Advanced Airway & Respiratory Assessment & Management

Michael D. Gooch, DNP, AC/F/ENP
Assistant Professor of Nursing – Vanderbilt
Emergency NP – TeamHealth

Objectives

1. Exam a patient’s airway to develop the proper course for airway management.
2. Identify common intubation and airways options.
3. Recall the indications and considerations when using medications to facilitate an advanced airway placement.

Assessment of the Airway

- Is it patent?
- Any abnormal sounds?
- Is the patient vocalizing?
- Is there an obstruction or potential obstruction?
  - Tongue
  - Dentures/Teeth
  - Vomit, Blood
  - Edema
  - Foreign bodies

Assessment of Breathing

- Rate
- Quality
- Depth
- Accessory Muscle Use
- Breath Sounds
- Chest Wall Integrity
- Pulse Oximetry
- Capnography
- Mental Status

Oropharyngeal Airways

- Size – measure from the corner of the mouth to the angle of the mandible
- Insertion – depress the tongue with a tongue blade or a yankauer and insert over the tongue
- Risk of vomiting if the patient still has a gag reflex
- May occlude the airway if too large

Nasopharyngeal Airways

- Size – measure from the nose to the angle of the mandible
- Insertion – lubricate, then insert beveled edge against the nasal septum
- May stimulate a gag reflex if too large
- Contraindications
Supraglottic Airways (SGA)
• Combitube
• King LT Airway
• LMA
• *Effective rescue devices

Indications for Intubation
• Apnea
• Airway Obstruction
• Airway Protection
• Respiratory Insufficiency/Failure
• Hemodynamic Instability
• Projected Clinical Course

Nasal Intubations
• Contraindications
  – Suspected basilar skull fracture
  – Acute epiglottitis
  – Severe facial fractures
  – Bleeding diathesis; use of anticoagulants may increase risk
• Complications
  – Hemorrhage
  – Sinusitis

P’s of RSI
• Preparation
• Pre-oxygenate
• Pre-medicate
• Paralysis and Sedation
• Passing the tube
• Proof of placement
• Post intubation management

Preparation
• Always consider will this patient be a difficult airway?
• Will you be able to perform a successful surgical airway?
• Always assume they have a full stomach
• Prepare equipment
• Airway Assessment

What Makes for a Difficulty Airway?
• Anatomy
• Anatomy
• Anatomy
• Your Skill Set
• Assume they have a full stomach
• If you are planning to RSI this patient, what is your back up plan?
The Difficult Airway
The “LEMON” Assessment

- Look at face and neck anatomy, is it normal?
- Evaluate the 3-3-2 rule
- Mallampati
- Obstruction, is there one present?
- Neck mobility

Mallampati

Airway
Pre-Oxygenate

- 100% O₂ NRB for 3-5 minutes will provide a Nitrogen washout of the lungs
- Avoid positive pressure ventilation if possible
- O₂ 15L via N/C – No DESAT Method
- Elevate the HOB

Preoxygenation and Prevention of Desaturation During Emergency Airway Management
Annals of Emergency Medicine 2012; 59(3)
Scott D. Weingart, MD, Richard M. Lazarus, MD

Preparation

- Equipment
  - Laryngoscope blade and handle
  - ETT, Stylet
  - BVM w/ OPA
  - Suction
  - ETCO₂ Detector
  - Securing device
  - Back up device
- Position the patient
  - C-Spine control if needed
  - Towel roll under the shoulders of pediatric patients or obese patients
- Monitoring equipment
  - ECG
  - SaO₂
  - ETCO₂

Medications

- Premedication
  - Lidocaine
  - Opioids
  - Atropine
- Induction
  - Etomidate
  - Ketamine
  - Midazolam

Medications

- Neuromuscular Blockade (NMB)
  - Succinylcholine
    - Avoid in patients with known or suspected hyperkalemia or h/o malignant hyperthermia
  - Rocuronium

Laryngoscopic View and Anatomy
The View

Cormack-Lehane Scale – Laryngoscopic View

Airway Manipulation

– Cric Pressure (Sellick Maneuver)

️ ELM (External Laryngeal Manipulation)

Video Nuances

Proof of Placement

• Visualize the tube passing through the cords
• Bilateral Lung Sounds
• No epigastric sounds
• Chest wall excursion
• ETCO₂
• EDD

Capnography - ETCO₂

• Pulse oximetry reflects oxygenation, End Tidal CO₂ reflects ventilation.
• ETCO₂ closely mirrors PaCO₂ as long as there is no shunting or increase in dead space
Post Intubation Management

- Secure the ETT
  - ~3 x tube size - estimates proper depth
- Long term sedation
  - Lorazepam
  - Midazolam
  - Ketamine
  - Propofol
- Long term NMB
  - Vecuronium
- Gastric Decompression

Ongoing Assessment

- Patency and Proper Placement of the Airway
- Continued need for an artificial airway
- Risk of intubation and mechanical ventilation
- Assessment of breath sounds
- Evaluation of SaO₂ and ETCO₂
- Evaluation of blood gases and chest x-ray

Evaluation of the Chest X-RAY

ETT Placement

Troubleshooting the Artificial Airway

- Displacement
- Obstructed
- Pneumothorax
- Equipment
Pediatrics

- Anatomical Differences
  - Larynx is more anterior and cephalad
  - The epiglottis is U shaped and protrudes more
  - The narrowest portion of the airway is at the cricoid cartilage
- Sizing ET tubes
  - Weight based resuscitation tape
  - 16 + age in years / 4
  - The patient’s little finger or nare

Ventilator Settings

- Tidal Volume (TV)
  - 4 - 8 ml/kg of Ideal Body Weight (IBW)
- \( \text{FiO}_2 \)
  - Avoid hyperoxia and manage hypoxia
- Positive End Expiratory Pressure (PEEP)
  - Increases functional reserve capacity (FRC), by recruiting alveoli
  - 5 - 20 cm H\(_2\)O
- Rate
- Inspiratory - Expiratory Time (I:E Time)
  - Normal is 1:2 or 1:3
  - Patients with reactive airway disease benefit from a longer expiratory times

Pneumothorax

Tension Pneumothorax

- Presentation
  - Signs of Hypoxia
  - Signs of Shock: Hypotension
  - Decreased or Absent breath sounds on the affected side
  - JVD
  - Tracheal deviation is a very late sign

Ultrasound

Ultrasound Findings

- Chest Ultrasound
  - No Pneumothorax
Pneumothorax

- Management
  - Chest Needle Decompression
    - 10 – 16 g 2-3 inch angiocath at 2nd or 3rd intercostal space at the midclavicular line
  - Finger Thoracostomy
  - Chest Tube Thoracostomy
    - Appropriate size tube at the 4th or 5th intercostal space at the midaxillary line

Questions

michael.gooch@vanderbilt.edu
References


