The Difficult Airway Management

Defining difficulty:

1. **Difficult face-mask ventilation** when FM ventilation can not be maintained by a single operator.

2. **Difficult SAD** when insertion requires multiple attempts or, effective lung ventilation is not possible after insertion.

3. **Difficult laryngoscopy** when laryngeal inlet can not be seen.

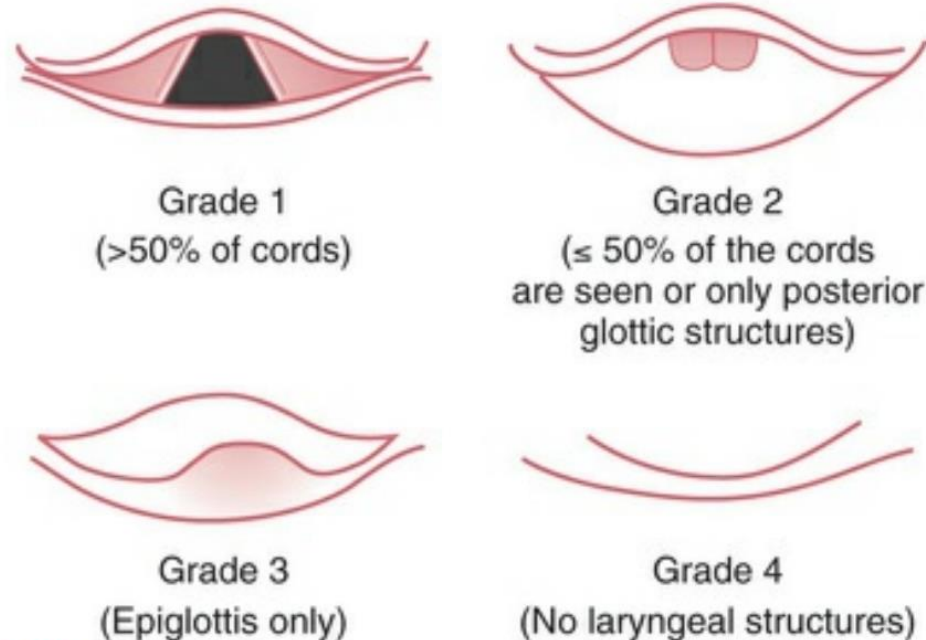   **Cormac and Lehane's grading of laryngeal view** is moderately correlated with measures of difficulty.

4. **Difficult tracheal intubation** when there is difficult laryngoscopy , or difficulty in passing the tube despite good view of the larynx, requiring multiple attempts or multiple operators.

5. **Difficult oxygenation** when hypoxia (SpO_2<92%) occurs despite pre-oxygenation.

Predictors of Difficult face-Mask ventilation

1. *BMI >26kg/m².*

2. *History of snoring.*

3. *Age >55Yrs.*

4. *Presence of beard*

5. *Absence of teeth.*

Cormac and Lehane's grading of laryngeal view

Grade 1
(>50% of cords)

Grade 2
(≤ 50% of the cords
are seen or only posterior
glottic structures)

Grade 3
(Epiglottis only)

Grade 4
(No laryngeal structures)

FIG. 23.36 Cormack and Lehane classification of glottic visualisation at direct laryngoscopy.

Predictors of Difficult SAD Insertion or Failure

1. Male sex.
2. Raised BMI.
3. Poor dentition.
4. Rotation of the tube after induction of anesthesia.
5. Limited mouth opening:

   -difficult if <2.5 cm.

   - impossible if <2.0 cm.
6. Intraoral ,pharyngeal mass or lingual tonsils.

Specific tests to predict risk of difficult laryngoscopy

1. Mouth opening-incisor gap of <3cm.

Measure the distance between the incisors (or alveolar margins) with the mouth fully open (Fig. 23.38). This distance is affected by upper cervical spine and temporomandibular joint mobility. A gap < 3cm increases likelihood of difficult tracheal intubation.


FIG. 23.38 Interincisor gap assessment: (A) normal; (B) large; (C) markedly reduced.

Specific tests to predict risk of difficult laryngoscopy

2. Mallampati test:

Mallampati test

Mallampati described three classes, and Samsoon and Young added a fourth The patient should be asked to open the mouth as wide as possible and protrude the tongue as far as possible; the view of the posterior pharyngeal wall should then be examined (Fig. 23.39). This should be done with the anaesthetist opposite the patient but can be done standing, sitting or lying.
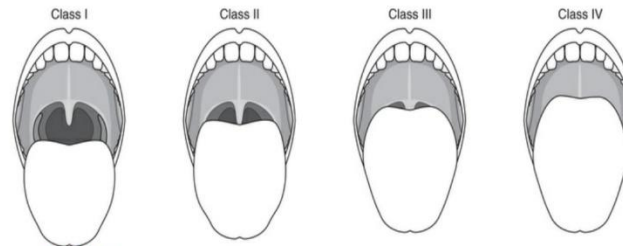
FIG. 23.39 Classification of the pharyngeal view when performing the Mallampati test. The patient must fully extend the tongue during maximal mouth opening. Class I: pharyngeal pillars, soft palate, uvula visible. Class II: only soft palate, uvula visible. Class III: only soft palate visible. Class IV: soft palate not visible. Note that the posterior pharyngeal wall is visible in class 1 and 2 but is not visible in class 3 and 4.

• Class 1: faucial pillars (palatoglossal and palatopharyngeal folds), soft palate and uvula visible.
• Class 2: faucial pillars and soft palate visible; uvula masked by base of tongue.
• Class 3: only soft palate visible.
• Class 4: soft palate not visible.

Class 3–4 views (i.e. when the posterior pharyngeal wall cannot be seen) are associated with increased risk of difficult laryngoscopy and face-mask ventilation. A positive test has a positive predicted value of only 3%–5% and sensitivity of 50%.

Specific tests to predict risk of difficult laryngoscopy

3. Flexion/extension of the upper cervical spine.

(Fig. 23.40). The patient's lower cervical spine should be immobilised manually, then the patient asked to fully flex and then extend the head, with a pen placed on the vertex to observe the arc of movement.

FIG. 23.40 Assessment of upper cervical spine extension.

Alternatively the patient can be asked to sit straight. One finger should then be placed on the patient's occipital prominence and another on the patient's chin. The patient should then fully extend the neck.

- Class 1 (normal): the chin rises above the occiput.
- Class 2 (moderate limitation): both fingers are at the same level.
- Class 3 (severe limitation): the chin remains lower than the occiput.

Specific tests to predict risk of difficult laryngoscopy

4. Thyromental distance (Patil test)

Thyromental distance (Patil test)

With the patient's head and neck fully extended and the mouth closed, a measurement should be taken from the tip of the thyroid cartilage to the mentum (tip of the mandible) (Fig. 23.41A).
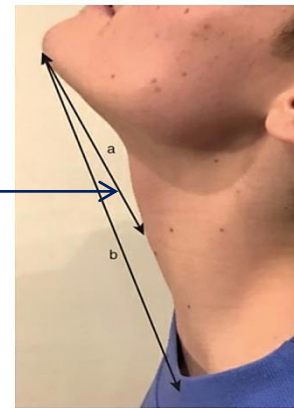

FIG. 23.41   Assessment of (A) thyromental and (B) sternomental distances.

- > 7.0 cm is normal.
- < 6.0 cm has a 75% sensitivity for detecting difficult laryngoscopy.
- < 5.5.cm means a difficult laryngoscopy is very likely.

Specific tests to predict risk of difficult laryngoscopy

5. Strernomental distance (Savva test):

<12.5cm predicts

Difficult laryngoscopy.

Thyromental distance (Patil test)

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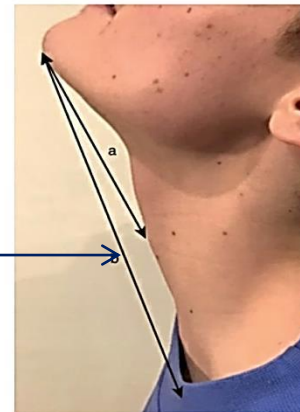

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Specific tests to predict risk of difficult laryngoscopy

6. Protrusion of the mandible (prognathism)

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To identify prognathism, the patient should be asked to move the lower jaw in front of the upper jaw.

- Class A (normal): the lower incisors lie anterior to the upper incisors.
- Class B (abnormal): lower incisors reach the upper incisors.

- Class C (very abnormal): lower incisors do not reach the upper incisors.

Specific tests to predict risk of difficult laryngoscopy

7.

Combined tests

Combining tests increases the positive predictive value and specificity at the cost of sensitivity.

Combining thyromental distance and Mallampati tests (< 7cm and class 3–4) increases specificity (97%) but reduces sensitivity (81%).

The Wilson score combines five factors (weight, upper cervical spine mobility, jaw protrusion, buck teeth, receding mandible) each rated 0–2 (normal to abnormal). A score > 3 identifies 75% of patients with difficult laryngoscopy.

Specific tests to predict risk of difficult laryngoscopy

8. Advanced testing :

* Ultrasound.

* Nasendoscopy.

* CT/MRI of the airways.

Predicting difficulty with FONA

FONA= Front Of Neck Airway:

1. Obesity.
2. Goitre or anterior neck mass.
3. Fixed neck flexion as scars.
4. Previous radiotherapy.
5. Surgical collar or external fixator(remove!)

Predicting difficultly securing airway awake

1. *Lack of patient co-operation.*

2. *Secretions and bleeding makes flexible bronchoscopy difficult.*

3. *Airway obstruction makes awake intubation more difficult and needs skilled and experienced operator.*