



A COMPARITIVE STUDY OF PALM PRINT SIGN WITH MODIFIED MALLAMPATTI TEST IN PREDICTION OF DIFFICULT AIRWAY BETWEEN DIABETIC AND NON DIABETIC PATIENTS

Anaesthesiology

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ABSTRACT

Failure to maintain a patent airway is one of the commonest causes of anaesthesia related morbidity and mortality. The reported incidence of difficult intubation varies from 1.5% to 13%. Grading of ink impression by palm of dominant hand has been proposed as a means for diabetic patients in whom tracheal intubation may be difficult because of glycosylation of both metacarpal and cervical joints. The Objective of the study is to compare modified mallampati and palm print in the assessment of difficult intubation. 100 patients scheduled for surgery under general anaesthesia were included in the study (51diabetics), all underwent MMT(modified mallampati test) and PPT(Palm print test) for airway assessment. After a standardized technique of induction of anaesthesia, primary anaesthetist performed laryngoscopy and graded described by Cormack lehane. Sensitivity, specificity, PPV, NPV and accuracy were calculated for both these tests in diabetic and non diabetic population. Palm print test has the highest sensitivity(76% vs 69%), NPV(76% vs 73%) when compared to modified mallampati test in the prediction of difficult laryngoscopy and intubation in diabetic and elderly patients. Both test have same specificity, PPV,accuracy.

KEYWORDS

Modified Mallampatitest, Palm print test, Diabetes, elderly population.

INTRODUCTION

Intubation is called difficult if a conventionally trained anesthesiologist needs more than three attempts or more than ten minutes for a successful endotracheal intubation. Failure of ventilation and intubation is still the most frightening complications which can cause severe hypoxia and sometimes permanent cerebral damage leading to coma and death. The incidence of difficult intubation is 1-3.6% and failed intubation is 0.05-0.3%.

Modified Mallampati is the standard airway assessment used by all anaesthesiologist's. We are evaluating the palm print test with modified Mallampati to facilitate the management of difficult intubation and to reduce the incidence of severe adverse outcomes, practical guidelines have been established for elective assessment and prediction of difficult intubation by which we can reduce the incidence of severe adverse outcome.

Recognition is based on factors that are associated with difficult intubation, which can be used as pre-operative tests. Mallampati is the most used screening test for detection of difficult intubation. Other tests include sternomental distance, thyromental distance, Wilson risk sum score, upper lip bite test, protrusion of mandible, tooth morphology, head extension, mouth opening, body mass index, 3-2 rule, and ultrasonography of neck soft tissue.

Reed *et al.* used LEMON method for prediction of difficult intubation in the emergency department.

Gupta *et al.* reported that palm print can help to predict difficult intubation. Some studies showed that palm print is a reliable test for prediction of difficult intubation in diabetic patients. Patient with diabetes mellitus may have limitation in joint mobility due to non-enzymatic glycosylation of collagen and its deposition in joints, which leads to difficult airway management. These changes also involve small joints of the hands leading to inability to approximate the palms and fingers of the hand, which can be assessed with palm print²⁸.

Therefore, in order to find an appropriate approach to the determination of difficult intubation and to help increase the safety throughout anesthesia management, we decided to conduct a study on evaluation of the sensitivity of palm print and modified mallampati tests in prediction of difficult intubation in the elderly population.

MATERIAL AND METHOD:

This is a prospective, descriptive, comparative and clinical study conducted in MVJMC & RH, Hosakote, Bangalore from October 2018 to October 2019. The study was carried out after obtaining ethical committee clearance from our institution. A total of 100 consecutive elderly patients admitted in MVJMC & RH for surgeries under general anaesthesia with endotracheal intubation were considered in this study. Anaesthesiologist evaluated the airway using Palm print sign and modified mallampati during pre-operative examination. History of any co-morbidities and their duration were noted. In the operation theatre, monitors were attached like NIBP, ECG, Pulse oximeter, EtCo2. Patient is preoxygenated with 100% oxygen. Induction of anaesthesia was with Inj. Thiopentone sodium 4mg/kg body weight given IV and succinyl choline inj. 2mg/kg IV. Laryngoscopy was done using Macintosh blade size 3 by an experienced anesthesiologist and the view was classified as per Cormack-Lehane's scale, without any external laryngeal manipulation. Grade 3 and 4 were taken as difficult intubation. Confirmation of intubation was done by bilateral auscultation of lung fields and capnography.

PALM PRINT TEST: The palm and fingers of the dominant hand of patient was painted with blue writing ink using brush. The patient then pressed the hand firmly against a white sheet of paper on a hard surface and scoring is done as:

Grade 0- All phalangeal areas visible.

Grade 1- Deficiency in the interphalangeal areas of 4th and 5th digit. Grade 2- Deficiency in the interphalangeal areas of 2nd to 5th digit.

Grade 3- only the tips of digits seen.

Grade 2 and 3 will be considered as difficult intubation.

MODIFIED MALLAMPATI TEST: Sampson and Young's modification of Mallampati test were 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. The view is classified as:

Grade 1 -Good visualization of palate, fauces, uvula and tonsillar pillars.

Grade2 -Pillars obscured by the base of the tongue but the soft palate, fauces and uvulavisible.

Grade 3 -Soft palate and base of the uvula visible. Grade 4 -Soft palate notvisible.

Grade 3 and 4 will be considered as difficult intubation.

CORMACK- LEHANE'S 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 structures visible. Difficult intubation is described as grade 3 & 4.

OBSERVATIONS AND RESULTS:

Age	Number	Percentage
60-65 Years	20	20.0
65 - 75 Years	61	61.0
75 - 85 Years	16	16.0
85 - 95 Years	2	2.0
95 and more Years	1	1.0
Total	100	100.0
Mean± SD	68.74±6.69 Years	

The age distribution was as follows, 61% were distributed in the age group of 65 to 75 years and the mean age was 68.74 68.74±6.69Years

Table No 2: Weight Distributions of study participants

Weight	Number	Percentage
40 to 55 KGS	29	29.0
55 to 70 KGS	46	46.0
70 to 85 KGS	19	19.0
85 to 100 KGS	5	5.0
100 and More KGS	1	1.0
Total	100	100.0
Mean±SD	62.57±13.04 KGS	

The weight distribution was as follows, 46% were distributed in the group of 55 to 70kg, 29% were distributed in the group of 40 to 55kg and the mean weight was 62.57±13.04 KGS

Table 3: Gender distributions of study participants.

Gender	Number	Percentage
Male	68	68.0
Female	32	32.0
Total	100	100.0

There was a total of a hundred patients in this study, 32% females, 68%males.

Table 4: Comparision of airway assessment grade (MM, PP, CL) in diabetic patients.

DM	I	II	III	IV
MM	13	12	21	5
PP*	6	7	19	19
CL	6	13	25	7

The Cormack Lehane (CL) is used as a standard reference, Modified Mallampatti grade and Palmpint grade were compared to CL in assessing the airway difficulty in diabetic patients.

In grade I airway assessment by CL and PP are similar but MM has overestimated, but in grade II, III, IV airway assessment by CL and MM are similar but PP has underestimated in grade II, III, but overestimated in grade IV. Thus MM grade is close to CL grade in assessing airway difficulty in our study population

Table 5:Predictive power of PP, MM, and CL their ability to predict difficult laryngoscopy in Diabetic and Non-diabetics Patients

	PP	MM	CL
Sensitivity	70.4	53.1	71.1
Specificity	71.7	51.0	65.5
PPV	74.5	51.0	62.7
NPV	67.3	53.1	73.5
Accuracy	71.0	52.0	68.0

Sensitivity, NPV was high in CL when compared to PP and MM,

whereas specificity, PPV, accuracy were high in PP when compared to CL and MM when the population was assessed as diabetic and non-diabetic patients.

DISCUSSION

Among the various endocrine disorders, diabetes mellitus is the commonest co-morbidity an anaesthetist encounters. Anesthesiologists, serving as perioperative physicians, will care for patients with diabetes on a near-daily basis. diabetic patients are believed to have non-enzymatic glycosylation of collagen, which is subsequently deposited in the joints. This process can lead to diabetic SJS. Changes from this disease process can first be noted in the fourth and fifth interphalangeal joints and later in the atlantooccipital joint. Diabetic SJS causes patients to have the inability to make a complete palmar approximation, despite the maximal effort. Patients with diabetic stiff joint syndrome have difficulty in approximating their palms and cannot bend their fingers backward (the prayer's sign). When the cervical spine is also involved, the limited atlanto-occipital joint motion may make laryngoscopy difficult⁶⁰.

Prayers sign can be seen even in old age due to stiff joints. In a joint, bones do not directly contact each other. As the age advances, joint movement becomes stiffer and less flexible because the amount of lubricating fluid inside joints decreases and the cartilage becomes thinner. Ligaments also tend to shorten and lose some flexibility, making joints feel stiff³³. The incidence of difficult intubation is 26.5% in non diabetic population.

Many methods to assess the airway, such as Mallampatti test, thyromental distance, inter-incisor gap, length of the mandibular rim, chin protrusion, atlanto-occipital extension, Palm test, and Prayer's sign have been described in the literature, but all have their limitations and no one test alone is 100% sensitive and specific. A combination of these different tests may increase their predictive value for difficult intubation. The objective of the current study was to determine the accuracy of Palmpint grade and Modified Mallampatti grade in predicting difficult intubation and relating their sensitivity, specificity PPV, NPV, accuracy against actual laryngoscopic view by using gold standard, Cormack & Lehanegrading.

The results of our study in the diabetic population are as follows, accuracy 72.5%, sensitivity 87.5%, PPV 73.7% and NPV 69.2% of Palmpint grade.

We have compared Palm print grade, Modified Mallampatti test, with Cormack Lehanegrade. Conclusion though several tests are available, in diabetics Palm print is the best single predictor of difficult intubation, followed by Mallampatti.

The association between Palm Print (PP) and Cormack Lehanegrade (CL) was as follows, there were 34 patients with difficult intubation in both category, there were 35 patients with easy intubation in both category, 20 patients with difficulty in intubation assessed by PP but were easy to intubate when assessed by CL. 11 patients with easy intubation as assessed by PP but were difficult to intubate when assessed by CL. Thus Palm print grade is a good predictor of difficult airway in diabetic patients.

The association between Modified Mallampatti (MM) and Cormack Lehanegrade (CL) was as follows, there were 31 patients with difficult intubation in both category, there were 37 patients with easy intubation in both category, 18 patients with difficulty in intubation assessed by MP but were easy to intubate when assessed by CL. 14 patients with easy intubation as assessed by MP but were difficult to intubate when assessed by CL. Thus Modified Mallampatti grade is a good predictor of difficult airway in the non-diabetic patient in an elderly group of patients.

CONCLUSION

1. The study showed palm print has the highest level of accuracy, sensitivity, PPV compared to modified mallampatti. Hence palm print is a better predictor in diabetic patients.
2. The study showed Modified Mallampatti has the highest sensitivity, specificity, NPV and accuracy in non-diabetics. Hence modified Mallampatti has a better airway predictor in non diabetics patients.
3. Palm print test showed the highest sensitivity, specificity, PPV, NPV, Accuracy in diabetic population and elderly population.

Hence palm print has a better predictor value of difficult intubation in diabetics and elderly population.

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