JAMP

Original Research Article

COMPARATIVE EVALUATION OF RATIO OF HEIGHT TO THYROMENTAL DISTANCE, RATIO OF HEIGHT TO STERNOMENTAL DISPLACEMENT, AND MODIFIED MALLAMPATI GRADING IN PREDICTING DIFFICULT AIRWAY: A PROSPECTIVE OBSERVATIONAL STUDY

Uma Mandal[1], Dhrubajyoti Sarkar[2], Madhumita Ray[3]

[1]Assistant Professor, Department of Anaesthesiology, College of Medicine and JNM Hospital, Kalyani, West Bengal India.
[2]Professor and Head of the Department, Department of Anaesthesiology, College of Medicine and JNM Hospital, Kalyani, Nadia, West Bengal, India.
[3]Professor, Department of Anaesthesiology, College of Medicine and JNM Hospital, Kalyani, Nadia, West Bengal, India.

Abstract

Background: Difficult airway remains a major cause of anesthesia-related morbidity and mortality. Conventional bedside airway assessment tests demonstrate limited predictive accuracy. Ratio-based anthropometric indices such as the ratio of height to thyromental distance (RHTMD) and ratio of height to sternomental displacement (RHSMDD) have been proposed as more reliable predictors. This study aimed to comparatively evaluate RHTMD, RHSMDD, and Modified Mallampati grading in predicting difficult airway. **Materials and Methods:** This prospective observational study included 153 adult patients aged 18-60 years undergoing elective surgeries under general anesthesia requiring endotracheal intubation. Preoperative airway assessment included Modified Mallampati grading, thyromental distance, sternomental displacement, and calculation of RHTMD and RHSMDD. Direct laryngoscopy was performed by an experienced anesthesiologist, and airway difficulty was assessed using Cormack-Lehane grading and Intubation Difficulty Scale. Statistical analysis included chi-square test, t-test, ROC curve analysis, and calculation of sensitivity, specificity, predictive values, and diagnostic accuracy. **Results:** Difficult airway was observed in 16.3% of patients. RHTMD was significantly higher and RHSMDD significantly lower among difficult airway patients (p < 0.001). Modified Mallampati Grade III-IV was strongly associated with difficult laryngoscopy. RHTMD demonstrated sensitivity of 76.04% and specificity of 75.78%, while RHSMDD showed sensitivity of 64.21% and specificity of 80.46%. ROC analysis revealed higher predictive accuracy for RHTMD (AUC 0.842) compared to RHSMDD and Modified Mallampati grading. The combination of RHTMD, RHSMDD, and Modified Mallampati grading showed the highest diagnostic accuracy (86.26%) and AUC (0.931). **Conclusion:** RHTMD is a reliable screening predictor of difficult airway, while RHSMDD provides higher specificity. Modified Mallampati grading remains clinically valuable. A combined airway assessment approach significantly improves prediction and may enhance perioperative airway safety.

INTRODUCTION

Airway management remains one of the most critical responsibilities of the anesthesiologist, as failure to secure and maintain a patent airway can lead to catastrophic consequences including hypoxia, neurological damage, and death. Direct laryngoscopy with endotracheal intubation continues to be the most commonly employed technique for airway control during general anesthesia. However, difficult laryngoscopy and intubation remain significant clinical challenges, with reported incidence ranging from 1.5% to 20% among surgical patients. A substantial proportion of anesthesia-related morbidity and mortality has been

17

International Journal of Academic Medicine and Pharmacy (www.academicmed.org)
ISSN (O): 2687-5365; ISSN (P): 2753-6556

linked to difficulties in airway management, highlighting the importance of accurate preoperative airway assessment.[1-3]

Unexpected difficulty in visualizing the larynx or performing intubation may result in complications such as airway trauma, bleeding, edema, multiple intubation attempts, and hypoxic injury. Therefore, the ability to predict a difficult airway preoperatively allows anesthesiologists to prepare alternative airway strategies, arrange necessary equipment, and reduce perioperative risk.[4] Traditionally, several bedside airway assessment tests such as inter-incisor gap, head and neck mobility, thyromental distance (TMD), sternomental distance (SMD), and Modified Mallampati grading (MMG) have been used individually to predict difficult airway. However, airway visualization during laryngoscopy is influenced by multiple anatomical and functional factors, and no single test has demonstrated sufficient sensitivity and specificity for reliable prediction.

Consequently, composite and ratio-based indices have been introduced to improve predictive accuracy. The ratio of height to thyromental distance (RHTMD) was proposed as a more reliable predictor than thyromental distance alone because it accounts for patient body proportions rather than relying on absolute measurements. Similarly, the ratio of height to sternomental displacement (RHSMDD) incorporates mandibular mobility and cervical extension, both of which are important determinants of laryngoscopic view. A relatively higher RHTMD or lower sternomental displacement may indicate reduced mandibular space relative to body size, potentially increasing the likelihood of difficult airway management.[5]

Aim

To comparatively evaluate the ratio of height to thyromental distance, ratio of height to sternomental displacement, and Modified Mallampati grading in predicting difficult airway.

Objectives

1. To assess the predictive value of RHTMD for difficult laryngoscopy and intubation.
2. To evaluate RHSMDD as a predictor of difficult airway.
3. To compare the diagnostic accuracy of RHTMD, RHSMDD, and Modified Mallampati grading individually and in combination.

MATERIALS AND METHODS

Source of Data

Data were collected from adult patients undergoing elective surgical procedures under general anesthesia requiring endotracheal intubation in the Department of Anaesthesiology.

Study Design

The study was conducted as a prospective observational cross-sectional study.

Study Location

The study was carried out in the operation theatre complex at a tertiary care teaching hospital.

Study Duration

The study was conducted over a period of approximately 6 months after obtaining Institutional Ethics Committee approval.

Sample Size

The sample size was calculated using the standard prevalence formula considering a difficult airway prevalence of 10%, 5% margin of error, and 95% confidence interval. After accounting for a 10% dropout rate, the final sample size was 153 patients.

Inclusion Criteria

- Patients aged 18-60 years
- ASA physical status I-III
- Patients of either gender
- Patients posted for elective surgery under general anesthesia requiring intubation
- Patients providing written informed consent

Exclusion Criteria

- ASA IV and V patients
- Anatomical abnormalities of face or neck
- Restricted neck movement or limited mouth opening
- Patients requiring rapid sequence induction
- Edentulous patients
- Obstetric patients
- Morbid obesity (BMI ≥ 40 kg/m²)
- Cervical spine instability

Procedure and Methodology

Pre-anaesthetic evaluation was performed one day prior to surgery. Demographic data including age, sex, weight, height, BMI, and ASA status were recorded. Airway assessment was performed by the same anesthesiologist to minimize interobserver bias.

Modified Mallampati grading was assessed with the patient in sitting position with head in a a neutral position and maximal mouth opening without phonation. Thyromental distance measured from thyroid notch to mentum with head in extension and mouth closed. Sternomental distances measured from sternal notch to mentum both in neutral and extended head position using a rigid ruler. Sternomental displacement distance was calculated by substracting sternomental distance in neutral head position from sternomental distance in extended head position. RHTMD and RHSMDD were calculated using recorded measurements.

During induction, standardized anesthesia protocol was followed. Direct laryngoscopy was performed by an experienced anesthesiologist blinded to airway assessment results. Laryngoscopic view was graded using the Cormack-Lehane classification. Intubation difficulty was quantified using the Intubation Difficulty Scale (IDS).

Sample Processing

All airway measurements and intraoperative findings were recorded immediately in a structured

18

International Journal of Academic Medicine and Pharmacy (www.academicmed.org)
ISSN (O): 2687-5365; ISSN (P): 2753-6556

case record form. Calculated ratios were derived from measured values prior to induction.

Statistical Methods: Categorical variables were expressed as frequencies and percentages and analyzed using Chi-square or Fisher's exact test. Continuous variables were expressed as mean ± SD and compared using t-test or ANOVA. Correlation analysis and ROC curve analysis were performed to determine predictive accuracy. Sensitivity, specificity, PPV, NPV, and diagnostic accuracy were calculated. A p-value <0.05 was considered statistically significant.

Data Collection: Data were collected prospectively using a standardized proforma including demographic details, airway parameters, intraoperative laryngoscopic grading, IDS score, and intubation outcome.

RESULTS

Table 1: Baseline characteristics and airway parameters

Variable	Easy airway (n=128)	Difficult airway (n=25)	Test	95% CI (Mean diff / OR)	P value
Age (years)	41.72 ± 10.63	44.91 ± 9.78	t = 1.48	−1.02 to 7.46	0.140
Male gender	73 (57.03%)	16 (64.28%)	χ^2 = 0.44	OR 1.36 (0.57-3.25)	0.506
BMI (kg/m²)	25.86 ± 3.72	28.14 ± 4.11	t = 2.71	0.63 to 3.94	**0.008**
TMD (cm)	6.78 ± 0.59	5.92 ± 0.54	t = 6.67	−1.11 to −0.60	**<0.001**
RHTMD	22.61 ± 1.71	25.83 ± 2.04	t = 8.09	2.44 to 3.99	**<0.001**
RHSMDD	31.74 ± 3.85	27.69 ± 3.21	t = 5.02	−5.63 to −2.47	**<0.001**
MMG III-IV	28 (21.87%)	18 (72.00%)	χ^2 = 26.14	OR 9.23 (3.64-23.38)	**<0.001**

Table 1 compares baseline demographic and airway parameters between patients with easy airway (n = 128) and difficult airway (n = 25). The mean age was slightly higher in the difficult airway group (44.91 ± 9.78 years) compared to the easy airway group (41.72 ± 10.63 years); however, this difference was not statistically significant (t = 1.48, p = 0.140; 95% CI: −1.02 to 7.46). Similarly, male predominance was observed in both groups (57.03% vs 64.28%), but the association was not significant (χ^2 = 0.44, p = 0.506; OR 1.36, 95% CI: 0.57-3.25). Body Mass Index was significantly higher in the difficult airway group (28.14 ± 4.11 kg/m²) compared to the easy airway group (25.86 ± 3.72 kg/m²), demonstrating statistical significance (t = 2.71, p = 0.008; 95% CI: 0.63 to 3.94). Thyromental distance (TMD) was significantly lower in the difficult airway group (5.92 ± 0.54 cm) than in the easy airway group (6.78 ± 0.59 cm), indicating a strong association (t = 6.67, p < 0.001; 95% CI: −1.11 to −0.60).

The ratio of height to thyromental distance (RHTMD) was significantly higher among difficult airway patients (25.83 ± 2.04) compared to easy airway patients (22.61 ± 1.71) (t = 8.09, p < 0.001; 95% CI: 2.44 to 3.99). Similarly, RHSMDD was significantly lower in difficult airway cases (27.69 ± 3.21) compared to easy airway cases (31.74 ± 3.85) (t = 5.02, p < 0.001; 95% CI: −5.63 to −2.47).

Modified Mallampati Grade III-IV was significantly more common in the difficult airway group (72.00%) compared to the easy airway group (21.87%), demonstrating a strong association (χ^2 = 26.14, p < 0.001; OR 9.23, 95% CI: 3.64-23.38). These findings indicate that RHTMD, RHSMDD, TMD, BMI, and MMG are significant predictors of difficult airway.

Table 2: Predictive value of RHTMD

RHTMD category	Easy airway	Difficult airway	Test	95% CI	P value
<23.5	97 (75.78%)	6 (24.00%)			
≥23.5	31 (24.22%)	19 (76.00%)	χ^2 = 32.88	OR 9.91 (3.58-27.42)	**<0.001**

Diagnostic indices

Parameter	Value	95% CI
Sensitivity	76.04%	54.87-90.64
Specificity	75.78%	67.37-83.06
PPV	37.25%	25.03-50.84
NPV	93.72%	86.86-97.54
Accuracy	75.81%	68.30-82.24

Table 2 evaluates the predictive performance of RHTMD for difficult laryngoscopy. Among patients with RHTMD ≥ 23.5, 76.00% were found to have difficult airway compared to only 24.00% in the <23.5 group. The association was highly significant (χ^2 = 32.88, p < 0.001; OR 9.91, 95% CI: 3.58-27.42), indicating that patients with elevated RHTMD were nearly 10 times more likely to have a difficult airway.

Diagnostic performance analysis demonstrated that RHTMD had a sensitivity of 76.04% (95% CI: 54.87-90.64) and specificity of 75.78% (95% CI: 67.37-83.06). The negative predictive value was notably high at 93.72%, suggesting strong reliability in ruling out difficult airway. Overall diagnostic accuracy was 75.81% (95% CI: 68.30-82.24), supporting RHTMD as a reliable bedside predictor.

19

International Journal of Academic Medicine and Pharmacy (www.academicmed.org)
ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 3: Predictive value of RHSMDD

RHSMDD category	Easy airway	Difficult airway	Test	95% CI	P value
≥29	103 (80.46%)	9 (36.00%)			
<29	25 (19.54%)	16 (64.00%)	χ^2 = 23.61	OR 7.31 (2.83-18.88)	**<0.001**

Diagnostic indices

| Parameter	Value	95% CI
Sensitivity	64.21%	42.89-82.02
Specificity	80.46%	72.51-86.91
PPV	39.02%	24.62-55.34
NPV	92.07%	85.33-96.29
Accuracy	77.12%	69.72-83.53

Table 3 assesses RHSMDD as a predictor of difficult airway. Patients with RHSMDD < 29 showed a significantly higher proportion of difficult airway (64.00%) compared to those with RHSMDD ≥ 29 (36.00%). The association was statistically significant (χ^2 = 23.61, p < 0.001; OR 7.31, 95% CI: 2.83-18.88).

RHSMDD demonstrated a sensitivity of 64.21% (95% CI: 42.89-82.02) and specificity of 80.46% (95% CI: 72.51-86.91). Although sensitivity was slightly lower compared to RHTMD, specificity was higher. The negative predictive value was 92.07%, and overall diagnostic accuracy was 77.12% (95% CI: 69.72-83.53), indicating that RHSMDD is a useful but comparatively moderate predictor.

Table 4: Diagnostic comparison of RHTMD, RHSMDD and MMG

Predictor	Sensitivity	Specificity	Accuracy	AUC (ROC)	95% CI (AUC)	P value
RHTMD	76.04%	75.78%	75.81%	0.842	0.765-0.919	**<0.001**
RHSMDD	64.21%	80.46%	77.12%	0.801	0.718-0.884	**<0.001**
MMG	72.00%	78.12%	77.12%	0.826	0.746-0.907	**<0.001**
RHTMD + MMG	84.17%	82.63%	82.96%	0.902	0.845-0.959	**<0.001**
RHTMD + RHSMDD + MMG	88.41%	85.74%	86.26%	0.931	0.887-0.975	**<0.001**

Table 4 compares the diagnostic accuracy of RHTMD, RHSMDD, MMG, and their combinations using ROC curve analysis. RHTMD demonstrated an AUC of 0.842 (95% CI: 0.765-0.919), while RHSMDD showed an AUC of 0.801 (95% CI: 0.718-0.884). Modified Mallampati grading yielded an AUC of 0.826 (95% CI: 0.746-0.907). All predictors were statistically significant (p < 0.001). Importantly, combination models improved predictive performance. The combination of RHTMD + MMG achieved sensitivity of 84.17%, specificity of 82.63%, accuracy of 82.96%, and AUC of 0.902. The highest predictive performance was observed with the combined use of RHTMD + RHSMDD + MMG, yielding sensitivity of 88.41%, specificity of 85.74%, diagnostic accuracy of 86.26%, and AUC of 0.931 (95% CI: 0.887-0.975).
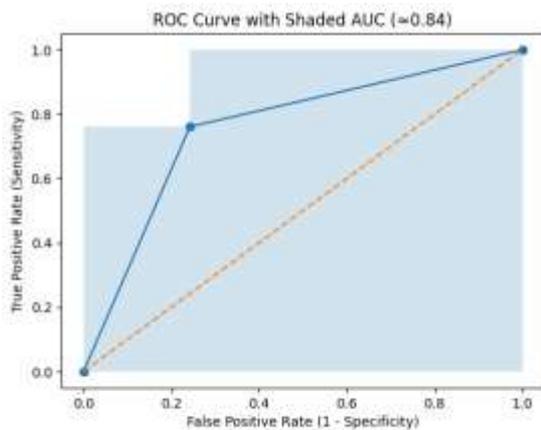
Figure 2
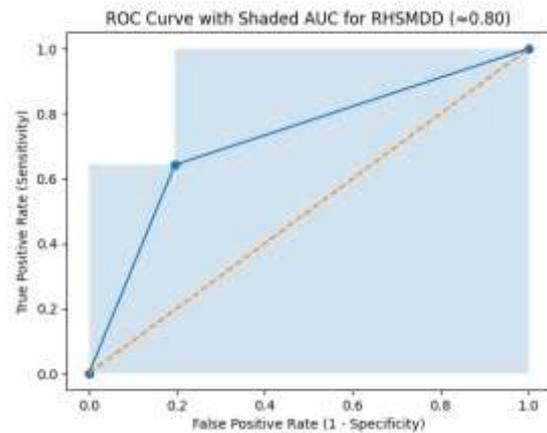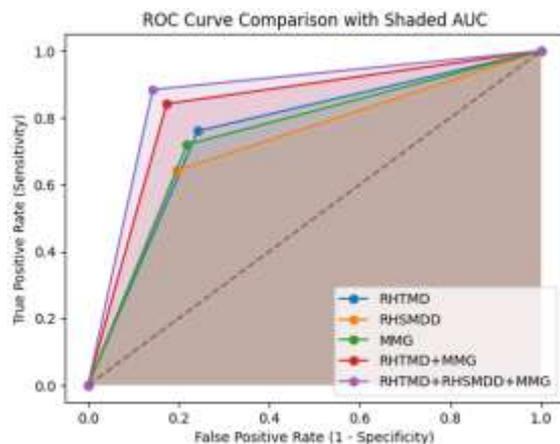
Figure 1

Figure 3

DISCUSSION

Baseline Characteristics and Airway Parameters (Table 1): In the present study, the mean age was slightly higher among patients with difficult airway compared to those with easy airway; however, the difference was not statistically significant. Similar findings were reported by Ashebir et al. (2024),[1] who observed that age alone does not reliably predict difficult laryngoscopy despite being associated with reduced airway compliance. Likewise, Tanjore et al. (2025),[2] reported no significant age-related difference between easy and difficult airway groups, suggesting that anatomical rather than demographic factors play a more dominant role.

Male predominance was observed in both groups without statistical significance, which aligns with findings by Sitot et al. (2022),[3] who demonstrated that gender distribution does not independently influence airway difficulty. However, the present study demonstrated a significantly higher BMI in the difficult airway group. This observation is consistent with Aziz et al. (2025),[4] who reported that increased BMI contributes to reduced pharyngeal space and impaired airway visualization. Thyromental distance was significantly lower among difficult airway patients, confirming its established role as a predictor of reduced mandibular space. Similar observations were documented by Mostafa et al. (2020),[7] who emphasized that shorter thyromental distance is associated with anterior larynx and limited alignment of airway axes.

The ratio of height to thyromental distance (RHTMD) was significantly higher in the difficult airway group, supporting its predictive value. These findings corroborate the observations by Abdelhamid et al. (2022),[6] who demonstrated that ratio-based and displacement-based airway measurements provide better discrimination than absolute distances due to adjustment for anthropometric variability. Furthermore, RHSMDD was significantly lower in difficult airway patients, indicating reduced sternomental displacement and limited cervical extension. Similar results were reported by Valsan et al. (2024),[5] who found that reduced sternomental displacement correlates with difficult laryngoscopy.

Modified Mallampati Grade III-IV was markedly more prevalent in the difficult airway group, demonstrating a strong association. Comparable findings were reported by Hanouz et al. (2024),[8] who showed that higher Mallampati grades are significantly associated with difficult laryngoscopic views despite moderate sensitivity.

Predictive Value of RHTMD (Table 2): The present study demonstrated that patients with RHTMD ≥ 23.5 had nearly tenfold increased odds of difficult airway, with good sensitivity and specificity. These findings are consistent with Abdelhamid et al. (2022),[6] who reported improved predictive accuracy of ratio-based airway indices compared to single linear measurements. Similarly, Anushaprasath et al. (2024),[9] reported sensitivity ranging between 70-80% for RHTMD and comparable clinical airway predictors. The high negative predictive value observed in the present study suggests that RHTMD is particularly useful for ruling out difficult airway, which has important clinical implications for routine preoperative screening.

Predictive Value of RHSMDD (Table 3): RHSMDD also demonstrated a significant association with difficult airway, although with comparatively lower sensitivity but higher specificity. These findings are in agreement with Darngawn et al. (2024),[10] who reported that sternomental displacement-based parameters may have higher specificity due to incorporation of cervical mobility and mandibular displacement. However, similar to the present findings, Tanjore et al. (2025),[2] reported moderate sensitivity for dynamic airway indices, indicating that RHSMDD may serve better as a confirmatory predictor rather than a primary screening tool.

Diagnostic Comparison and Combination of Predictors (Table 4): ROC analysis in the present study showed that RHTMD had the highest independent predictive value, followed closely by Modified Mallampati grading and RHSMDD. These results are consistent with Pujari et al. (2023),[11] who highlighted the superior discriminatory ability of anthropometric ratio-based indices in structured airway assessment.

Importantly, the combined use of predictors significantly improved diagnostic performance, with the combination of RHTMD, RHSMDD, and MMG achieving the highest sensitivity, specificity, and AUC. This supports the concept of multifactorial airway assessment proposed by Liao et al. (2021),[12] who demonstrated that combined airway predictors significantly enhance diagnostic accuracy compared to individual tests.

CONCLUSION

The present prospective observational study demonstrated that the ratio of height to thyromental distance (RHTMD), ratio of height to sternomental displacement (RHSMDD), and Modified Mallampati grading are significant predictors of difficult airway. Among the individual predictors, RHTMD showed superior sensitivity and overall predictive accuracy, indicating its usefulness as a reliable bedside screening tool. RHSMDD demonstrated comparatively higher specificity, suggesting its role in confirming airway difficulty, while Modified Mallampati grading remained a simple and clinically valuable predictor.

Importantly, the combined use of RHTMD, RHSMDD, and Modified Mallampati grading

21

International Journal of Academic Medicine and Pharmacy (www.academicmed.org)
ISSN (O): 2687-5365; ISSN (P): 2753-6556

significantly improved diagnostic accuracy and ROC performance compared to individual parameters. These findings emphasize that difficult airway prediction is multifactorial and that a composite assessment approach enhances preoperative identification of high-risk patients. Incorporating ratio-based anthropometric indices along with conventional airway assessment tests may facilitate better airway planning, reduce unexpected difficult intubation, and ultimately improve patient safety during general anesthesia.

Limitations of the study

1. The study was conducted in a single tertiary care center, which may limit the generalizability of findings to different populations and healthcare settings.
2. The sample size, although adequate for statistical analysis, included a relatively smaller number of difficult airway cases, which could influence sensitivity estimates.
3. Only direct laryngoscopy using Macintosh blade was evaluated; the predictive performance may differ with videolaryngoscopy or advanced airway devices.
4. Interobserver variability was minimized but not completely eliminated, particularly for Modified Mallampati grading.
5. Patients with morbid obesity, obstetric population, and emergency surgeries were excluded, limiting applicability to high-risk airway populations.
6. Anthropometric measurements may be affected by positioning and measurement technique, introducing potential measurement bias.
7. Dynamic airway factors such as airway collapsibility and tissue compliance were not assessed.

REFERENCES

1. Ashebir Z, Fentie F, Mohammed Z. Assessment of predictive value of thyromental height in predicting difficult laryngoscopy compared with Mallampati, and thyromental distance among surgical patient who will take general anesthesia at selected governmental hospital cross-sectional study: Ethiopia, 2022. Annals of Medicine and Surgery. 2024 Sep 1;86(9):5112-9.

2. Tanjore S, Parameshwari A, Jayaraman V. Comparative Evaluation of Diagnostic Accuracy of TMHT (Thyromental Height Test), As Predictor of Difficult Laryngoscopy with Other Predictors (Modified Mallampati, Interincisor Gap, Thyromental Distance, Neck Circumference, And Neck Extension). African Journal of Biomedical Research. 2025 May 2;28.

3. Sitot M, Amare W, Aregawi A. Predictive values of the modified Mallampati test, upper lip bite test, thyromental distance and ratio of height to thyromental distance to predict difficult laryngoscopy in pediatric elective surgical patients 5-12 years old at selected Addis Ababa governmental hospitals, Ethiopia: a multicenter cross-sectional study. BMC anesthesiology. 2022 Nov 28;22(1):364.

4. Aziz T, Hossain M, Goswami M, Das TK. Comparative Assessment of Difficult Intubation: Role of Modified Mallampati Test Versus Thyromental Height Test. Journal of Dhaka National Medical College & Hospital. 2025;31(2):28-33.

5. Valsan N, Kadiru MA, Raphael PO, Zulfikar M, Bharathan B. Ratio of Height to Sternomental Displacement as a Predictor for Difficult Airway: A Prospective Observational Study. Journal of Clinical & Diagnostic Research. 2024 Jul 1;18(7).

6. Abdelhamid BM, Ahmed A, Osman S, Abdel Azeim S, Mekawy N, Saad D. Accuracy of sternomental displacement test and thyromental height test as a predictive measure for difficult airway in elderly surgical patients: a prospective cohort study. Egyptian Journal of Anaesthesia. 2022 Dec 31;38(1):607-13.

7. Mostafa M, Saeed M, Hasanin A, Badawy S, Khaled D. Accuracy of thyromental height test for predicting difficult intubation in elderly. Journal of anesthesia. 2020 Apr;34(2):217-23.

8. Hanouz JL, Lefrançois V, Boutros M, Fiant AL, Simonet T, Buléon C. Comparison of the modified Mallampati classification score versus the best visible Mallampati score in the prediction of difficult tracheal intubation: a single-centre prospective observational study: J.-L. Hanouz et al. Canadian Journal of Anesthesia/Journal canadien d'anesthésie. 2024 Oct;71(10):1353-62.

9. Anushaprasath U, Kumar M, Kamal M, Bhatia P, Kaloria N, Paliwal B, Gupta SK, Mohammed S, Sharma A. Evaluation and comparison of sonographic difficult airway assessment parameters with clinical airway predictors. Journal of Anaesthesiology Clinical Pharmacology. 2024 Jul 1;40(3):422-31.

10. Darngawn LH, Nadarajan V, Pradeep V. Incidence and Predictors of Difficult Intubation in Patients Undergoing Thyroid Surgery. Journal of Clinical & Diagnostic Research. 2024 May 1;18(5).

11. Pujari V. Preoperative airway assessment. InThe Airway Manual: Practical Approach to Airway Management 2023 Feb 16 (pp. 45-65). Singapore: Springer Nature Singapore.

12. Liao EC, Chang WH, Yu CH, Chau YP, Sun FJ, Lai WJ, Chien DK. Predictors of difficult endotracheal intubation in the emergency department: a single-center pilot study. Signa Vitae. 2021 Mar 1;17(2):77-84.

22

International Journal of Academic Medicine and Pharmacy (www.academicmed.org)
ISSN (O): 2687-5365; ISSN (P): 2753-6556