



# PBL Case 4 (anesthesia course) Group C

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## Case 4: Difficult Airway

A 35-year-old woman presents for laparoscopic lysis of adhesions. Her first laparotomy occurred 10 years prior to this admission. At that time, the process of tracheal intubation consumed 1 hour. She awakened with a very sore throat, but does not know the details of the intubation.

The old records are unavailable.

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# Question 1

What are the predictors of difficult mask ventilation?

- Difficult mask ventilation can be a serious threat to a patient if difficult intubation occurs, and the patient cannot be properly ventilated by mask
- Five factors were found to be independently associated with difficult mask ventilation
  - Age > 55 (least important )
  - BMI > 26
  - Lack of teeth
  - Presence of beard ( most important )
  - History of snoring
- Patient with active airway obstruction (tumor, abscess, laryngeal edema) will also likely be difficult to ventilate
- Presence of two of these factors is 72% Sensitive and 73% Specific for difficult mask ventilation

# Question 1

What are the predictors of difficult mask ventilation?

MOANS mnemonic to remember it

- MASK SEAL
- OBSTRUCTION/ OBESITY
- AGE
- NO TEETH
- STIFFNESS

## Question2: **Discuss the risk factors for difficult intubation.?**

- Abnormal facial anatomy/development
- small mouth ( **scleroderma** )and/or large tongue(**Downs**)
- High arch palate ( **Marfan**)
- dental abnormality: Full set of teeth, buck teeth
- Receding mandible ( maybe hidden by a beard)
- Inability to sublux the jaw ( forward protrusion of the lower incisors beyond the upper incisors)
- obesity
- Inability to open mouth
- masseter muscle spasm (dental abscess)
- temporo-mandibular joint dysfunction
- facial burns
- post radiotherapy fibrosis
- Scleroderma
- Lock Jaw
- Cervical immobility/abnormality
- short neck/obesity
- poor cervical mobility, e.g ankylosis spondylitis , rheumatoid arthritis
- previous cervical spine surgery
- presence of cervical collar:
- **MCQ – if a pt is at a rural area and you have to advanced methods what so ever , how do you intubate this patient ? By manual inline stabilization and if you were alone you do not remove the collar no matter what**

## Question2: **Discuss the risk factors for difficult intubation.?**

### Pharyngeal and laryngeal abnormality

- high or anterior larynx
- deep vallecula (inability to reach base of epiglottis with blade of scope)
- anatomical abnormality of epiglottis ( **omega shaped epiglottis which is managed by a macoy laryngoscope**) or hypopharynx, e.g tumor
- subglottis stenosis
- Other Acquired :
- Infection: **epiglottitis ( impeding airway obstruction and is seen in pediatric cases with no IV line )**, dental or facial abscess
- Neoplasia: tongue, neck, mouth,
- advanced pregnancy ( **20wks and 3<sup>rd</sup> trimester**)
- Endocrine: thyroid enlargement , acromegaly
- congenital syndrome – Rare

## Question3: **How is the anticipated difficult intubation approached?**

Not all difficult airways are detected by the preoperative assessment.

- Not every previously successful intubated patient means easy airway.
- Pre oxygenation is very important in these cases to give the patient a good reservoir.
- Intubation should be done within 30 seconds.
- **The first step after failed intubation is calling for help.**
- When difficulty is anticipated, tracheal intubation after induction of general anesthesia should be considered only when success with the chosen device(s) could be **predicted in a maximum of three attempts.**

Concomitant predicted difficulty-using oxygenation by facemask or supraglottic

device ventilation as a fallback makes an awake approach advisable.

Contextual issues, such as patient cooperation, availability of additional skilled help, and the clinician's experience, must also be considered in deciding the appropriate strategy.

# Question? **How is the anticipated difficult intubation approached?**

So we can do either:

- Awake intubation
- Intubation with Lighted stylet (trachlight), fiberoptic laryngoscope, or Glidscope.



# Question 4

Describe the management options for a patient who, after induction of anesthesia, unexpectedly cannot be intubated with a Macintosh blade. This patient has a good mask airway.

- Initial management strategy for failed intubation:
- 1. Plan a course of management before starting anaesthesia.
- 2. Call for HELP.
- 3. Maintain airway.
- 4. Ventilate with 100% oxygen.
- 5. Maintain cricoid pressure (if part of anaesthetic technique).
  - Q: what are contraindications to the cricoid pressure ?
- -Cricoid fracture
- -Cervical collar- Cervical trauma
- -Active vomiting
- 6. Avoid persistent attempts to intubate if patient is hypoxic.
- 7. Avoid further doses of muscle relaxants unless you are absolutely sure of airway control and ventilation. Because the risk of apnea prolongation MCQ

# Question 4

Describe the management options for a patient who, after induction of anesthesia, unexpectedly cannot be intubated with a Macintosh blade. This patient has a good mask airway.

- Subsequent management strategies for failed intubation:
- 1. Awaken patient or continue anaesthetic until senior help arrives
- 2. Summon experienced help – intubate under general or local anaesthesia: laryngeal mask (intubation through mask), fibre-optic intubation, blind nasal intubation)
- 3. Last resorts include retrograde intubation, transtracheal jet ventilation, cricothyroidotomy( is only indicated if you cant ventilate cant intubate )
- 4. Make elective tracheostomy
- 5. Perform surgery under regional anaesthesia.
- Failed intubation should be prepared for and the priority initially should be on airway control and ventilation of the lungs. It is usually safer to awaken a patient and then consider the alternatives after consultation with a more experienced colleague.

# Question 5

Following induction of anesthesia, ventilation by facemask and intubation are impossible. What maneuvers may help?

- 1- Manual airway maneuvers:
    - the head tilt/chin lift maneuver = sniffing position (preferred)
    - the jaw thrust (if neck injury is present)
  - 2- Cricoid pressure (Sellic maneuver)
  - 3- BURP (Backward, Upward, Rightward Pressure) – modification of cricoids pressure
- \* Apply backward pressure and push the cartilage toward the chin. Move it to the patient's right.
- **The best answer is cricothyroidotomy**

# Question 6

How is successful tracheal intubation verified?

A-Clinically

**Box** Clinical signs used to confirm tracheal intubation

- Direct visualisation of tracheal tube through vocal cords **the most accurate**
- Palpation of tube movement within the trachea
- Chest movements
- Breath sounds
- Reservoir bag compliance and refill
- Condensation of water vapour on clear tracheal tubes

• Condensation of water vapour on clear tracheal tubes

• Reservoir bag compliance and refill

# Question 6

How is successful tracheal intubation verified?

## A-Technical

**Box** Technical tests to confirm intubation

- Negative pressure tests
- End-tidal CO<sub>2</sub> monitoring – six breaths **the most accurate**
- Fenestration disposable CO<sub>2</sub> monitors
- Fibre-optic observations of the trachea

# Question 7

Following a difficult intubation, how is postoperative extubation managed?

## *Prior to extubation of the difficult or at-risk airway:*

- An extubation strategy must be formulated that includes a plan for reintubation if necessary.
- Neuromuscular blockade should be reversed.
- The patient should be normothermic, hemodynamically stable, and adequately spontaneously ventilating.
- Administration of 100 percent oxygen (O<sub>2</sub>) and positive end-expiratory pressure or continuous positive airway pressure in order to maximize the safe apneic period if problems occur.
- The oropharynx should be thoroughly suctioned to remove blood and secretions.
- A soft bite block should be placed between the patient's molars to prevent occlusion if the patient bites down during emergence.

# Question 7: Following a difficult intubation, how is postoperative extubation managed?

## DAS Extubation Guidelines: 'At risk' algorithm

**Step 1**  
Plan extubation

**Plan**  
Assess airway and general risk factors

**'At risk' extubation**  
Ability to oxygenate uncertain  
Reintubation potentially difficult  
and/or general risk factors present

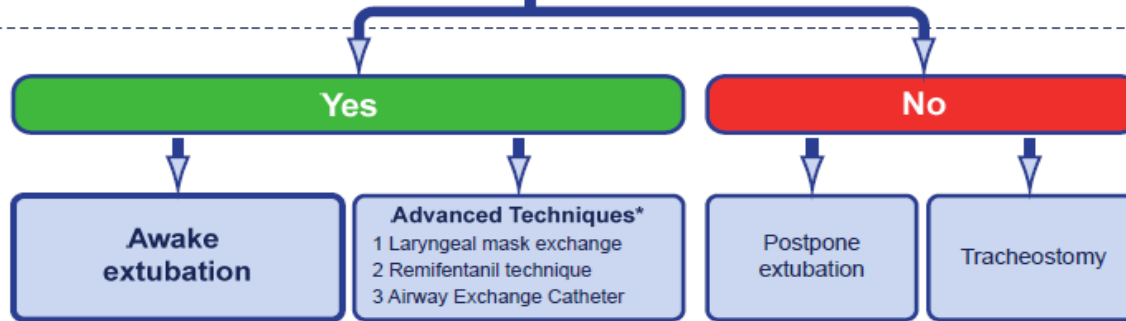
**Step 2**  
Prepare for extubation

**Prepare**  
Optimise patient and other factors

<b>Optimise patient factors</b>	<b>Optimise other factors</b>
Cardiovascular	Location
Respiratory	Skilled help / assistance
Metabolic / temperature	Monitoring
Neuromuscular	Equipment

**Key question: is it safe to remove the tube?**

**Step 3**  
Perform extubation



**Step 4**  
Postextubation care

**Recovery / HDU / ICU**

Safe transfer	Analgesia
Handover / communication	Staffing
O <sub>2</sub> and airway management	Equipment
Observation and monitoring	Documentation
General medical and surgical management	

\*Advanced techniques: require training and experience





# Question 7

Following a difficult intubation, how is postoperative extubation managed?

## Airway Exchange Catheter

The AEC is a 100-cm-long, flexible, hollow plastic tube designed to maintain access to the airway after extubation.

AEC is used as a stylette to facilitate and guide reintubation, if necessary. The AEC is passed through the endotracheal tube (ETT) into the trachea prior to extubation.

The ETT is removed over the AEC; the AEC is left in place in the trachea, taped securely, until the possible need for reintubation has passed.

If reintubation is required, an ETT is passed over the AEC, often while performing direct or indirect laryngoscopy to retract soft tissue.





# Thank You



# Reference:

- General Anesthesia Lecture
- Medscape
- <http://www.ncbi.nlm.nih.gov/pubmed/24132408>
- Anesthesia Department Booklet
- <https://www.acep.org/Clinical---Practice-Management/Verification-of-Endotracheal-Tube-Placement/>
- <http://emedicine.medscape.com/article/2116444-periprocedure>
- [http://www.narescue.com/NAR\\_EDD\\_\(Esophageal\\_Detection\\_Device\)-CNB93F881E9DA9.html](http://www.narescue.com/NAR_EDD_(Esophageal_Detection_Device)-CNB93F881E9DA9.html)