Recognizing the Difficult Airway in Pediatric Patients

Nancy L. Glass, MD, MBA, FAAP

nglass@bcm.edu
@DrNancyGlass1
Disclosures

• None
At the end of this presentation, participants will be able to:

• Correlate the patient’s physiognomy with airway function
• Identify common pediatric syndromes associated with a difficult airway
• Formulate a plan for managing the difficult pediatric airway, using commonly available tools
Identifying the site of the problem is key to planning management.
Anatomy of the Difficult Airway

- Extrinsic compression, swelling
- Malposition of craniofacial structures in relation to larynx
- Deposition of abnormal material in or around the airway
Minimal acute disease can have a *major impact* on the anatomically abnormal airway.
Airway edema / secretions

Effect of 1 mm edema on airway area

From Coté, A Practice of Anesthesia for Infants and Children, 2nd edition
The Difficult Airway

……..Not necessarily the same as a difficult intubation
The airway that was easy “last time” may not be easy now……and vice versa….kids change!
Why do kids turn blue So Fast?

• Low FRC (oxygen reserves)

• High oxygen consumption
  Adults 3-4 ml/kg/min

And it seems like it takes FOREVER for the O2 sat to recover after an unsuccessful laryngoscopy
The Difficult Pediatric Airway

- Foreign bodies
- Congenital anomalies
- Airway masses
- Acquired conditions

Photos of patients will be used to illustrate key findings in each category, and to suggest strategies for securing/managed the airway.
Foreign Bodies
Suspicion of Foreign Body

- Acute vs. chronic
- Sudden onset distress / coughing, vs. unusual or repeated pneumonia
- Distress while eating
- Sudden distress while playing alone
- Distress after falling onto hard or pointed objects, w or w/o subcutaneous emphysema
Kinds of Foreign Bodies

- **Radio-opaque**: metal, sharp or smooth, penetrating or not

- **Food**: large obstructing bolus, or small pieces organic material, causing inflammatory reactions

- **Unusual and/or iatrogenic**
Anesthetic Considerations

- Shared airway procedure
- Obstructing lesion makes challenge
- TIVA vs inhalation?
- Instrument the airway, or spontaneous ventilation?
- Airway may be WORSE after FB removed!
Trachea or esophagus? Other possibilities?

What do you want to know about this object?
LOOK FOR BLEEDING or TEAR after object removed!
Congenital Anomalies
Key Facial Features

- Head size / shape
- Jaw mobility
- Mouth size / opening
- Midface hypoplasia
- Neck length / circumference / mobility
BEWARE THE FLAT MIDFACE:
ANTERIOR LARYNX
Mucopolysaccharidoses: ALWAYS get worse with age!
BEWARE the asymmetric face / jaw
Nasal Trumpet

Great for delivering oxygen and volatile agent during laryngoscopy, or if mask fit is difficult
Kids who do not eat (chew) and do not speak are at HIGH RISK for having poor jaw mobility.
What’s the hard part of managing her airway? What else should we be worrying about?
Airway Masses
Types of Airway Masses

- External compression
- Internal masses
- Effect of loss of airway muscle tone on obstruction
Effective Control of Tongue:
• Tongue Stitch
• Towel Clip
and from Guatemala
Yep, they want a bx: now what?
Acquired Airway Problems
Acquired Airway Problems

- Infectious problems
- Obesity
- Trauma
- Progression of storage diseases
- Miscellaneous
What is it?

How do you manage it?
Epiglottitis

- Positive pressure to stent airway open
- Spontaneous ventilation
- Drying agent
- Sedation? IV?
- Sitting induction?
- Helium?
- Parental presence?
“Just intubate thro an LMA...”
Videolaryngoscope

TIP: In pediatrics, much more useful for NECK immobility than JAW immobility
Etiology?
Postoperative Airway Obstruction

- Long prone case
- Patient awakened, extubated
- Tongue massively swollen within 10 min
Hasani A, Pediatric Anesthesia, 2008
Anterior

Posterior

Dental Bite Block
Diagnosis?
Key physical finding?

Hard to do inhalation anesthetic with airway obstruction
TIVA? Combination?
Childhood Obesity: our newest airway challenge

- Positioning challenges
- Mask fit
- Mouth opening
- Laryngoscopy
- Enlarged tonsils and redundant soft tissue
- Abnormal CO2 response; possible sleep apnea
- Rapid desaturation with apnea
Anatomy of a Difficult Airway

• Identifying the site of the problem is the key to planning your management

• There is no substitute for a good physical exam

• A *Difficult Airway* is not necessarily the same as a difficult intubation
Minimal acute disease can have a major impact on the anatomically abnormal airway.

Kids change with age: airway may get easier or harder!
### Medications
- Drying agents
- Lidocaine spray
- Steroids
- Spontaneous ventil:
  - Sevoflurane
  - Ketamine
  - Dexmedetomidine
  - Propofol

### Tools
- Nasal trumpet
- Tongue stitch
- Good head/neck positioning
- LMAs
- Glidescope
- Fiberscope
Good mask ventilation trumps a “flailed” intubation every time!

And a BAD airway beats NO airway at all: so keep ‘em breathing!