Overview

• BVM Ventilation
• Intro to Cricothyrotomy
• Relevant Anatomy
• Cricothyrotomy Medical Directive
• Procedure
• Clinical Pearls
• Complications
• Summary
Objectives

• Describe emergency techniques for BVM and available airway adjuncts
• Recognize a failure when attempting to secure an airway
• Identify the indications and contraindications of a surgical airway as per the *Cricothyrotomy Medical Directive*
• Describe the relevant anatomy associated with Cricothyrotomy
• Demonstrate the correct insertion and post-insertion management of a Cricothyrotomy tube.
Bag–Valve–Mask Ventilation

• The most important airway skill and cornerstone of airway management

• Universally available

• Keeps you out of airway disasters
  • Safety net!
Traditional Technique

• C–E technique

• Anesthesia modality

• Paramedics perform to avoid airway disaster

• BVM ventilation is difficult in 1/3 pts in whom intubation has failed
Two-Thumbs-Down Technique

• Both thumbs and palms to manipulate mask seal

• Both sets of 4 fingers to bring mandible anteriorly to the maxilla (jaw thrust)
Advantages

• Palms surround mask so you can feel air leaks

• Maximal mask maneuverability

• Strong muscles of hands and arms
Clinical Pearls

• Apply mask with bag detached
  • Separate ‘skill’ part of procedure
  • Bulky, irrelevant to mask seal

• Insert oral and two nasal airways
Supraglottic Airways

- Excellent rescue devices
- Blind insertion, technically easier than BVM ventilation
- Delivers air directly to the glottis
- Literature to support as first line agent in obese patients
King LT
The Nightmare Scenario

CAN’T INTUBATE  +  CAN’T VENTILATE (BVM or King LT)

**FAILED AIRWAY**
Emergency Cricothyrotomy

- Essential skill as it is the ultimate failsafe
- Endpoint of can’t intubate, can’t ventilate
- Most important is practice
- Next step is quick recognition of the situation that calls on this skill
Cricothyrotomy, What is it?

- Utilized for securing a patient's airway when all other methods have failed
- Cannulation below the glottis
- Two types:
  - Needle and Surgical
  - Percutaneous transtracheal ventilation
- Temporary procedure

(Sanders, McKenna, Lawrence, & Quick, G., 2007)
What’s the Difference?

Tracheotomy

Cricothyrotomy
Anatomical Landmarks

• The larynx consists of 9 cartilages
  • 6 are paired 3 are unpaired
• All connected by muscles and ligaments
• The order of cartilages from superior to inferior are:
  1. Thyroid (unpaired)
  2. Arytenoid (paired)
  3. Cricothyroid Membrane (insertion location)
  4. Cricoid (unpaired)

(Sanders, McKenna, Lawrence, & Quick, G., 2007)
Cricothyrotomy Medical Directive

**Patient Indications**
- Need for advanced airway
- ETT and SGA unsuccessful or contraindicated
- Unable to ventilate

**Conditions**
- Age >12
- Altered LOA

**Contraindications**
- # larynx
- Inability to landmark

**Mandatory Patch Point**

(Advanced Life Support Patient Care Standards, 2011)
General Procedure

- Dependent upon system utilized by Service
  - Needle Cricothyrotomy
  - Quick Trach System
  - Surgical Insertion
  - Seldinger System (retrograde intubation)
LCEMS–ACP Specific

- Utilize needle cricothyrotomy technique
- BLS suction, positioning, compressions etc.
- Laryngoscopy and McGill's for FBAO removal
- If unsuccessful, stabilize head, neck, and trachea
- Identify cricothyroid membrane, related structures
- Sterilize area with alcohol swab
- Patch to BHP for direction
Needle Cricothyrotomy

- Prepare 14–18G catheter 2 inches in length
- Connect to 10ml syringe with 5ml of NaCl
Needle Cricothyrotomy

- Palpate for the ‘v’
- Grab the midline
- Slide down to cricothyroid cartilage
Needle Cricothyrotomy

- Insert 45° through the cricothyroid membrane
- Aspirate for free air
Needle Cricothyrotomy

• If free air present, advance catheter toward carina

• Remove needle
Needle Cricothyrotomy

- Remove plunger
- Attach a 3ml syringe
- Attach a #7 ETT connector
- Attach BVM
Clinical Pearls

• Positioning
  • head in extension – brings airway more superficial

• Equipment preparedness

• Light

• Assistant

• Suction
Ventilating a Cricothyrotomy

- Cricothyrotomy usually requires high frequency “Jet” ventilation (45–60psi)
- When ventilating use a ratio of 1:8 seconds
- Ventilate gently, allow the air to escape
  - 8 sec. optimal to prevent barotrauma
- If chest remains distended, gentle compression may be needed
- Constant observation of patient

(Sanders, McKenna, Lawrence, & Quick, G., 2007)
Advantages

• Lowest risk of the surgical airway procedures

• Does not compromise C–Spine control

• Can be accomplished quickly

• Effective, and inexpensive

(Sanders, McKenna, Lawrence, & Quick, G., 2007)
Disadvantages

- Airway is not protected
- Promotes oxygenation but does not effectively eliminate CO₂
  - Short ventilation time <1 hour
- Does not maximize lung volumes
- Difficult to inflate lungs due to lumen size
- Slow expansion and relaxation of chest wall
- Air trapping may occur resulting in barotrauma from overzealous ventilations

(Rich, James Michael., 2008)
Complications

- Barotrauma
- Catheter Issues
- Subcutaneous emphysema
- Hypercapnia
- Damage to adjacent structures
- Bleeding/infection
Summary

• Good BVM ventilation technique is critical to airway success

• Rescue devices (SGA) are easy to insert, can help avoid worst case scenario

• Recognize the failed airway

• Practice until it becomes reflexive
References


