THE DIFFICULT AIRWAY
(THE ROLE OF NEW AIRWAY DEVICES)

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DISCLOSURE

- President AI Medical Devices
DIFFICULT AIRWAY

No Universal Solution!
INTUBATION TECHNIQUES

- RSI
  - Direct Laryngoscopy (DL)
  - Video Laryngoscopy (VL)
  - Rescue

- Awake
  - Nasal
  - FFB
  - Oral
PATIENT EVALUATION

- Patient evaluation for difficult airway
- Consider other options (awake or nasotracheal)
- Always have back up plan!!!
AIRWAY EVALUATION / DIFFICULT TO BAG

- MOANS
  - Mask Seal
  - Obesity/Obstruction
  - Age over 55
  - No Teeth
  - Stiff (lungs)
AIRWAY EVALUATION / DIFFICULT TO INTUBATE

- **LEMON:**
  - Look
  - Evaluate
  - Mallampati and Mandible
  - Obstruction
  - Neck
LOOK

- Obesity
- Protruding incisors
- Loose teeth
- Beard
- High arched palate
EVALUATE

- 3-3-2 rule
MANDIBLE/MALLAMPATI

- Receding mandible
Mallampati Classification

Class I = visualization of the soft palate, fauces, uvula, anterior and posterior pillars.
Class II = visualization of the soft palate, fauces and uvula
Class III = visualization of the soft palate and the base of the uvula.
Class IV = soft palate is not visible at all.
OBSTRUCTION

- Tumor
- Hematoma
- Foreign Body
NECK

- Fusion
- Cervical Collar
PREDICTED DIFFICULT? CONSIDER AWAKE
AWAKE INTUBATION

- Patient Selection
- TOPICAL ANESTHETIC ESSENTIAL
  - MADD or MADgic
- Light Sedation
- Nasal or Oral
- Devices FFB, AVID Nasal Stylet, Shikani
- Supine or Sitting
TOPICAL

- 4% Lidocaine Spray
  - Nasopharynx
  - Oropharynx
  - Larynx
  - Nebulize
- 4% Lidocaine Ointment
ORAL AWAKE ON PRIOR FAILED AIRWAY
DIRECT LARYNGOSCOPY DL

- Laryngoscopes (always check the bulb)
  - Miller (straight)—tip of the blade is used to lift the epiglottis and view the glottic opening
  - Macintosh (curved)—tip of the blade is inserted into the vallecula to displace the tongue anteriorly; then traction is exerted upward to move base of tongue and epiglottis anteriorly, exposing the glottic opening
Grades of Laryngoscopic View

Grade I = visualization of the entire laryngeal aperture.
Grade II = visualization of just the posterior portion of the laryngeal aperture.
Grade III = visualization of only the epiglottis.
Grade IV = visualization of just the soft palate only, not even the epiglottis is visible.
POGO SCORE

- Percentage of glottic opening
THINGS TO INCREASE SUCCESS IN DL

- Patient Positioning
- Mouth Opening
- Use the Right Size Blade
- BURP
- Bougie
- Tru-Flex Stylet
- Visualized Stylet
PATIENT POSITIONING
INTUBATION PILLOW'S
SCISSOR TECHNIQUE
METHODS TO IMPROVE VIEW

- BURP
- External laryngeal manipulation
VISUALIZED STYLETS
Mulcaster et al. Anesthesiology Jan 2003
20 novice trainees
47 attempts required for >90% success
Statistical modeling
COMPETENCE?

- Initial competence: 80 intubations
- Ongoing competence: 2 per month

1ST GENERATION VIDEO LARYNGOSCOPE S
1ST GENERATION VIDEO LARYNGOSCOPE

POSITIVES

- Improves Laryngeal View
- Reduces Learning Curve
- Success Rates on Par with DL
- Good Tool for Teaching DL
1\textsuperscript{st} Generation Video Laryngoscopes

- May Increase TTI
- Misaligned Visual Axis (around a corner)
- Associated Trauma with Rigid Stylet
- Three Handed Technique
TRUFLEX STYLET

- REUSABLE STYLET
- ARTICULATES 15-30 DEGREES DEPENDING ON ET SIZE
- MAY BE HELPFUL WITH ANTERIOR AIRWAYS DL and VL
- 6.5-8.5 ET Sizes
TF significant faster in the simple airway with PF, HS or FO (TF: 26.4s ± 5.5s vs PF: 35.3s ± 9.8s HS: 41.2s ± 18.3s vs FO: 45.8s ± 10.2s, p< 0.05).

Difficult airway (swollen tongue) the intubation with the Truflex™ was significant faster compared with FO, HS, PF (TF: 30.6s ± 9.2s vs FO: 41.7s ± 9.6s vs HS 42.7s ± 18.4s vs PF: 45.4s ± 21.3s).

Success rate
- Sniffing Position: TF 100%, PF 100%, FO 95%, HS 90%
- Difficult airway: TF 100%, FO 100%, PF 80%, HS 60%.

- All Stylets equally effective
- Frova preformed poorly
1ST AND 2ND GENERATION CHANNELED LARYNGOSCOPIES
2\textsuperscript{ND} GENERATION CHANNELED SCOPES

POSITIVE

- Laryngeal tube alignment and visualization in one step
- Success rates as good or better than DL
- Literature supports use as back up device
2ND GENERATION CHANNELED SCOPES NEGATIVE

- Insertion profile can be difficult
- Blade “thickness”
- AWS must be used as Miller
- Airtraq better success as a Mac
- Per use cost
3rd Generation Hybrid Scopes On The Horizon

- AP Advance
- AVID FlexBlade
- CoPilot
- King Vision
AP ADVANCE

- Standard and Difficult Airway Blade
- Early studies demonstrate superiority to 1st generation VL
CO-PILOT

- $2,999
- VL with unique bougie port
KING VISON

- 1st Generation VL
- 2nd Generation Channeled Device
- Handle $800 Blades $25
AND WHEN ALL THAT FAILS?
SUPRAGLOTTIC DEVICES
USE OF THE INTUBATING LMA-FASTRACH IN 254 PATIENTS WITH DIFFICULT TO MANAGE AIRWAYS

- Ferson, Anesthesiology, 2001
- 254 patients with difficult airways
- 96.5% Success
- 100% with fiberscope
KING LT

• Both balloons
• Small balloon esophageal
• Aspiration protection
• New tube with gastric port
KING LT PACKAGE
KING LT SEALING PRESSURE

- Asai – Br J Anaesth – Nov 2002
- Compared KLT to LMA
- 26 vs 19 cm H$_2$O
King LT vs LMA

Inexperienced personnel (Fire Students)

High success rate: KLT 100%, LMA 98%

26/28 felt KLT easier than LMA

2/28 felt no difference
KING LT USE IN OR

- Asai, Aug 2003 Acta Anaesthesiol Scand
  - 97% success after 2 attempts (90/7)
- Asai, Apr 2001 Anaesthesia
  - 94% success after 1 attempt
KING LT AS A RESCUE AIRWAY

- Guyette, Wang, Cole PreHospital and Emergency Care Oct/Dec 2007
- 26 uses as rescue airway
- 100% Success
48 91W Students Combat Scenario

Combitube vs King LT (training 16 wks for both, 2 week refresher Combitube)

KLT 100% Combitube 96%

Insertion speed KLT 15sec, Combitube 32 sec
INTUBATION WITH TRACHEAL TUBE INTRODUCER
KING LT WITH TRACHEAL TUBE INTRODUCER

- Schwartz, Coule, McManus Annals of Emergency Medicine Sept. 05
- Cadaver Model
- 14 of 22 attempts successful (64%)
KING LT SUMMARY

- Easy to train
- Excellent success rates
- Gastric port of limited utility
- Unable to pass ET through device
- Must remove device prior to transition to ET
COOK ILA / AIR Q
AIR Q

- Designed for Ventilation and Intubation
- High success with FFB or AVID
- Blind success rates low
- Limited aspiration protection
INTUBATING THROUGH SUPRAGLOTTIC DEVICE
LMA CAROTID PIG
AIR-Q CAROTID HUMAN
BUT...

- Endotracheal intubation versus supraglottic airway insertion in out-of-hospital cardiac arrest

- 10,455 OHCA 81.2% ET 18.8 SGA
- 4.7 ET 3.9% SGA WITH GOOD FUNCTIONAL STATUS AT HOSPITAL DC
SO...

- STILL UNCLEAR ANSWER AND MORE RESEARCH NEEDED
SALT® AIRWAY

- Supraglottic Airway Laryngopharyngeal Tube
- Designed for blind ETT placement
- No studies identified
- Poor anecdotal reports
OK... AND IF THAT FAILS!
SURGICAL AIRWAY KITS
SURGICAL AIRWAY

- Eisenburger – Anesthesiology Mar 2000
- 20 Critical Care Physicians
- Surgical Cricothyrotomy vs Seldinger
- Cadaver Model
- Success: 70% Surgical 60% Seldinger
- Conclusion: Both techniques have equally poor performance
SURGICAL CRICOTHYROTOMY

Technique:
- Identify cricothyroid membrane (vert incision PRN)
- Horizontal stab (skin and membrane)
- Stabilize Larynx tracheal hook inf aspect, caudal traction
- Place Shiley

Limitation: No bleeding (cadaver model)
Consider use of ET tube and Bougie
SUMMARY

- Consider options
- Have a plan
- Devices all have advantages and disadvantages and should be considered in your device selection
QUESTIONS?