PEDIATRIC OFFICE EMERGENCIES: RESPIRATORY DISTRESS

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**LECTURE OBJECTIVES**

- Effectively recognize common pediatric respiratory disorders
- Review current guidelines for management of these disorders
- Discuss optimal patient transfer to the Emergency Department and office preparation for pediatric emergencies
CASE BASED PRESENTATION
LIVE POLLING

1. Text erindunbar133 to 22333 once to join
2. Text your answer choice to take part in the cases (a, b, c, d, e)
WHY IS THIS AN IMPORTANT TOPIC?

• Pediatric office emergencies are not common
  • Pediatric primary care providers see a median of 24 pediatric emergencies per year
• Sick children continue to be brought into the office!

Flores G, Weinstock DJ. The preparedness of pediatricians for emergencies in the office: what is broken, should we care, and how can we fix it? Arch Pediatr Adolesc Med. 1996;150:249-256

WHY IS THIS AN IMPORTANT TOPIC?

• Primary care practices most commonly see emergencies related to:
  1. Asthma
  2. Dehydration
  3. Serious febrile illnesses
  4. Allergic reactions
  5. Moderate to severe croup
  6. Seizure
  7. Foreign body in airway


CASE #1
CASE #1

A 6 month old male presents after an episode of choking and cyanosis at daycare. Since that time the patient’s mother reports that he has had noisy and fast breathing with intermittent coughing. He has had no recent fevers, no congestion and no sick contacts.

CASE #1

You see the patient in your office:
• RR 40
• Appears well, no respiratory distress
• Normal lung exam until he is re-positioned then you notice some high pitched noises coming from his right lung field.

Your poll will show here

1. Install the app from pollev.com/app
2. Make sure you are in Slide Show mode

Still not working? Get help at pollev.com/app/help
Open poll in your web browser
FOREIGN BODY ASPIRATION

- 80% of foreign body aspirations occur in children < 3 years old

Clinical signs and symptoms of foreign body aspiration

<table>
<thead>
<tr>
<th>Upper airway foreign body</th>
<th>Lower airway foreign body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough, stridor, respiratory or cardiopulmonary arrest</td>
<td>Cough, wheezing, retractions, decreased breath sounds</td>
</tr>
</tbody>
</table>

- A witnessed episode of choking has a high sensitivity (76-92%) for the diagnosis of foreign body aspiration
- Late diagnosis: fever, signs of pneumonia, infiltrates not improving with antibiotics

Uptodate.com – Foreign body aspiration

FOREIGN BODY ASPIRATION

- Chest x-ray
  - Hyperinflated lung
  - Atelectasis
  - Mediastinal shift
  - Pneumonia
  - Normal!

Inspiratory film  Expiratory film  Lateral decubitus

FOREIGN BODY ASPIRATION

- Play it safe and send him in by EMS
  - Possibility of foreign body dislodgement en route
  - May transition from a partial airway obstruction to a complete airway obstruction

- How did our patient do?
CASE #2

A 2 year old male presents to your office with a barking cough for the past 2 days.
He appears well hydrated and without distress. He has no stridor at rest.
You try to approach him and he starts crying and you notice faint stridor.
You leave the room for a minute and his exam returns to normal.
CROUP

• Laryngo-tracheo-bronchitis
• Inflammation of the upper airways secondary to a viral infection
• Children 6 months to 3 years
• Inspiratory stridor, barky cough, increased work of breathing

CROUP

<table>
<thead>
<tr>
<th></th>
<th>Mild Croup</th>
<th>Moderate/Severe Croup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>Barky cough, no stridor at rest</td>
<td>Stridor at rest, respiratory distress</td>
</tr>
<tr>
<td>Treatment</td>
<td>Oral dexamethasone (0.6mg/kg) x 1 dose</td>
<td>Racemic epinephrine, dexamethasone (least invasive route)</td>
</tr>
<tr>
<td>Disposition</td>
<td>Home</td>
<td>ED</td>
</tr>
</tbody>
</table>

WHAT IF THIS CHILD LOOKED MORE ILL?

• Beware!
• Call for EMS and keep the patient as calm as possible
  • No meds, no IV, no exam
• Your communication with EMS and the receiving hospital will be very important
CASE #3

1 year old female, previously healthy presents to your office with 3 days of cough, congestion and increased work of breathing.

- O2 sat is 94%, RR 40, HR 130
- Bilateral coarse breath sounds with wheezing
- Subcostal retractions, no nasal flaring
- Pink and well hydrated
BRONCHIOLITIS

- Acute inflammation of the lower airways – viral cause
- Children < 2 years old
- Congestion, cough, bilateral wheezing and/or crackles
- Annually ~100,000 bronchiolitis admissions in the U.S.


AMERICAN ACADEMY OF PEDIATRICS CLINICAL PRACTICE GUIDELINES – BRONCHIOLITIS (2014)

- Does not include children with complex medical conditions
- Diagnosis based on history and physical exam


AMERICAN ACADEMY OF PEDIATRICS CLINICAL PRACTICE GUIDELINES – BRONCHIOLITIS (2014)

- Most important:
  - Evaluate the effects of respiratory status on mental status, feeding, and hydration
  - Ability of the family to care for the child
  - Ability to return for evaluation
  - Any additional risk factors
    - < 12 weeks old, prematurity, underlying cardiopulmonary disease, immunodeficiency

AMERICAN ACADEMY OF PEDIATRICS CLINICAL PRACTICE GUIDELINES – BRONCHIOLITIS (2014)

Imaging
- Current evidence does not support doing routine chest x rays
  - Often there are abnormalities seen on x ray
  - One randomized trial: patients with suspected lower respiratory tract disease who had chest x rays were more likely to be prescribed antibiotics without a difference in outcomes

AMERICAN ACADEMY OF PEDIATRICS CLINICAL PRACTICE GUIDELINES – BRONCHIOLITIS (2014)

Albuterol
- The previous guidelines gave the option for a trial
- Current guideline: should not be administered
- Most infants will not benefit

AMERICAN ACADEMY OF PEDIATRICS CLINICAL PRACTICE GUIDELINES – BRONCHIOLITIS (2014)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Recommendation</th>
<th>Level of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Racemic epinephrine</td>
<td>Don’t give unless severe disease</td>
<td>B, strong recommendation</td>
</tr>
<tr>
<td>Hypertonic saline</td>
<td>Does not shorten LOS in the ED or acute setting, may administer if an inpatient (&gt;24hrs of use)</td>
<td>B, moderate recommendation</td>
</tr>
<tr>
<td>Systemic corticosteroids</td>
<td>Not to be used in any setting</td>
<td>A, strong recommendation</td>
</tr>
</tbody>
</table>
MODERATE TO SEVERE BRONCHIOLITIS

- When to send your patient to the ED
  - Signs of respiratory distress or failure
  - Unable to maintain good hydration status
  - Altered mentation
  - Hypoxia
  - Younger age (<3 months)
  - Unreliable follow up or care at home
  - Complex medical history

CASE #4

5 year old female in your office who presents with a wet cough for 1 week and daily fevers.

- Decreased air entry right lung base with crackles
- Well hydrated, alert, no respiratory distress
- O2 sat 95% on room air
## COMMUNITY ACQUIRED PNEUMONIA IN CHILDREN

<table>
<thead>
<tr>
<th>Age</th>
<th>Organism</th>
</tr>
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<tbody>
<tr>
<td>Birth – 3 weeks</td>
<td>Group B Streptococcus, Gram-negative bacteria, Listeria monocytogenes</td>
</tr>
<tr>
<td>3 weeks – 3 months</td>
<td>Streptococcus pneumoniae</td>
</tr>
<tr>
<td>3 months – preschool age</td>
<td>Viral, S. Pneumoniae, Mycoplasma pneumoniae, Haemophilus influenzae type B, Staphylococcus aureus</td>
</tr>
<tr>
<td>School aged and adolescents</td>
<td>M pneumoniae, S pneumoniae, Viral</td>
</tr>
</tbody>
</table>


## COMMUNITY ACQUIRED PNEUMONIA - TREATMENT

- Antimicrobial therapy is not routinely required for pre-school aged children with CAP, because viral pathogens are responsible for the great majority of clinical disease (strong recommendation, high quality evidence)
  - Consider it with suspected bacterial origin
- First line: High dose amoxicillin
  - Alternatives 2nd or 3rd generation cephalosporins, levofloxacin, clindamycin
- Macrolides should be prescribed in school-age children and adolescents when findings are compatible with atypical pathogens

COMMUNITY ACQUIRED PNEUMONIA – WORK UP IN THE OUTPATIENT SETTING

- Pulse oximetry
  - If suspected PNA and hypoxemia
- Chest radiography
  - Not necessary to confirm uncomplicated CAP in outpatient setting
- Viral testing
  - Yes – may reduce the need for additional testing
- Blood cultures
  - NOT obtained in fully immunized, non-toxic, CAP in outpatient setting
  - Obtained in patients who fail to improve, progressive symptoms, clinical deterioration after antibiotics started – please send to the ED!


COMMUNITY ACQUIRED PNEUMONIA – WHEN TO HOSPITALIZE?

- Respiratory distress, hypoxemia (<90% O2 sat)
- Less than 3-6 months of age
- Suspected increased virulence – CA-MRSA
- Concern about careful observation at home, unable to comply with follow up
- Clinical signs of tiring
  - Grunting
  - Nasal flaring
  - Altered mentation


CASE #5
CASE #5

A 12 year old female with history of asthma presents to your office with a few days of congestion and cough. Today she reports a heaviness in her chest and difficulty catching her breath.

On exam she has wheezing bilaterally and decreased air entry at the lung bases. She does not appear to be in distress.

You determine she is having a mild to moderate asthma exacerbation and decide to give her albuterol in the office. You would also like to start a course of steroids.

ASTHMA

- Asthma: chronic disorder of the airways characterized by variable and recurring symptoms, airflow obstruction, bronchial hyper-responsiveness and underlying inflammation
- Affects more than 6 million children in U.S.
ASTHMA EXACERBATION

- Symptoms: Breathlessness, inability to talk in full sentences, chest tightness
- Signs: Respiratory rate, accessory muscle use, wheeze, pulse rate
- Functional assessment: Peak expiratory flow
- Very concerning factors: Confusion/drowsiness, no wheeze, bradycardia, PEF <40%


ASTHMA EXACERBATION

- Quick relief/emergency medications
  - SABAs: Albuterol – relaxes smooth muscle
  - Anticholinergics: Ipratropium bromide - inhibit muscarinic cholinergic receptors and reduce intrinsic vagal tone of the airway
    - Multiple doses provide additive benefit to SABA to reduce hospital admissions
  - Systemic corticosteroids: for moderate to severe exacerbations to speed recovery


BRONCHODILATORS

- Albuterol MDI: 4-8 puffs every 20 minutes + spacer
- Albuterol neb: 2.5mg-5mg every 20 minutes
- Ipratropium with albuterol: 1 vial every 20 minutes (has 0.5mg ipratropium bromide and 2.5mg albuterol)

STEROIDS

- Prednisone/prednisolone: 1-2 mg/kg per day
- Dexamethasone: 0.6 mg/kg once or twice
- Oral = IV = IM

CASE #6

An 11 year old male presents to you after going on a hike with his class today. The patient’s mother brought him in because of a rash all over his body. The patient reports that he feels like his tongue is swollen.

His mother gave him diphenhydramine before coming in.

On exam the patient appears nervous and pale, and you notice a faint rash on his trunk and extremities.
RECOGNIZING ANAPHYLAXIS

- A severe, potentially life-threatening allergic reaction, typically 2 or more systems are involved
- Most common signs are cutaneous – urticaria, angioedema, flushing, pruritus (10-20% don’t have these signs)
- Danger signs: Respiratory distress, wheezing, dyspnea, retractions, cough, signs of poor perfusion, abdominal pain, vomiting, hypotension

EMERGENT TREATMENT OF ANAPHYLAXIS

- ABCs + E
- Epinephrine 0.01 mg/kg IM (1:1000 preparation)
- Monitor for airway compromise and signs of shock
- Albuterol for bronchospasm
- Oxygen via facemask (8-10 L/minute) as needed
- Once EMS arrives (or if you have supplies) IV placement, H1, H2 antihistamine, glucocorticoids, fluids, secure airway if needed
ANAPHYLAXIS – DOSING EPINEPHRINE SAFELY

• In an emergency, pediatric dosing errors can be common
• Children 10-29 kg: 0.15 mg → auto-injector pen junior
• Children > 30 kg: 0.3 mg → auto-injector pen adult
• < 10 kg – should ideally be given an exact weight-based dose, if that is not available evaluate the risks and benefits of giving the auto-injector pen junior
• We use this strategy in our ED to avoid medication errors!

ANAPHYLAXIS – TO THE ED!

• If you are giving epinephrine to a patient please send them emergently to the ED
• If a patient comes to you after using their auto-injector at home please also send them in via EMS

• Biphasic anaphylaxis: uniphasic response, asymptomatic period 1 – 30 hours, then return of symptoms (1-23% cases)

ANAPHYLAXIS – A GREAT EXAMPLE TO DISCUSS EMERGENCIES IN THE OFFICE

EMERGENCY MEDICAL SERVICES

• Basic Life Support: EMT on board
  • Basic ECG, pulse oximetry
  • Intermediate airways – LMA, King airways
  • Defibrillation, resuscitation drugs
• Advanced Life Support: EMT and paramedic on board
  • Interpret 12 lead ECG
  • Intubation, needle/surgical cricothyroidotomy
  • Severely ill patient, or potential to worsen en route

EMERGENCY MEDICAL SERVICES

• What EMS can do versus family driving in
  • Monitor
  • Obtain IV access
  • Secure an emergency airway, chest compressions
  • EMS can call and update the receiving hospital
  • When in doubt send patient in by EMS

TRANSFERRING A PATIENT TO THE EMERGENCY DEPARTMENT

• Phone call to discuss the condition of your patient
  • Vital signs, physical appearance of your patient
  • Any resuscitative efforts or other treatment you have done, at what time and what response the patient had
  • Patient’s weight
• This allows us to prepare our resources appropriately
  • We can have anesthesia ready in our resuscitation bay, an operating room ready, PICU team aware, ventilator, intubation equipment etc.
TRANSFERRING A PATIENT TO THE EMERGENCY DEPARTMENT

• What we would love to receive on paper
  • A summary of the above if possible
  • A brief but comprehensive summary of important medical information for your patient

OFFICE PREPAREDNESS

• Essential supplies to have in the office
• Strongly suggested supplies
• Suggestions for preparing office personnel

OFFICE PREPAREDNESS

• Essential supplies
  • Oxygen delivery system, clear oxygen masks, breather, non-rebreather with reservoirs (infant, child, adult)
  • Bag-valve-mask (450 and 1000 mL)
  • Suction device, tonsil tip, bulb syringe
  • Nebulizer (or MDI with spacer)
  • Oropharyngeal airways (sizes 00-5)
  • Pulse oximeter
OFFICE PREPAREDNESS

• Essential medications
  • Oxygen
  • Albuterol
  • Epinephrine (1:1000)

• Strongly suggested supplies
  • Advanced airway supplies
  • Vascular access supplies – IV, IO
  • Spot glucose test
  • Neck collars
  • Heating source – overhead warmer

• Strongly suggested medications
  • Normal saline
  • Epinephrine (1:10,000)
  • Steroids
  • Antibiotics

PREPARING THE OFFICE PERSONNEL – FRONT DESK STAFF

APPENDIX 2A: RECEPTION DESK EMERGENCY CARD
The following signs and symptoms may signal an emergency:
• Internally labored breathing
• Blue or pale color (cyanosis)
• Noisy breathing (wheezing or snoring)
• Absent normal status
• Seizure
• Agitation (in the parent)
• Vomiting after a head injury
• Uncontrolled bleeding

If you feel a patient has symptoms that may signal an emergency, alert the following office staff: ________

APPENDIX 2B: CALLING EMS FOR AN OFFICE EMERGENCY
Call 9-1-1 or your local EMS emergency responder number: ________

Be ready to give the emergency medical dispatcher the following information:
• Age and condition of child (with vital signs, if appropriate)
• Your office location (with directions and telephone number, if necessary)
• Level of clinical staff present
• Desired transport destination (pediatric center, local ED, others)
• Level of EMS provider required: ALS (advanced life support) or BLS (basic life support)

If required, where security or other personnel will be meeting them to assist in guiding EMS to location of the child: ________
PREPARING THE OFFICE PERSONNEL

• Clear management plan with assigned roles
• Mock codes
• Clinical staff – PALS training

OFFICE EMERGENCIES – A REVIEW

• Know your resources
  • What supplies do you have and where are they?
  • Are there other offices/resources around who can help
  • Where is your closest ED? Tertiary care center?
• EMS – know how long they take to arrive
• Phone call to the receiving hospital
• Summary of important medical information for your patient

THANK YOU FOR YOUR ATTENTION!