**MAJOR TAKE HOME POINTS**

**Simon Drama**

Airway management

May be the single most important topic in Emergency Medicine

The area of EM with the greatest immediate breadth of outcomes within minutes: life and death

**Difficult Airway Management Steps (7)**

1. Always assume the intubation will be difficult! **
2. Familiarize yourself: **
   Where are your airway tools located
   What devices are at your disposal
3. Have backup plans A B & C developed before the scairway arrives **
Airway Plans A B & C

A
Optimize Oral Endotracheal Intubation conditions

B
LMA – Combitube – Stylet guided Intubation

C
Surgical: Needle, Seldinger, or Traditional

More Steps

4. Consider the urgency of the case
   Airway control is needed: NOW!!
   Within minutes
   Semi – elective

5. Can the patient be bag-valve-mask ventilated?
More Steps

4. Consider the urgency of the case
   Airway control is needed:
   **NOW!!**
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5. Can the patient be bag-valve-mask ventilated?
6. Assess airway anatomy
7. How great is the risk of aspiration?

Airway edema (time 0110)

53 year old male  A young man

NN: Medication reaction, difficult breathing,
    talking, swallowing
Meds: Doxy, vicodin, naproxen, benazepril
Allergies: Levaquin
154/85  80  18  100% (O2?) 98.1
Skin pale dry GCS 15

MD note (0115 – 5 minutes later)

53  male
Swelling to back of throat, started with
uvula (?) now whole throat - getting
difficult to breath. Pt started on doxy
today for diverticulitis
PMH – HTN and d-itis

MD PE cont

WDWN anxious + stridor
HEENT – “massively swollen”
Resp: +resp distress + wheezing
Rest of exam unremarkable including the
skin exam
**ED interventions**

Cool mist air
Aerosolized racemic epi
Pepcid
Benadryl
Solumedrol
Cric kit to bedside

**ED course (2 hrs)....unremarkable**

Pt states feeling better
Limited additional info avail
Should anything else be done before moving to the unit?

**Moved to the ICU at 0305**

Moving from the ED gurney to the ICU bed – coughed ......severe resp distress....RT called – more nebulized racemic epi ....the ED doc arrives 2 minutes later....agitation ....dropping sats......unable to bag......

**What would you do now?**
......unable to bag.....

......sux is ordered unable to intubate X 2 unclear what if any attempts to bag were made cric tray arrives without a scalpel!

......frantic running to find a scalpel cric done tube passed unable to vent code called

issues

Other medical treatments – not to be discussed today – except IV epi?
• Icatibant? (NEJM Aug 2010)

Prophylactic intubation in the ED prior to transfer?

More ifs – even if can’t be BVM-ed

Is the tongue so swollen that it isn’t worth trying an oral approach?
Can an LMA be passed? Its always worth a try
Can a bougie be passed blindly while starting the cric?
Do we have a glidescope?
Can a nasal tube be passed while the cric is being started

My recommendation upon arrival in that ICU

Simultaneous orders:
• Versed 5mg IVP (flumazenil at bedside)
• Oral and NP airways to be inserted
• Two person BVM
• Cric kit to bed side
• Glidescope / bougie / LMA
ASA Definitions

- **Difficult Mask Ventilation**
  - Unable to maintain the SpO2 > 90% using 100% O₂ in a pt whose SpO2 was >90% before induction.
- **Difficult Laryngoscopy**
  - It is not possible to visualize any portion of the vocal cords with conventional laryngoscopy.
- **Difficult Intubation**
  - Proper insertion of the tracheal tube with laryngoscopy requires more than 3 attempts or more than 10 minutes.

Difficult Airway Management Steps (7)

1. **Always assume the intubation will be difficult!**
2. **Familiarize yourself:**
   - Where are your airway tools located?
   - What devices are at your disposal?
3. **Have backup plans A B & C developed before the airway arrives**

**MAJOR TAKE HOME POINTS**

More Steps

4. **Consider the urgency of the case**
   - Airway control is needed:
     - **NOW!!**
     - Within minutes
     - Semi – elective
5. **Can the patient be bag-valve-mask ventilated?**
6. **Assess airway anatomy**
7. **How great is the risk of aspiration?**

Can I bag this patient?

- Excess facial hair
- Severe facial burns
- Morbid obesity
- Angioedema / facial swelling
- Unstable facial fractures

If you CAN’T bag the patient … be very afraid of using paralytics!
Will the intubation be difficult?

- Morbid Obesity
- Abnormal facial shape
- Buck Teeth
- Protruding / prominent tongue
- Prominent mandible
- Short neck / limited motion

More on intubation difficulty

- High arched palate
- Can’t open mouth >3-4 cm
- Narrow space between hyoid and the mandible (3 finger breadths)
- Narrow space between the floor of the mouth and the thyroid cartilage (2 finger breadths)

Determination of difficult intubation in the ED


Conclusions

The floor of the mouth-to-hyoid distance less than 2 fingers is the only independent variable in predicting difficult intubation. Mallampati classification is not a useful tool in classifying the difficult intubation in the ED

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LEMON

- L – Look at external facial features
- E – Evaluate the 3-3-2 rule for the spaces in the mouth and neck
- M – Mallampati – appearance of the oropharynx
- O – Obstruction
- N – Neck mobility

Before Alternative Approaches are Used......

- Bag the patient
  - Place an oral airway + 2 nasal airways
  - Make it a two person procedure
  - Intubator should not secure the mask
- Re-pre-oxygenate (8 vital capacity breaths)
- Don’t forget to suction

Preparing for the second attempt

- Positioning can make a huge difference
  - Raise the bed to the level of the practitioners waist
  - Top of patients head at very end of gurney
  - Flex neck 30° - extend head / ramp up
- Change blades – or use the Mac like a Miller
- Insert the blade… attach the handle later
- BURP maneuver
  - Back – UP - Right - Pressure
Bimanual laryngoscopy

POGO = % of glottic opening

The second attempt – cont.

- Have a second practitioner press on the chest and maintain pressure – look for air bubble
- Smaller tube – use stylet
- Hockey stick bend to stylet
- Magill assist

Alternative Airway Approaches / Devices

- Nasal intubation
- Fiberoptic intubation
- Gum elastic bougie
- Lighted Stylet
- Laryngeal Mask Airway (LMA)
- Combitube / King

Alternative Airway Approaches / Devices

- Tactile digital intubation
- Retrograde intubation
- Percutaneous transtracheal intubation
- Cricothyrotomy – traditional
- Cricothyrotomy – needle guided
- Video laryngoscopes
Personal recommendations

Laryngeal Mask Airway LMA

Consider other options if aspiration is a major risk

Laryngeal Mask Airway LMA

ILMA
**LMA / ILMA - Indications**
- Indicated in difficult airway scenarios – Especially when ventilation is needed immediately
- Complications
  - Does not protect against aspiration until an ETT is passed
- Relative contraindications:
  - Airway obstruction
  - Foreign body
  - Mass
  - Epiglottitis

**LMA / ILMA**
- Lubricate
- Neutral position
- Advance and rotate the tube
- Inflate the balloon (20cc+-) and ventilate
- Adequate ventilation in >95%
- Lubricate and place the ETT through the ILMA (>90% with limited practice)

**LMA - insertion complication**
The soft tip can flip on itself resulting in a poor seal. Adding 5cc air to the balloon can prevent this.

**ILMA**
LMA / ILMA - miscellaneous

- Neuromuscular agents are not needed but may decrease vomiting
- Less airway trauma than with std intubation
- Difficulty with ETT passing through the LMA can be facilitated with fiberoptics
- Can leave the ILMA in place after the ET tube is placed in the trachea
Bougie
- 60 cm long – 15 French
- Natural J angle at distil tip
- Indication:
  - a difficult intubation is anticipated, or a poor view of the glottic opening has been confirmed on laryngoscopy

Bougie – miscellaneous
- Can cause significant trauma to the pharynx, larynx and trachea
- Can be used as a tube changer
- Ideal in the difficult patient when aspiration is a major threat

Bougie
- Laryngoscopy – obtain the best possible view of the glottic opening.
- Advance the bougie, continually observing its distal tip, with the concavity facing anterior;
- Visualize the tip of the bougie as it passes the epiglottis in an anterior direction
- As the tip of the bougie enters the glottic opening feel for ‘clicks’ as it passes over the tracheal rings
- Rotate the ETT counter-clockwise

Percutaneous Transtracheal Ventilation (PTV)
- Ventilation via a catheter placed through the cricoid membrane
  - High frequency jet ventilation (small volumes of oxygen at rates of 100-200/min)
  - High pressure standard ventilation (large volumes at 50psi at a rate of 12-20.min)
  - Traditional bag valve ventilation (intermediate volumes, low pressure std rate)
**Percutaneous Transtracheal Ventilation**

- **Indications:**
  - Rescue airway – especially in children

- **Contraindications:**
  - *Complete airway obstruction*
  - Unable to identify landmarks

- **Complications:**
  - Barotrauma
  - Esophageal perforation
  - Hypercapnea

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**Needle Cricothyrotomy**

(The MacGuyver Approach)

- I suggest using a #10 blade to produce a larger skin ‘nick’
Needle Cricothyrotomy

Airway Scenario considerations & flow recommendations

- Unable to intubate using any laryngoscope blade through the oropharynx..........

  4 basic categories of alternative airway options:

- Nasal  Stylet guided  LMA / Combitube

  Surgical

Patient can be bagged

Stable

Try any acceptable alternative approach (Bag between attempts)

Unstable

No nasal attempts

LMA or combitube

Surgical

My preferred alternative is the LMA / ILMA
**Patient can not be bagged**

- **Avoid Paralysis**
  - **Stable**
    - Use any acceptable methods that don’t require paralysis
  - **Unstable**
    - ILMA or Combitube
    - Surgical airway

**Aspiration is a major concern:**
- Bougie or Lightwand
  - ILMA
  - Combitube
  - LMA / King

**Airway Pearls**
- Breathing 100% O₂ for 5 minutes will replace all nitrogen reservoirs with O₂.
  - Apneic pt with normal lungs will maintain a sat >90% for 8 minutes!
- 8 Vital capacity breaths will achieve similar results.
- The BVM – bag – holds about 2 L of air – one only needs to administer about 1/4 of the bag to ventilate

**Desaturation times for apneic, fully preoxygenated pts**
Nasopharyngeal O₂ insufflation following pre-oxygenation using the four deep breath technique

Anesthesia May 2006

NO Oxygen after induction (N=15)
Sat fell to 95% in 3.65 min +-.15

YES 5L/min nasal O₂ after induction (N=15)
Sat was 100% in ALL pts at 6 minutes

Hematemesis

What are the immediate issues/questions that need to be answered?

- Can the pt be bag mask ventilated?
- Is aspiration a real threat?
- How difficult is traditional oral tracheal intubation likely to be?
- How much time do we have?

Hematemesis

- 45 yo male with ESLD due to cirrhosis presents with ALOC, jaundice and asterixis
- 100/50, 110, 24, 92.7 F, Sat = 93% RA. You make a presumptive diagnosis of sepsis with hepatic encephalopathy
- While in the ED, the patient develops bright red hematemesis. He becomes unresponsive, blood pressure is 70/P and the pulse oximetry fails to register. You begin your resuscitation...
Hematemesis

- BVM vent likely to be very difficult
- A secure airway is needed NOW!!!
- Aspiration is a major threat
- Too crashed for nasal (+probable coagulopathy)
- +/- one attempt at traditional oral intubation ....

Hematemesis

- I recommend trying to pass a bougie if you can see some anatomy but have the ILMA and a needle cric kit ready

Traumatic Brain Injury

The patient is a 29 year-old female who was hit by a car while crossing the street. She is found unconscious by EMS providers and is combative during transport. The paramedics immobilize the spine, start two large-bore intravenous lines, and splint clinically obvious bilateral open tibia-fibular fractures.

VSS: HR 124, RR 14, BP 92/50, O2 100% NRM, GCS 7

General: Localizes to pain, not following commands
Airway: Normal – clear – no obvious trauma
Face: Blown right pupil, no evidence of facial fx
Neck: Immobilized with no evidence of injury
Lungs: Scattered chest wall abrasions, equal BS
Heart: Tachy without murmurs, good heart tones
Abdomen: Distended, FAST grossly [+] for blood
Extremities: Legs splinted, good distal pulses
CNS: Not lateralizing
Airway considerations

Timing
Protect the brain
- Blood pressure considerations
  - Ketamine?
- Lidocaine
- Fentanyl

Summary

Expect the worst and be prepared
Assess the anatomy
Consider the urgency
Positioning is critical
Balance the needs for ventilation & oxygenation vs.
the risk of aspiration
Become familiar with
- LMA or Combitube
- Lightwand or Bougie
- Traditional or Seldinger cric
- PTV

Sublingual man

- 22 year-old male presents post assault with an obvious unstable mandible fracture. Although the patient has limited jaw opening due to pain, you still are able to notice a large ecchymotic swelling to the floor of the mouth. The patient has a throaty sounding voice but appears comfortable. Over the next hour, he develops more labored respirations. Reexamination confirms a dramatic worsening of the sublingual hematoma .........
Sublingual man

- Can this man be BVM ventilated?
- Will the cords be visible? Mandible fracture makes it easier but the SL hematoma makes it tougher?
- Is the rest of the face stable
- Risk of aspiration?

Sublingual man

- Approaches depend on the answers to the questions.
- Nasal is an option if the rest of the face is stable
- Traditional RSI is possible if the pt can be bagged and one predicts the cords will be visible
- ILMA/LMA and Bougie are good options