HUGE GOITER AND AIRWAY MANAGEMENT

RAMAVATH

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1. Introduction
2. Airway challenges in goiter
3. ASA Difficult airway algorithm
4. Different methods to anaesthetic airway management
5. Flexible fiberoptic bronchoscopy
6. How we did it in our OT ?????
The normal thyroid gland is impalpable.

The term goiter is used to describe generalised enlargement of the thyroid gland.

It was coined from the Latin guttur = the throat
Introduction..

- Thyroidectomy is the MC endocrine procedure being carried out.
- The anesthesiologist has to face difficulty while administering anesthesia for a large thyroid swelling.
- Anticipated difficult airway due to pressure effects of enlarged thyroid gland further adds to the anesthetic challenges.
- The challenging scenarios can be encountered at any stage during airway intubation or extubation or postoperative period.
2. Airway challenges in goitre

- A. Pre-anaesthetic Checkup
- B. Preparation of OT
- C. Tracheal Intubation
  - D. Extubation
A. Predicting the Difficult Airway preoperatively

- History
- Physical Examination
History

1. Elicitation of history should include symptoms and signs related to
   hyperthyroidism,
   hypothyroidism and
   co-morbid medical diseases.

2. History should also include difficulties encountered during normal breathing and respiration such as
   dyspnea,
   orthopnea,
   dysphagia,
   stridor or horseness of voice
   breathlessness on assuming supine position.
Dr. Binnions Lemon Law: An easy way to remember multiple tests

- **L**ook externally.
- **E**valuate the 3-3-2 rule.
- **M**allampati score
- **O**bstruction
- **N**eck mobility.
Look externally

- Nose - DNS, Polyp
- Teeth - Buck Teeth
- Receding Jaw (Dentures)
- Burns
- Short Muscular neck
- Obesity or very small
- Facial Trauma
- Macroglossia
Evaluate the 3-3-2

✓ 3 fingers fit in mouth
✓ 3 fingers fit from mentum to hyoid cartilage
✓ 2 fingers fit from the floor of the mouth to the top of the thyroid cartilage
**M-Mallampati Score**
(Samsoon and Young’s modification)

**Grade 1 & 2**: Easy laryngoscopic view of glottis

**Grade 3 & 4**: Difficult & impossible view of glottis

**Class-I**
- Soft palate, fauces; uvula, anterior and the posterior pillars.

**Class-III**
- Soft palate, fauces and uvula

**Class-III**
- Soft palate and base of uvula

**Class-IV**
- Only hard palate
0: Obstruction?

- Blood
- Vomitus
- Teeth
- Epiglottis
- Dentures
- Tumors
- Impaled Objects
N-Neck mobility. Neck flexion, extension and side movements should be adequate
Temporo Mandibular Joint function

Judged with:

1. Jaw protrusion (Subluxation)

2. Upper lip bite test (ULBT)

3. Hyomental distance:
   distance between mentum and hyoid bone.
   Gr I -> 6 Cm,  GrII-4-6 cm  GrIII-< 4 cm
   Gr III – difficult intubation

4. Thyromental Distance
   >6.5 cm – Normal
   <6 cm difficult intubation may be possible

5. Sternomental Distance
   • >12.5cm normal
Atlanto-Occipital Angle

Estimates the angle traversed by the occluded surface of the upper teeth

Grade I --- > 35°
Grade II --- 22-34°
Grade III – 12-21°
Grade IV -- < 12°
Cormack and Lehane Laryngoscopic View

Class I: the vocal cords are visible
Class II: the vocal cords are only partly visible
Class III: only the epiglottis is seen
Class IV: the epiglottis cannot be seen.

grade 3,4 -> risk for difficult intubation
Difficult Airway

- ASA defines Difficult airway as “Situation where a conventionally trained anesthesiologist experiences difficulty with mask ventilation, endotracheal intubation or both”
Difficult Mask Ventilation- BONES

B- BeardHiding? Bad seal

O- Obesity BMI > 26-30kg/m²

N- NoTeeth

E- elderly >55yrs

S- Snoring and
Difficult Surgical Airway

BANG

- B- Bleeding tendency
- A- Agitated patient
- N- Neck scarring or Flexion deformity
- G- Growth or vascular abnormality in the region of surgical deformity
Systemic examination

CVS
Resp system.
CNS
Vital signs;
lab tests
• CBP,Sr.ele,bu/sc,Sr.cal, Lft, Ct/bt, CUE, Ecg, 2decho
Specific tests

- Thyroid Functional test
  TSH, T3, T4
- Chest and thoracic inlet radiography
- Neck X-ray
- Ultrasound scanning
- Fine-needle aspiration cytology
- Indirect laryngoscopy (IDL):
  
  IDL is done preoperatively to detect any involvement of the vocal cords
- Computerised tomography,
- Magnetic resonance imaging
PRE OPERATIVE ORDERS

- Pt should be euthyroid state before surgery
- Informed valid written consent.
- Nothing by mouth for 6 hours.
- Tab.alprazolam 0.25 mg and tab.ranitidine 150 mg given at night before day of surgery
- Pt should continue any medication if he is ON eg. anti HTN and antithyroid drugs on the day of surgery
B. Preparation of OT

a. O2 source checked

b. Difficult Airway Trolley
   - Tracheal tubes
   - Tracheal tube guides
   - Laryngeal Mask Airway
   - Non-invasive/minimally invasive equipments
   - airways- OPA,NPA
   - Surgical Airway
   - Fiberoptic Bronchoscope

- Drugs: all emergency drugs
- Monitors:
  - pulse oximetry etco2,Ecg,NIBP
Pre medication

- Inj. Glycopyrronium 0.2mg/iv given to minimise the airway secretions.
- Antiemetic drug - inj. Ondansetron 4 mg/iv
- Sedatives is omitted or given in small doses. If required to allely anxiety
  Inj. Midazolam 1mg/ iv is given
C. INTUBATION

Intubation- can be done under

1. Awake-
   a. Nerve block
   b. Topical anesthesia –Spray As You Go technique

2. Asleep/Induced state
Different methods of airway management

a. Nerve Block
   i. Glossopharyngeal block
   ii. Superior laryngeal block
   iii. Trans tracheal block

i. Glossopharyngeal block

There are two way to approach:
1. Intra-oral – need enough mouth opening
2. Peristyloid – require the ability to distinguish the bony landmarks
Fig 5. Intraoral approach to the glossopharyngeal nerve. (Reprinted with permission.28)

Fig 6. Peristyloid approach to the glossopharyngeal nerve. (Adapted and reprinted with permission.28)
ii. Superior laryngeal block

Patient position is supine with neck extended.

- The greater cornu of the hyoid bone is palpated and identified just below the angle of the mandible and by tracing upwards from the posterolateral surface of the thyroid cartilage.
- The hyoid bone is held between the index and thumb fingers of the operator and firm pressure is applied to displace it toward the side to be blocked.
- After negative aspiration for air and blood, 2-3 mL of 2% lignocaine is injected.

iii. Trans tracheal block

placed pt insupine with neck extended

- The cricothyroid membrane can be felt in the mid line between in the mid line of the thyroid prominence and the cricoid cartilage.
- Aspiration is done, and, when air is aspirated, the local anesthetic is 4ml of inj.of 2% lignocaine is injected.
Topical anesthesia

ANAESTHETISING THE AIRWAY

Nasal Cavity.
- Cotton-tipped swabs soaked in 4% lidocaine is placed superiorly and posteriorly in the nasopharynx. Then wait for 5-10min minutes to block the branches of the ethmoidal and trigeminal nerves.
- Nebulise 2ml 4% Lignocaine

Mouth and Oropharynx
- Anaesthesia of posterior one third and posterior oropharyngeal wall (gag reflex).
- Lidocaine (lignocaine 4%; 4mL) can be nebulized.
- Viscous lignocaine 2% around 2-4 mL can be gargling
- Applying a 4% lignocaine soaked swab or spray with 10% Lidocaine (lignocaine)

Larynx below the vocal cords, and tracheo-bronchial tree,
- 4% Lignocaine in 1 ml aliquots to anaesthetise to larynx below the vocal cords, and tracheo-bronchial tree, using: “Spray as you go” technique during endoscopy
**Fiberoptic Aided Intubation (AFOI).**

- It is a technique which allows a flexible oral or nasal route to provide a clear visualisation of the vocal cords, and subsequent passage of an endotracheal tube into the trachea under direct vision.

**Design:**
- Several parts – handle, light source, flexible insertion portion.
- Handle - it has eye piece, focusing ring, working channel port the tip control knob.
- Working channel - it can be used for suctioning injecting saline or medication, insufflating gases or passing guidewire.
Parts of Fiberoptic scope..
Preparation of the patient to AFOI

Explain to the pt regarding the procedure.
1. The reasons for proceeding with an awake fiberoptic intubation
2. The potential complications
3. The type of airway anesthesia that will be provided
4. Possible alternatives to the proposed.
Technique

Premedication is given 30-60 min before the procedure

Apply anaesthesia to the airway -

2 methods

1. Nasal packing, orapharynx with nebulisation of lidocaine or gagring can be done preoperative area.

2. Nerve blocks - Intra operatively

Intraoperatively, I v line secured and monitors are connected.

Pt position -

a. supine - endoscopist is at the head of table
b. Sitting - endoscopist faces the pt.

Preoxygenation

a. nasal cannula in spontaneously breathing pt
b. O2 flow through the suction port

Procedure can be done orally or nasally
**Technique..**

- Nasal is prefered to avoid biting to the scope
- Introduce the fibrescope through the nostril
- Steer the fibrescope into the oropharynx,
- Steer the fibrescope into the oropharynx,
- Once in the oropharynx, visualization of the epiglott is the st landmark.
- Advance the fibrescope into the laryngeal opening using **Spray As You Go Technique.**
- Advance the fibrescope until it enters the subglottic space, visualization of the trachea, 2nd landmark.
- Advance the fibrescope again into the trachea, identifying the carina, 3rd landmark
- **Keep the carina in the field of vision at all times to prevent dislocation of the fibrescope out of the larynx into the oesophagus**
- Remove the fibrescope maintaining the ETT in place, with the tip at 3-5cm above the carina.
- Fix the ETT in place and connect to the anaesthetic breathing circuit
- Confirm the ETT position by capnography, auscultation of bilateral air entry, observation of bilateral chest movement and misting of the tube,

5. **Induce** the patient using appropriate anaesthetic agents (intravenous, inhalational, neuromuscular blockers), and inflate the ETT cuff.
Awake Intubation Advantages

- Maintain spontaneous ventilation
- Maintain esophageal tone (↓ aspiration)
  - Able to protect if reflux occurs
- Most Versatile Tool Available for Difficult Intubation
- Optical Elements are Small
- Visualization Below the Cords
- Awake Intubation

Disadv
- Unique Skillset
- Lens Contamination
- Cost
Contraindications to Awake

- Allergy to local anaesthetic agents
- Infection/contamination of the upper airway – blood, friable tumour, open abscess
- Grossly distorted anatomy
- Fractured base of skull (CI to nasal route)
- Penetrating eye injuries
- Patient refusal or uncooperative patient
Difficulties/trouble shooting

1. Inability to advance FOB into Trachea
2. Inability to advance Ett into trachea from FOB
3. Inability to remove FOB.
3. ASA Difficult airway algorithm

DIFFICULT AIRWAY ALGORITHM

1. Assess the likelihood and clinical impact of basic management problems:
   A. Difficult Ventilation
   B. Difficult Intubation
   C. Difficulty with Patient Cooperation or Consent
   D. Difficult Tracheostomy

2. Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management

3. Consider the relative merits and feasibility of basic management choices:
   A. Awake Intubation vs. Intubation Attempts After Induction of General Anesthesia
   B. Non-Invasive Technique for Initial Approach to Intubation vs. Invasive Technique for Initial Approach to Intubation
   C. Preservation of Spontaneous Ventilation vs. Ablation of Spontaneous Ventilation

4. Develop primary and alternative strategies:
   A. AWAKE INTUBATION
      Airway Approached by Non-Invasive Intubation vs. Invasive Airway Access
      - Succeed vs. FAIL
      - Cancel Case vs. Consider Feasibility of Other Options
   B. INTUBATION ATTEMPTS AFTER INDUCTION OF GENERAL ANESTHESIA
      Initial Intubation Attempts Successful vs. Initial Intubation Attempts UNSUCCESSFUL
      - FROM THIS POINT ONWARDS CONSIDER:
        1. Calling for Help
        2. Returning to Spontaneous Ventilation
        3. Awakening the Patient

   C. FACE MASK VENTILATION ADEQUATE
      - CONSIDER / ATTEMPT LMA
         - LMA ADEQUATE vs. LMA NOT ADEQUATE OR NOT FEASIBLE
            - EMERGENCY PATHWAY
              - Ventilation Not Adequate, Intubation Unsuccessful
                - Call for Help
                - Emergency Non-Invasive Airway Ventilation
                - Successful Ventilation vs. FAIL
      - NON-EMERGENCY PATHWAY
        - Ventilation Adequate, Intubation Unsuccessful
          - Alternative Approaches to Intubation
            - Successful Intubation vs. FAIL After Multiple Attempts

   D. FACE MASK VENTILATION NOT ADEQUATE
      - CONSIDER / ATTEMPT LMA
         - LMA ADEQUATE vs. LMA NOT ADEQUATE OR NOT FEASIBLE
            - EMERGENCY PATHWAY
              - Ventilation Not Adequate, Intubation Unsuccessful
                - Call for Help
                - Emergency Non-Invasive Airway Ventilation
                - Successful Ventilation vs. FAIL
      - NON-EMERGENCY PATHWAY
        - Ventilation Adequate, Intubation Unsuccessful
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            - Successful Intubation vs. FAIL After Multiple Attempts

How we did it in our OT ????

Anticipated DA, so awake fiberoptic intubation is technique of choice to this pt.

- So, Difficult airway trolley kept ready
- Pt explained about the procedure
- Premedicated with inj. Glyco, inj. Ondansetron
- Preoxygenation given adequately
- As anatomy of neck is distorted Nr block technique for awake intubation is precluded.
- We followed spraying of L.A. as we go technique with 10% lidocaine spray.
- AFOI is tried and failed due to obstruction with soft tissue mass protruding from the right side'
- With difficult we managed to negotiate the Ett by direct laryngoscope with aid of bougie
Pt the induced with Inj. Thiopentone 5mg/kg
Long acting muscle relaxant inj Vecuronium 0.1mg/kg is given as loading dose

- Maintenance of anaesthesia:
  O2+N20, Volatile inhalational agents
  Opioids, Muscle relaxants
extubation

- After the conclusion of surgery, NMB is reversed by Inj. Neostigmine + inj.glyco
- Extubation done electively.
Post op complications

1. Immediate
   Laryngospasm,
   post op laryngeal oedema
   Tracheomalacia causing airway collapse,
   Nr injury- B/L RLN or SLN

2. Late phase
   Hematoma, hypocalcemia
Thank u