PEDIATRIC ENT & YOU—A PATIENT CARE PARTNERSHIP

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Disclosure
Timothy McEvoy, MD has no relevant relationships with commercial interests to disclose.

Learning Objectives
At the end of this presentation the participant will be able to:
1. Discuss diagnostic methods for airway evaluation
2. Evaluate patients whose care may require the assistance of an otolaryngologist
3. Identify the role of the pediatric ENT in the patient care team
When Might you Need an ENT?

• Respiratory Symptoms
  • Noisy Breathing
  • Airway obstruction
  • Weak voice
  • Exubation failure
  • Chronic Aspiration
• Infectious Considerations
  • Neck swelling
  • Eye swelling
  • Recurrent throat infections
  • Recurrent ear infections
  • Recurrent rhinosinusitis
• Hearing Loss

Topics to Discuss Today

• Airway Evaluation
• Airway urgency/emergency
• Adenotonsillar disease
• Recurrent/chronic otitis media
• Foreign Bodies
• Hearing Screening and Follow up
• Patient care partnership topics

Definitions

• “Noisy breathing” could mean anything

• Definitions courtesy of Merriam Webster
  • Stertor –
    • the act of producing a snoring sound : snoring
    • from Latin stertere to snore
  • Stridor–
    • 1) a harsh, shrill, or creaking noise
    • 2) a harsh vibrating sound heard during respiration in cases of obstruction of the air passages
Types of Stridor

- Inspiratory
  - Supraglottic
  - Biphasic
    - Glottic/Subglottic
- Expiratory
  - Intrathoracic

Dynamic Examination

- Flexible laryngoscopy
  - Patient Preparation:
    - Preferably 30 minutes or more after previous feeding
    - Local anesthetic/decongestant used depending on patient age
    - The patient should not be sedated as the goal is to evaluate vocal cord mobility, secretion management, and dynamic tone
  - Limitations:
    - Small diameter scope does not provide the best resolution
    - Limited evaluation beyond vocal cord level
    - Diagnostic tool only, not for interventions
  - Other Capabilities:
    - Assist with swallowing evaluations: Flexible Endoscopic Evaluation of Swallowing (FEES)

Flexible Laryngoscopy

The Booger Cam!

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Flexible Laryngoscopy

- Indications
  - Voice concerns
  - Breathing concerns (stridor, stertor)
  - Chronic cough
  - Aspiration
  - Globus sensation
  - Laryngopharyngeal reflux (LPR) and GERD
  - ALTE Workup
  - Otalgia

Completion of Airway Evaluation—Operative Direct Laryngoscopy and Bronchoscopy

- Improved optics for greater resolution/detail
- Ability to evaluate subglottis, trachea and bronchi
- Ability to ventilate through the bronchoscope
- Ability to perform interventions
  - Foreign body removal
  - Airway sizing
  - Airway dilation
  - Biopsy/removal of lesions

Rigid Direct Laryngoscopy

Rigid Bronchoscopy Tools

Anesthesia for Rigid Bronchoscopy

Rigid Laryngoscopy and Bronchoscopy

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Flexible Laryngoscopy

Visualization Difference: Flexible vs. Rigid Instrumentation

Rigid Bronchoscopy
FEES-Flexible Endoscopic Evaluation of Swallowing

- Another helpful tool in the evaluation of swallowing
- Airway evaluation (flexible laryngoscopy) is first step
- No radiation
- Direct viewing of laryngeal functioning for airway protection
- Assesses secretions management before risking aspiration of a feeding trial
- Strong evaluation tool in the establishment of treatment and compensatory strategies

FEES Example

What are we looking for?

- Common airway pathology
- Airway sizing
- Structural and dynamic evaluation
Common Airway Pathology

Table 6.1. Cause of stridor

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number of patients</th>
<th>Percentage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congenital laryngeal anomalies</td>
<td>122</td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>Congenital tracheal anomalies</td>
<td>35</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Congenital bronchial anomalies</td>
<td>13</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Congenital vocal fold paralysis</td>
<td>12</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Tissues</td>
<td>12</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>219</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

* Percentages have been rounded off.

Table 6.2. Congenital laryngeal anomalies

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number of patients</th>
<th>Percentage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laryngomalacia</td>
<td>12</td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>Subglottic stenosis</td>
<td>27</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Median lobe anomaly</td>
<td>17</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Median lobe tracheal extension</td>
<td>12</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Unilateral vocal fold paralysis</td>
<td>3</td>
<td></td>
<td>7</td>
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<tr>
<td>Total</td>
<td>132</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Common Airway Pathology

Table 6.3. Congenital tracheal anomalies

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number of patients</th>
<th>Percentage</th>
<th>Total</th>
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<tbody>
<tr>
<td>Tracheomalacia</td>
<td>15</td>
<td></td>
<td>45</td>
</tr>
<tr>
<td>Accessory lobe compression</td>
<td>12</td>
<td></td>
<td>34</td>
</tr>
<tr>
<td>Aberrant innominate artery (11)</td>
<td>4</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Vascular ring</td>
<td>2</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Tracheal stenosis</td>
<td>2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Tracheal diverticulum</td>
<td>5</td>
<td></td>
<td>5</td>
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<tr>
<td>Total</td>
<td>35</td>
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Subglottic Stenosis Grading

<table>
<thead>
<tr>
<th>Classification</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td>Grade I</td>
<td>50%</td>
<td>25%</td>
<td>25%</td>
<td>No Descent</td>
</tr>
<tr>
<td>Grade II</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
<td>No Descent</td>
</tr>
<tr>
<td>Grade III</td>
<td>75%</td>
<td>25%</td>
<td>0%</td>
<td>No Descent</td>
</tr>
<tr>
<td>Grade IV</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>No Descent</td>
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### Airway Sizing

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Size 2.0</th>
<th>Size 2.5</th>
<th>Size 3.0</th>
<th>Size 3.5</th>
<th>Size 4.0</th>
<th>Size 4.5</th>
<th>Size 5.0</th>
<th>Size 5.5</th>
<th>Size 6.0</th>
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<tbody>
<tr>
<td>Premature</td>
<td>58</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-3 ½ mos</td>
<td>68</td>
<td>48</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 ½-9 ½ mos</td>
<td>75</td>
<td>59</td>
<td>41</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 ½-2 yrs</td>
<td>80</td>
<td>67</td>
<td>53</td>
<td>38</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 yrs</td>
<td>84</td>
<td>74</td>
<td>62</td>
<td>50</td>
<td>35</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yrs</td>
<td>86</td>
<td>78</td>
<td>68</td>
<td>57</td>
<td>45</td>
<td>32</td>
<td>17</td>
<td></td>
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<tr>
<td>6 yrs</td>
<td>89</td>
<td>81</td>
<td>73</td>
<td>64</td>
<td>54</td>
<td>43</td>
<td>30</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

### Laryngomalacia

- Most common cause of stridor

#### Laryngomalacia Types
- Type 1: Inward collapse of the aryepiglottic folds
- Type 2: A long tubular epiglottis that curls on itself
- Type 3: Anterior, medial collapse of the arytenoid cartilages
- Type 4: Posterior displacement of epiglottis
- Type 5: Short aryepiglottic folds

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Laryngomalacia Timecourse

- Can begin anytime from birth to 6 months.
- Noisy breathing can last up to 18 months.
- In early months, stridor will typically get worse before it gets better.
- Of patients referred to see ENT, 1 in 10 will require surgical intervention.

Laryngomalacia and Tracheomalacia

- Independent diagnoses.
- Not mutually exclusive.
- Evaluated differently.
  - Laryngomalacia – can be diagnosed on flexible laryngoscopy.
  - Tracheomalacia – requires formal bronchoscopy for diagnosis (at certain centers can be diagnosed by airway fluoroscopy).

Supraglottoplasty

- Surgery becomes necessary in less than 10 percent of patients with laryngomalacia.
  - Apnea.
  - Cyanosis.
  - Failure to gain weight despite appropriate.
  - Significant chest and neck retractions.
  - Oxygen requirements.
- Surgery will not eliminate stridor.
  - Reduce the severity of the symptoms.
  - Decrease apnea.
  - Improve weight gain.
  - Family counseling is of utmost importance to help manage expectations.
Laryngomalacia Treatment--Supraglottoplasty

Tracheomalacia
- Primary
  - Intrinsic anatomical abnormality (especially associated with esophageal atresia and tracheoesophageal fistula)
- Secondary
  - Extrinsic compression (vascular rings and slings)
- Acquired
  - Prolonged intubation, infections, relapsing polychondritis

Tracheomalacia
- Harsh, "brassy cough"
- "Wheeze" not responsive to bronchodilators
- Blue spells when upset
Tracheomalacia Examples

Hoarseness

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Cough & Chronic Aspiration

Airway Urgency & Emergency
For ER and Inpatients
- Contact ENT team sooner rather than later
- Keep the patient breathing spontaneously
- Consider a nasal trumpet or a LMA

Critical Airway Concept
- Certain patients will be labeled as having a “Critical Airway”
  - Known difficult intubation by anesthesia
  - Acute airway issue
  - Anatomical abnormality where they cannot be intubated and are dependent on a tracheostomy
  - Patients who have just undergone an airway reconstruction or have other known airway pathology
- Goal of “Critical Airway” label is to help facilitate care of patients who need rapid airway stabilization and increase vigilance for stabilized patients
  - Patients with fresh tracheostomies do not necessarily meet criteria as a critical airway
  - Patients with Critical Airways need to be transferred to a tertiary care pediatric facility as soon as possible
Clinical Practice Guidelines

- Developed in order to help facilitate appropriate care
- Can at time limit what procedures will be covered by health insurance plans
- Require appropriate documentation

AAO-HNS Guidelines
Tonsillectomy Guideline

STATEMENT 1. WATCHFUL WAITING FOR RECURRENT THROAT INFECTION: Clinicians should recommend watchful waiting for recurrent throat infection if there have been fewer than 7 episodes in the past year or fewer than 5 episodes per year in the past 2 years or fewer than 3 episodes per year in the past 3 years. **Recommendation** based on randomized controlled trials with limitations and observational studies with a preponderance of benefit over harm.

Criteria for Tonsillectomy

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum frequency of sore throat episodes</td>
<td>7 or more episodes in the preceding 2 y OR 5 or more episodes in each of the preceding 2 y OR 3 or more episodes in each of the preceding 2 y OR Temperature &gt; 38°C OR</td>
</tr>
<tr>
<td>Clinical features (sore throat plus the presence of one or more qualifies as a counting episode)</td>
<td>Cervical lymphadenopathy (lymph nodes or &gt; 2 cm OR Tonsillar exudate OR</td>
</tr>
<tr>
<td>Treatment</td>
<td>Antibiotics have been administered in conventional doses for proved or suspected suppurative infection</td>
</tr>
<tr>
<td>Documentation</td>
<td>Each episode in the qualifying feature has been documented by a professional or a clinical record OR Each episode in the qualifying feature has been documented by a professional or a clinical record in combination with a history of recurrent episodes of throat infection with patterns of frequency and clinical features consistent with the initial infection</td>
</tr>
</tbody>
</table>

1 This last statement allows children who meet all other criteria for tonsillectomy except documentation or documentation qualify for surgery if the same pattern is observed in subsequent episodes. This statement is important when giving advice on the initial decision for tonsillectomy.

Tonsillectomy Guideline

STATEMENT 2. TONSILLECTOMY FOR RECURRENT INFECTION WITH MODIFYING FACTORS: Clinicians should assess the child with recurrent throat infection who does not meet criteria in Statement 2 for modifying factors that may nonetheless favor tonsillectomy, which may include but are not limited to multiple antibiotic allergy/intolerance, PFAPA (periodic fever, aphthous stomatitis, pharyngitis, and adenitis), or history of peritonsillar abscess. **Recommendation** based on randomized controlled trials and observational studies with a preponderance of benefit over harm.
Otitis Media

- Definitions:
  - Recurrent acute otitis media
    - 3 episodes in 6 months or 4 episodes in 1 year
  - Chronic otitis media with effusion
    - Effusion that persists for 3 months or more

<table>
<thead>
<tr>
<th>Statement</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. OME of short duration</td>
<td>Clinicians should not perform tympanostomy tube insertion in children with a single episode of otitis media with effusion (OME) of less than 3 months duration.</td>
</tr>
<tr>
<td>2. Hearing testing</td>
<td>Clinicians should obtain an age-appropriate hearing test if OME persists for 3 months or longer (chronic OME) or prior to surgery when a child becomes a candidate for tympanostomy tube insertion.</td>
</tr>
<tr>
<td>3. Chronic bilateral OME with hearing difficulty</td>
<td>Clinicians should offer bilateral tympanostomy tube insertion to children with bilateral OME for 3 months or longer (chronic OME) AND documented hearing difficulties.</td>
</tr>
<tr>
<td>4. Chronic OME with symptoms</td>
<td>Clinicians may perform tympanostomy tube insertion in children with unilateral or bilateral OME for 3 months or longer (chronic OME) AND symptoms that are likely attributable to OME that include, but are not limited to, vestibular problems, poor school performance, behavioral problems, ear discomfort, or reduced quality of life.</td>
</tr>
<tr>
<td>5. Surveillance of chronic OME</td>
<td>Clinicians should reevaluate, at 3- to 6-month intervals, children with chronic OME who did not receive tympanostomy tubes, until the effusion is no longer present, significant hearing loss is detected, or structural abnormalities of the tympanic membrane or middle ear are suspected.</td>
</tr>
</tbody>
</table>

6. Recurrent acute otitis media
(AOM) without middle ear effusion (MEE)

7. Recurrent AOM with MEE

8. At-risk children

9. Tympanostomy tubes in at-risk children

10. Perioperative education

11. Acute tympanostomy tube otorrhea

12. Water precautions

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Important Take Aways

- Patients who present with clear middle ears will be put on a surveillance plan
- Patients that have tympanostomy tubes should be treated with otic antibiotic drops for any otorrhea
  - First line: ofloxacin otic
  - Second line: Ciprodex otic

Texas Early Hearing Detection and Intervention (TEHDI)

http://www.dshs.state.tx.us/tehdi/Audiology-Services-Home.aspx
Foreign Bodies

- Certain Foreign Bodies constitute a surgical emergency:
  - Button batteries
  - Airway foreign bodies causing acute airway obstruction/distress
  
  - Button battery injuries
    - External auditory canal and middle ear
    - Nasal cavity
    - Esophagus

Aspiration Prevention

- The American Academy of Pediatrics recommends that anticipatory guidance be provided to parents and caregivers when their child is 6 months old.
- The Consumer Product Safety Act was enacted in an effort to prevent foreign-body aspiration. Since 1995, any toy with small parts, marbles, or balls less than 4.44 cm in size must carry a label that the item contains small parts and that it is not recommended for young children.
Anticipatory Guidance

- Bright Futures campaign recommends that pre-school children should avoid:
  - Peanuts
  - Chewing gum
  - Popcorn
  - Chips
  - Round slices of hog dogs
  - Carrot sticks
  - Hard candy
  - Large pieces of raw vegetables
  - Tough meat

https://brightfutures.aap.org/pdfs/Guidelines_PDF/6-Promoting_Healthy_Nutrition.pdf

Risk Factors for Aspiration

- Lack of molars
- Lack of coordination/chewing ability even when molars present
- Small size of airway
- Strength of cough in young children
- Distraction/activity while eating

Esophageal Foreign Body
Esophageal Injury

Sending Patients with Foreign Bodies to the Pediatric ENT Clinic
- Ear foreign bodies
- Nasal foreign bodies

- Protocol
  - Ensure that the object is not a button battery
  - Call Pediatric ENT Clinic and have the patient scheduled for the next clinic session. Foreign bodies will be added on during specific timeslots
  - Instruct the family to keep the patient NPO that morning in case in office removal is not successful

Patient Education/Partnership
- Nasal saline irrigation can help with
  - Nasal congestion
  - Post-Nasal Drip
  - Allergic Rhinitis
  - Chronic Sinusitis
  - Epistaxis

  - It only works if patients use it!
Sinus Irrigation Demo

• From: https://www.youtube.com/watch?v=aZgueuvJIsQ

Nasal Saline

• Compliance with use can be difficult due to taste as concerns of a “drowning feeling”
• Stress importance of making nasal irrigation part of daily routine
• Encourage use with head tilted forward to keep salt water out of the throat
• Encourage irrigation to be done at bath time/during showers

Essential Trach Tenets

• Humidification is of the utmost importance
• Suctioning to an appropriate depth helps prevent mucosal irritation and injury
Routine Trach Care

- ANY patient with a tracheostomy who is admitted should have the same equipment available
  1. Appropriately sized trach obturator taped to the bed to be used if accidental decannulation occurs
  2. Replacement tracheostomy tube equivalent in size and type to the trach tube currently in place. A second trach tube that is the next size smaller
  3. Suction equipment including an adequate number of appropriate sized suction catheters
  4. Oxygen or room air mist, as ordered
  5. Resuscitation bag with appropriate size mask
  6. Monitor appropriate for patient
  7. Surgical lubricant (Surgilube)
  8. Appropriately sized trach ties
  9. A placard denoting appropriate suction depth for the patient’s particular trach. If in doubt about suction depth, measure obturator of the extra trach of the same size

Trach Care & Clinical Follow Up

- Patients with long-standing tracheostomies, should be seen in the ENT clinic at least every 6 months
- Follow up recommended sooner if:
  - Excessive stomal granulation tissue
  - Difficulty with trach changes
  - Difficulty suctioning
  - Bloody secretions
  - Any other concerns

In office procedures

- Ear and nose foreign body removal
- Flexible laryngoscopy
- Nasal endoscopy
- Nasal cautery (limited)
- Cerumen removal
- Freurolotomy (unless the child has teeth)
- Auricular hematoma drainage (depending on patient age)
Management of Expectations

- Many ENT procedures can be done without general anesthesia
- However, this may require a brief period of assistance holding an anxious child still
- The ENT Clinic is NOT set up for conscious sedation

Clinic Scheduling

UHS Pediatric ENT Clinic
358-KIDS
Main Clinic
358-0500
Fax
358-0510

How to Contact Me

- (210) 358-KIDS
- Email: mcevoy@uthscsa.edu

Note: Some night and weekend call coverage is being provided by Drs. Juan Bonilla and Don Moe. The ENT Resident on call will be able to direct consults to appropriate staff.