Airway Workshop Lecture
Department of Anesthesiology
University of Ottawa
Overview

- Ventilation
- Airway assessment
- Difficult airways
- Airway management
  - equipment aids
- Intubation/Improving Intubation Success
- Complications of intubation
- LMA’s
Bag-Mask Ventilation

• The *most important* skill to possess
• Patients die from hypoxemia, NOT the lack of an endotracheal tube!
Bag-Mask Ventilation

• Technique:
  • head position (cervical flexion, AO extension)
  • mask fit
  • mask hold
  • pressure used (< 20 cmH₂O)
  • troubleshooting (leaks, airway obstruction)
Difficult Bag-Mask Ventilation

- **Predictors**
- **B** bearded (difficult seal)
- **O** old (emaciated – difficult seal)
- **O** obese/pregnant (high pressure, obstruction)
- **T** toothless (‘edentulous’, difficult seal)
- **S** sleep apnea (high pressure, obstruction)
Upper AW Obstruction

- Suction oropharynx
- Chin lift
- Jaw thrust
- Insertion oral/nasal airway
- Positive pressure
Airways

• Purpose

• Oropharyngeal airways
  – truly obtunded patients
Airways

- Nasal airways
  - semi-conscious patients
  - careful re: nosebleeds (lubricate)
Airway Assessment - Purpose

– To look at a patient’s physical features to predict ability to see the vocal cords (with laryngoscopy) and therefore predict the ease of intubation

– Predicting a difficult airway allows you to:
  • have extra equipment available
  • change your approach (e.g. awake intubation)
Airway Assessment

• Mallampati classification
• Mouth opening
• Dentition
• TMJ mobility
• Thyromental distance (TMD)
• Cervical spine range of motion
• Other factors: e.g. obesity, pregnancy
Mallampati Classification*

* Modified by Samsoon and Young
Airway Assessment

- **Mouth opening**
  - Male assessor: 2 finger breadths
  - Female assessor: 3 fingers

- **Teeth**
  - loose, chipped, capped, dentures

- **Thyromental distance (TMD)**
  - want > 6 cms
    - Male assessor: 3 finger breadths
    - Female assessor: 4 fingers
Difficult Airway - Examples

• Anatomy
  – small mouth
  – big tongue
  – recessed chin
  – short, fat neck
  – prominent incisors

• Circumstances
  – facial trauma
  – C-spine collar
  – vomit, blood
  – swelling
    • burns, anaphylaxis
  – foreign body
  – combative patient
Difficult Airway - Conditions

• Neck
  – arthritis
  – ankylosing spondylitis

• Oropharynx
  – obesity
  – pregnancy
  – sleep apnea
  – Down’s syndrome, tracheoesophageal fistula, Pierre-Robin sequence

• Other
  – tumours
  – abscesses
  – previous airway surgery/radiation
    • distorts anatomy
    • stiff tissues
Intubation - Indications

- Airway protection
- Oxygenation
- Ventilation
- Tracheobronchial lavage
- Relief airway obstruction
- Cardiovascular instability/shock
- Medication delivery
Intubation - Equipment

- Suction
- Tape
- Airway
- Bag - mask - oxygen
- Laryngoscope
- Endotracheal tube (stylettered)
- Syringe
Larynx

- base of tongue
- vallecula
- epiglottis
- vocal cord
- false cord
- arytenoids
- esophagus (compressed!)
Laryngeal Views

Classification of Laryngoscopy Views
How do we confirm the ETT is placed correctly?

- **Gold standards**
  - direct visualization of tube through cords
  - ETCO$_2$ reading
- **Others (indirect)**
  - air entry by auscultation
  - chest rise and fall
  - lack of abdominal distension
  - mist in ETT
Right Equipment

• Laryngoscope
  – Straight vs. curved blade
  – Macintosh sizes:
    • men: # 4
    • women: #3

• Endotracheal tube
  • men: 8.0-8.5
  • women: 7.0-7.5
Intubating ("Sniffing") Position

- Ear lobe in line with xiphoid
- Normal recumbency
- Raised, extended
- Correct
Intubating ("Sniffing") Position

oral

larynx

pharynx
Use of Meds to Intubate

• Paralytics+sedation will improve view
• BUT: often unnecessary
  – code blue
• When pt not unconscious:
  – must be certain of ability to take over ventilation/oxygenation before rendering patient apneic with meds (don’t burn your bridges)
Intubation - Complications

• Trauma
  – teeth, oropharynx
  – vocal cords, trachea
• Regurgitation, aspiration
  – mortality = 30-70%
• Esophageal intubation
  – mortality = 100%
• Mainstem intubation
• Cardiovascular instability
Aspiration Risk

- Full stomach (non-fasting)
- GERD
- Impaired AW reflexes
- Autonomic neuropathy (DM)
- Pregnancy
- Emergency Sx
  - trauma
  - acute abdomen/bowel obstruction
Fasting Guidelines

<table>
<thead>
<tr>
<th>Food Type</th>
<th>Time Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear fluids</td>
<td>2 hrs</td>
</tr>
<tr>
<td>Breast milk</td>
<td>4 hrs</td>
</tr>
<tr>
<td>Infant formula</td>
<td>6 hrs</td>
</tr>
<tr>
<td>Milk (nonhuman)</td>
<td>6 hrs</td>
</tr>
<tr>
<td>Light meal</td>
<td>6 hrs</td>
</tr>
<tr>
<td>Heavy/fatty meal</td>
<td>8 hrs</td>
</tr>
</tbody>
</table>

NB: regular meds with small sips water is OK!
Rapid Sequence Induction

- Use when pt at risk for aspiration
- Goal to minimize time with unprotected airway:
  - suction on and accessible
  - preoxygenate (no bagging)
  - rapid adm of meds
    - induction agent (propofol, thiopental)
    - fast-acting muscle relaxant (succinylcholine)
  - cricoid pressure with LOC
  - intubate with cuffed, styletted ETT
BURP vs Cricoid Pressure

• BURP
  – Backwards Upwards Rightwards Pressure on thyroid cartilage
  – to improve view of cords

• Cricoid pressure
  – pressure on cricoid ring to close esophagus and prevent aspiration
  – pressure is maintained until ETT is confirmed to be in
Airway Anatomy

- Hyoid Bone
- Thyroid Membrane
- Aperture Superior
- Laryngeal A. and N.
- Thyroid Cartilage
- Cricothyroid Membrane
- Cricoid Cartilage
- Tracheal Cartilages
LARYNGEAL MASK AIRWAY (LMA)
Laryngeal Mask Airway - LMA

• Operating room
  – alternative to ETT if intubation unnecessary

• Emergencies
  – means to ventilate when unable to intubate (like oral AW)
  – route to assist difficult intubation

• Airway NOT protected
LMA - Contraindications

- Aspiration risk
- Obesity
- Low pulmonary compliance
  - requires high inflation pressures
The End

• Questions?
• Comments?