has been compared using appropriate test and 'p' value of 0.05 was taken as significant.

RESULTS

100 patients aged between 18-65 years, of either sex belonging to ASA grade I-III were posted for elective surgeries. There was no correlation between demographic data (age, sex, weight) and incidence of difficult intubation in present study.

Table 1: Modified Mallampatti Classification Distribution And Upper Lip Bite Test Distribution

MMT	No of patients	Percent	ULBT	No of patients	Percentage
Class I	25	25%	Class I	65	65%
Class II	55	55%	Class II	19	19%
Class III	16	16%	Class III	16	16%
Class IV	4	4%	Total	100	100%
Total	100	100%			

The above table shows that, number of the patients in MMT class 1 & 2 (25+55) was 80, predicted as easy intubation where as class 3 & 4 (16+4) was 20 predicted as difficult intubation.

In upper lip bite test (65+19) 84 cases included in class 1 and class II hence predicted as easy intubation, 16 patients included in class III hence predicted as difficult intubation.

Table 2: Thyromental Distance [TMD] Distributions And Patients Height To Thyromental Distance Distributions [RPHTMD]

TMD	No of patients	Percentage	RPHTMD	No of patients	Percentage
>6.5	65	65%	<23.5	80	80%
6-6.5	27	27%	>23.5	20	20%
<6.0	08	8%	Total	100	100%
Total	100	100%			

Above table shows that, according to TMD classification there are 65 patients considered easy intubation, 27 patients considered as difficult intubation, 8 patients considered as very difficult intubation where in case of RPHTMD classification 80 patients have <23.5 ratio which is predicted as easy intubation, 20 patients have >23.5 ratio which is predicted as difficult intubation.

Table 3: Distribution Of Patients Among Different Grades Of Cormack & Lahane Classification On Glottis Exposure.

Cormack & Lahane grade	No of patients	Percentage
Grade I	60	60%
Grade II	32	32%
Grade III	6	6%
Grade IV	2	2%
Total	100	100%

DISCUSSION

Safe outcome from anesthesia is an important goal for an anaesthesiologist^[4]. The incidence of difficult laryngoscopy and intubation is ranges from 1.5- 13%^[5]. In our study, incidence is 8%. Variation in incidence of difficult intubation is depend of various factors like different anthropometric features among population, inter-observer variation in describing grading of various pre operative test and laryngeal view.

The ULBT evaluates a combination of jaw subluxation and the presence of buck teeth concurrently^[6]. It is not appropriate for edentulous patients^[6].

Modified mallampatti classification correlates tongue size to pharyngeal structure^[5]. There are several limitation of MMP like there is no definitive demarcation between class 2 & class 3 and between class 3 & class 4 group. Another limitation of MMP is it does not assess neck mobility which is another important factor in predicting difficult intubation^[7], which is also true for ULBT.

Thyromental distance was earlier used for predicting difficult intubation but its use was questionable, as its varies with patients height and body proportion^[8]. The RHTMD is better than TMD; it depends on accurate measurement of patient's TMD and height^[6]. Ratio of patient's height to thyromental distance mainly measures mandibular space relative to patient's height^[8].

In our study, data was collected from 100 patients scheduled to receive general anesthesia and endotracheal intubation after permission of ethical committee and after taking informed consent. We assessed 100 patients included 58(58%) male and 42(42%) female with age ranging from 18 to 65 years (37.58±14.9). Three pre-operative tests (MMT, ULBT and RHTMD) were done before induction of anesthesia in pre operative room. Test results are compared with laryngoscopic view after induction of anesthesia using Cormack Lahane grading. Sensitivity, specificity, PPV, NPV and accuracy of each pre operative tests are calculated.

Sensitivity and specificity of ULBT is higher than RHTMD and MMP. Sensitivity, specificity, PPV and NPV of ULBT is higher than RHTMD and MMT. This study comparable to our study.

Sensitivity: ULBT(75%)>MMT(62.5%)>RHTMD(50%).

Specificity: ULBT(89.13%)>MMT(86.6%)>RHTMD(82%).

PPV: RHTMD(40%)>ULBT(37.5%)>MMT(25%)

NPV: ULBT(97.6%)>MMT(96.25%)>RHTMD(95%).

Accuracy: ULBT(88%)>MMT(82%)>RHTMD(80%).

SUMMARY

Preoperative tests like MMT, ULBT and RHTMD were performed before induction of anesthesia and these tests were compared with laryngoscopic view of CORMACK LAHANE'S classification.

In conclusion, sensitivity and specificity of ULBT is higher than MMT and RHTMD when compared to Cormack Lahane's classification. ULBT is used as single bedside screening test for predicting difficult laryngoscopy when compared against modified mallampatti classification and ratio of patient's height to thyromental distance. Accuracy of upper lip bite test is higher than modified mallampatti classification and accuracy of modified mallampatti score is higher than ratio of patient's height to thyromental distance. No test is 100% accurate. So it is advisable to use combination of different tests or use

of various scoring system for predicting difficult laryngoscopy/intubation.

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