Pediatric Emergencies: What the Primary Care Physician Should Know

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Objectives

• Plan the appropriate initial evaluation of status epilepticus, and manage appropriately
• Recognize the signs and symptoms of anaphylaxis, and manage appropriately
• Provide appropriate treatment for a patient who has an acute exacerbation of asthma, including asthma that is not responsive to adrenergic agonist therapy

Practice Gap – Status Epilepticus

• The causes of seizures are many, and a number of other conditions can mimic seizures, making careful evaluation of seizure-like episodes critical.
• Febrile seizures are the most common type of seizure in children, and their management is usually the task of the general pediatrician.
• Status epilepticus constitutes an emergency situation that can have severe consequences and requires skilled therapy.
Practice Gap – Anaphylaxis

• Anaphylaxis can cause death; thus, clinicians must be aware of the characteristics of anaphylaxis and of proper therapy, including immediate administration of epinephrine.
• All patients at risk should carry self-administration epinephrine pens, with 2 epinephrine pens (twin pack) now recommended in case a second dose is needed for persistent symptoms.
• Given the 20% incidence of biphasic latent reactions, patients always should self-administer epinephrine and seek immediate emergency medical treatment.


Practice Gap – Status Asthmaticus

• Asthma affects the health and quality of life of many children and is a major cause of emergency department visits and hospital admissions.
• Advances in clinical and basic research have not led to a significant reduction in urgent care visits.
• One probable contributor is the lack of universal implementation of asthma guidelines into clinical practice.

Holger Werner Link. Pediatric Asthma in a Nutshell. *Pediatrics in Review* 2014;35;287
Disclosures

Nothing to disclose...

Status Epilepticus
Classification of Status Epilepticus (SE)

- Acute symptomatic: 26%
- Remote symptomatic: 22%
- Remote symptomatic with an acute precipitant: 3%
- Progressive encephalopathy: 3%
- Febrile: 1%
- Cryptogenic: 1%

EEG Findings in Children with SE

- Normal: 8%
- Generalized slowing: 2%
- Focal slowing: 6%
- Epileptiform features, generalized only: 19%
- Epileptiform features, focal only: 16%
- Epileptiform features, generalized and focal: 41%
- Electroencephalographic inactivity: 8%
Characteristics of Distinct Seizure Phenotypes

Results of Studies in Which AED Levels Were Obtained

<table>
<thead>
<tr>
<th>Key</th>
<th>N</th>
<th>Low AED levels</th>
<th>AED withdrawn or D/C</th>
<th>AED noncompliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>528</td>
<td>74</td>
<td>31</td>
<td>1 (0.2%)</td>
</tr>
<tr>
<td>Mean, %</td>
<td>32 ± 25</td>
<td>9 ± 10</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Median, %</td>
<td>21</td>
<td>4.2</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Range, %</td>
<td>2.7 – 63</td>
<td>1 – 28</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>95%, CI, %</td>
<td>8.8 – 51</td>
<td>-0.5 – 18.6</td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

Doses of Commonly Used Antiepileptic Drugs in Status Epilepticus

<table>
<thead>
<tr>
<th>Drug</th>
<th>Route</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorazepam</td>
<td>Intravenous</td>
<td>0.1 mg/kg up to 4 mg total, may repeat in 5-10 min</td>
</tr>
<tr>
<td></td>
<td>Intranasal</td>
<td>0.1 mg/kg</td>
</tr>
<tr>
<td>Midazolam</td>
<td>Intravenous</td>
<td>0.2 mg/kg up to 10 mg total dose, may repeat in 5-10 min</td>
</tr>
<tr>
<td></td>
<td>Intramuscular</td>
<td>0.2 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Intranasal</td>
<td>0.2 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Buccal</td>
<td>0.5 mg/kg</td>
</tr>
</tbody>
</table>

Proposed Treatment Algorithm for Status Epilepticus: 0 – 5 Minutes: Stabilization Phase

1. Stabilize patient (“ABCD” – neurologic exam)
2. Time seizure from its onset, monitor vital signs
3. Assess oxygenation, give oxygen, consider intubation if needed
4. Initiate ECG monitoring
5. Collect finger stick blood glucose
6. Attempt IV access and collect electrolytes, hematology, toxicology screen, (if appropriate) anticonvulsant drug levels


Proposed Treatment Algorithm for Status Epilepticus: 5 – 20 Minutes: Initial Therapy Phase

• Choose 1 of the following 3 equivalent first line options
  • Intramuscular midazolam (10 mg for > 40 kg, 5 mg for 13 – 40 kg, single dose)
  • Intravenous lorazepam (0.1 mg/kg/dose, may repeat dose once)
  • Intravenous diazepam (0.15 – 0.2 mg/kg/dose, may repeat dose once)

• If none of the 3 options above are available, choose 1:
  • Intravenous phenobarbital (15 mg/kg/dose, single dose)
  • Rectal diazepam (0.2 – 0.5 mg/kg, single dose)
  • Intranasal or buccal midazolam

Proposed Treatment Algorithm for Status Epilepticus: 20 – 40 Minutes: Second Therapy Phase

• There is no evidence-based preferred second therapy of choice
• Choose 1 of the following second line options, give as a single dose
  • Intravenous fosphenytoin (20 mg PE/kg, single dose)
  • Intravenous valproic acid (40 mg/kg, single dose)
  • Intravenous levetiracetam (60 mg/kg, single dose)
• If these options above are available, consider (if not already given)
  • Intravenous phenobarbital (15 mg/kg, single dose)


Rescue Medicine for Epilepsy in Education Settings – Clinical Report

3. An individualized action plan will be most effective if it takes into consideration the possible options for the least restrictive medication choice (i.e., buccal or nasal route) for the child in his or her environment while ensuring the child’s safety.

4. An individualized action plan can also include details of when to activate emergency medical services, depending on the patient and available resources.

Adam L. Hartman, Cynthia Di Laura Devore, and the SECTION ON NEUROLOGY and COUNCIL ON SCHOOL HEALTH. Rescue Medicine for Epilepsy in Education Settings. Pediatrics 2016;137. originally published online December 28, 2015
# Anaphylaxis

## Signs and Symptoms of Anaphylaxis

<table>
<thead>
<tr>
<th>Sign/symptom</th>
<th>%</th>
<th>Sign/symptom</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cutaneous</strong></td>
<td></td>
<td><strong>Hypotension, dizziness, syncope, diaphoresis</strong></td>
<td>30 – 35</td>
</tr>
<tr>
<td>Urticaria and angioedema</td>
<td>62 – 90</td>
<td>Abdominal</td>
<td></td>
</tr>
<tr>
<td>Flushing</td>
<td>45 – 55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pruritus without rash</td>
<td>2 – 5</td>
<td>Nausea, vomiting, diarrhea, abdominal pain</td>
<td>25 – 30</td>
</tr>
<tr>
<td><strong>Respiratory</strong></td>
<td></td>
<td><strong>Miscellaneous</strong></td>
<td></td>
</tr>
<tr>
<td>Dyspnea, wheeze</td>
<td>45 – 50</td>
<td>Headache</td>
<td>5 – 8</td>
</tr>
<tr>
<td>Upper airway angioedema</td>
<td>50 – 60</td>
<td>Subternal pain</td>
<td>4 – 5</td>
</tr>
<tr>
<td>Rhinitis</td>
<td>15 – 20</td>
<td>Seizure</td>
<td>1 – 2</td>
</tr>
</tbody>
</table>

Anaphylaxis: Recognition

- **Skin, conjunctivae, oral mucosa**: itching, redness, hives, swelling
- **Respiratory tract**: hoarseness, throat itching, throat tightness, stridor, cough, difficulty breathing, chest tightness, wheeze, cyanosis;
- **Cardiovascular symptoms**: tachycardia, chest pain, hypotension, weak pulse, dizziness, collapse, incontinence, shock;
- **Gastrointestinal tract symptoms**: nausea, crampy abdominal pain, persistent vomiting, diarrhea
- **Central nervous system**: behavioral changes (infants), sense of doom, headache, altered mental status, confusion, tunnel vision.

Scott H. Sicherer, F. Estelle R. Simons and SECTION ON ALLERGY AND IMMUNOLOGY. Epinephrine for First-aid Management of Anaphylaxis. *Pediatrics* 2017;139;; originally published online February 13, 2017

Symptoms and Signs of Anaphylaxis in Infants

<table>
<thead>
<tr>
<th>System</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>SKIN/MUCUS MEMBRANES</td>
<td><strong>Rapid onset of hives</strong> (potentially difficult to discern in infants with acute atopic dermatitis; scratching and excoriations will be absent in young infants); <strong>angioedema</strong> (face, tongue, oropharynx)</td>
</tr>
<tr>
<td>RESPIRATORY</td>
<td>Rapid onset of coughing, choking, stridor, wheezing, dyspnea, apnea, cyanosis</td>
</tr>
<tr>
<td>GASTROINTESTINAL</td>
<td>Sudden, profuse vomiting</td>
</tr>
<tr>
<td>CARDIOVASCULAR</td>
<td>Weak pulse, arrhythmia, diaphoresis/ sweating, collapse/unconsciousness</td>
</tr>
<tr>
<td>CENTRAL NERVOUS SYSTEM</td>
<td>Rapid onset of unresponsiveness, lethargy, or hypotonia; seizures</td>
</tr>
</tbody>
</table>

Patient Factors That Contribute to Anaphylaxis


Anaphylaxis Mechanisms and Triggers

Causes of Anaphylaxis

<table>
<thead>
<tr>
<th>Cause</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>Peanut, tree nuts, fish, shellfish, cow milk, soy, egg</td>
</tr>
<tr>
<td>Medication</td>
<td>Antibiotics, nonsteroidal anti-inflammatory drugs, chemotherapy</td>
</tr>
<tr>
<td>Stinging insects</td>
<td>Honey bee, wasp, hornet, yellow jacket, fire ant</td>
</tr>
<tr>
<td>Natural rubber latex</td>
<td>Balloons, gloves, medical equipment</td>
</tr>
<tr>
<td>Vaccinations</td>
<td>Gelatin, egg, yeast, neomycin</td>
</tr>
<tr>
<td>Exercise-induced</td>
<td>Food-exercise, medication-exercise</td>
</tr>
</tbody>
</table>

Anaphylaxis Triggers

- Anaphylaxis triggers
  - Across all age groups, the most common are
    - Ingested foods (33%)
    - Insect stings (19%)
    - Medications (14%)
- Hereditary angioedema
  - Consider when angioedema occurs in the absence of urticaria
Role of Laboratory Tests in the Diagnosis of Anaphylaxis

• Total tryptase (pro, pro’, and mature forms of α/β tryptases)
  • Obtain blood sample within 15 minutes to 3 hours of symptom onset
  • Consider measuring levels in accurately timed serial blood samples during the anaphylactic episode
  • Consider comparing levels measured during the episode with a baseline level

• Histamine
  • Obtain blood sample within 15 minutes to 1 hour of symptom onset
  • Measure histamine and its metabolite N-methylhistamine in a 24-hour urine sample


Diagnosis of Anaphylaxis

• Anaphylaxis is highly likely when any 1 of the following 3 criteria is fulfilled:
  1. Acute onset of an illness (minutes to several hours) with involvement of the skin and/or mucosal tissue

  AND AT LEAST 1 OF THE FOLLOWING:
    a. Respiratory compromise
    b. Reduced BP or associated symptoms of end-organ dysfunction

Diagnosis of Anaphylaxis

• Anaphylaxis is highly likely when any 1 of the following 3 criteria is fulfilled:

2. Two or more of the following that occur rapidly after exposure to a likely allergen for that patient (minutes to several hours):
   a. Involvement of the skin/mucosal tissue
   b. Respiratory compromise
   c. Reduced BP or associated symptoms
   d. Persistent gastrointestinal symptoms


Diagnosis of Anaphylaxis

• Anaphylaxis is highly likely when any 1 of the following 3 criteria is fulfilled:

3. Reduced BP following exposure to known allergen for that patient (minutes to several hours):
   a. Infants, children: low systolic BP (age-specific) or >30% drop in systolic BP
   b. Adults: systolic BP <90 mm Hg or >30% drop from patient’s baseline

Anaphylaxis: First-aid Treatment

1. Be prepared! Have a written anaphylaxis emergency action plan.
2. When anaphylaxis occurs, promptly assess the patient’s airway, breathing, circulation, and skin and call for help: 911 or EMS.
3. Inject epinephrine (adrenaline) IM. If needed, give a second injection 5 to 15 minutes after the first.
4. Place the patient on his or her back or in a position of comfort.
5. Transport the patient to an emergency department, preferably by an EMS vehicle, for further assessment and monitoring. Additional treatment, including supplemental oxygen, intravenous fluids, and other interventions may be needed.

Scott H. Sicherer, F. Estelle R. Simons and SECTION ON ALLERGY AND IMMUNOLOGY. Epinephrine for First-aid Management of Anaphylaxis. Pediatrics 2017;139;; originally published online February 13, 2017

Anaphylaxis Treatment Protocol – Medications

<table>
<thead>
<tr>
<th>Optional treatment (efficacy has not been established)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H₁ antihistamine</strong></td>
</tr>
<tr>
<td><strong>Corticosteroids</strong></td>
</tr>
</tbody>
</table>

**Observation and monitoring**

| Observation in hospital | Transport to emergency department by EMS for further treatment and observation for ± 8 h |
| Observation in office | Observe in office until full recovery + additional 30 – 60 min for all patients who are not candidates for EMS transport to emergency department |

Anaphylaxis Treatment Protocol – Discharge Management

**Discharge management**

<table>
<thead>
<tr>
<th><strong>Education</strong></th>
<th>Educate patient and family on how to recognize and how to treat anaphylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Auto-injectable epinephrine</strong></td>
<td>Prescribe 2 doses of auto-injectable epinephrine for patients who have experienced an anaphylactic reaction and for those at risk for severe anaphylaxis; train patient, patient provider, and family on how to use the auto-injector</td>
</tr>
<tr>
<td><strong>Anaphylaxis action plan</strong></td>
<td>Provide patients with an action plan instructing them on how and when to administer epinephrine</td>
</tr>
</tbody>
</table>


Guidance on Completing a Written Allergy and Anaphylaxis Emergency Plan

Julie Wang, Scott H. Sicherer and SECTION ON ALLERGY AND IMMUNOLOGY. Guidance on Completing a Written Allergy and Anaphylaxis Emergency Plan. *Pediatrics* 2017;139;; originally published online February 13, 2017
Anaphylaxis Emergency Plan Summary

2. An allergy and anaphylaxis emergency plan, developed by the health care provider, would be beneficial for patients who are at risk of anaphylaxis and those who have been prescribed an epinephrine autoinjector.

3. The written plan may serve as a guide for patients, family and nonfamily caregivers, and school personnel in the management of allergic reactions.

Julie Wang, Scott H. Sicherer and SECTION ON ALLERGY AND IMMUNOLOGY. Guidance on Completing a Written Allergy and Anaphylaxis Emergency Plan. Pediatrics 2017;139;; originally published online February 13, 2017
Demographics

- Over 10 million school days missed due to asthma
- Over $50 billion spent annually by the healthcare system due to asthma


Stepwise Approach for Asthma Therapy – Preferred Treatment

<table>
<thead>
<tr>
<th>Age, y</th>
<th>STEP 1</th>
<th>STEP 2</th>
<th>STEP 3</th>
<th>STEP 4</th>
<th>STEP 5</th>
<th>STEP 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 4</td>
<td>SABA as needed</td>
<td>Low-dose ICS</td>
<td>Medium-dose ICS</td>
<td>Medium-dose ICS and LABA</td>
<td>High-dose ICS and LABA</td>
<td>STEP 5 and OCS</td>
</tr>
<tr>
<td>5 – 11</td>
<td>SABA as needed</td>
<td>Low-dose ICS</td>
<td>Low-dose ICS and LABA</td>
<td>Medium-dose ICS and LABA</td>
<td>High-dose ICS and LABA</td>
<td>STEP 5 and OCS</td>
</tr>
<tr>
<td>≥ 12</td>
<td>SABA as needed</td>
<td>Low-dose ICS</td>
<td>Low-dose ICS and LABA</td>
<td>Medium-dose ICS and LABA</td>
<td>High-dose ICS and LABA</td>
<td>STEP 5 and OCS</td>
</tr>
</tbody>
</table>

Stepwise Approach to Asthma Management

Asthma Exacerbations Initial Management

- Initial management
  - Decreasing airway obstruction
  - Correcting hypoxemia
  - Preventing further progression of symptoms

- Immediate goals
  - Close patient monitoring
  - Oxygen supplementation to maintain oxygen saturation at 90% or greater
  - Administration of bronchodilators

- Inhaled beta₂-agonist
  - Nebulization or an MDI
  - Administered every 20 minutes for 1 hour should be the initial therapy

- Inhaled anticholinergics
  - Have been shown to improve lung function and reduce hospitalization rates IF
  - Must be given with the first three albuterol treatments
Asthma Exacerbations Severity Treatment

Table 2. Management of Exacerbations by Severity

<table>
<thead>
<tr>
<th>Severity</th>
<th>Signs and Symptoms</th>
<th>Initial Peak Expiratory Flow (or FEV1)</th>
<th>Clinical Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nild</td>
<td>Dyspnea only with activity (assess intubation in young children)</td>
<td>PEF &gt; 70% predicted or personal best</td>
<td>Usually cared for at home. Prompt relief with inhaled SABA. Possible short course of oral systemic corticosteroids.</td>
</tr>
<tr>
<td>Moderate</td>
<td>Dyspnea interferes with or limits usual activity</td>
<td>PEF 40-60% predicted or personal best</td>
<td>Usually requires office or ED visit. Relief from frequent inhaled SABA. Oral systemic corticosteroids; some symptoms last 1-2 days after treatment visits.</td>
</tr>
<tr>
<td>Severe</td>
<td>Dyspnea at rest; interferes with conversation</td>
<td>PEF &lt;40% predicted or personal best</td>
<td>Usually requires ED visit and likely hospitalization. Partial relief from frequent inhaled SABA. Oral systemic corticosteroids; some symptoms last &gt;3 days after treatment visits. Adjunctive therapies are helpful.</td>
</tr>
<tr>
<td>Life-Threatening</td>
<td>Too dyspneic to speak; perspiring</td>
<td>PEF &lt;25% predicted or personal best</td>
<td>Requires ED hospitalization, possible ICU. Minimal or no relief from frequent inhaled SABA. Intravenous corticosteroids. Adjunctive therapies are helpful.</td>
</tr>
</tbody>
</table>

IPA: ED — emergency department, FEV1 — forced expiratory volume in 1 second; ICU — intensive care unit; PEF — peak expiratory flow; SABA — short-acting beta agonists

Pediatric Asthma Score

Asthma Pathway for Community Emergency Department

- **Triage order set**
- Nursing interventions
  - Continuous pulse ox monitoring
  - Peripheral IV start
- **Medications**
- For patients < 30 kg
  - Continuous ipratropium 0.5 mg x 1
  - Continuous albuterol 7.5 mg x 1
- For patients > 30 kg
  - Continuous ipratropium 1 mg x 1
  - Continuous albuterol 15 mg x 1
  - Dexamethasone
    - 6 mg for patients 6 – 10 kg PO
    - 10 mg for patients 11 – 20 kg PO
    - 16 mg for patients 21 kg and above PO


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Asthma Pathway for Community Emergency Department

- **Provider order set** (in addition to triage to nursing set)
- Additional interventions
  - Consider consult other facility
- Additional medications
  - Magnesium sulfate
  - Epinephrine
  - Methylprednisolone

Asthma Action Plan


Questions...
Status Epilepticus

PREP 2009 Question 150

• A 14-year-old boy who has epilepsy presents to the emergency department after a generalized tonic-clonic seizure that began on the playground at school.

• He continued to convulse en route in the ambulance, where he received 15 mg diazepam rectally and intravenous access was achieved.

• In the emergency department, he continues to be unresponsive, exhibiting tachycardia and non-suppressable bilateral synchronous rhythmic clonic jerks.
150. 2

• Of the following, the MOST appropriate medication to administer next is
  A. fosphenytoin 20 mg/kg intravenously
  B. pentobarbital 5 mg/kg intravenously
  C. phenobarbital 20 mg/kg intravenously
  D. phenytoin 7 mg/kg orally
  E. valproic acid 15 mg/kg intravenously

PREP 2010 Question 102

• A 17-year-old boy is brought via ambulance to the emergency department due to a generalized tonic-clonic seizure that is ongoing.
• No medications have been administered en route, but intravenous access has been obtained.
• After administration of 2 mg intravenous lorazepam, the seizure stops.
• According to his father, the boy has epilepsy that is difficult to control, for which he takes valproic acid, oxcarbazepine, and levetiracetam.
102., 2

• Of the following, the MOST appropriate next diagnostic test to obtain is
  A. brain magnetic resonance imaging
  B. electroencephalography
  C. measurement of blood anticonvulsant concentrations
  D. measurement of serum calcium, magnesium, and phosphorous
  E. measurement of serum electrolytes

Anaphylaxis
PREP 2014 Question 159

• A 2-year-old is in the ER for rash and swelling of her lips.
• She ate a peanut butter cracker before arrival and started choking.
• The girl then developed hives on her face.
• Her mother gave her diphenhydramine, and the hives faded, but symptoms progressed to include lip swelling and a raspy voice.
• Now the girl is irritable and appears to be breathing fast.

159., 2

• The MOST appropriate step in this girl’s management is to administer
  A. Injectable corticosteroid
  B. Injectable epinephrine
  C. Nebulized albuterol
  D. Ranitidine and diphenhydramine
  E. Scheduled diphenhydramine
PREP 2014 Question 213

• A 3-year-old girl is seen after hospital discharge.
• A few days ago, she developed an erythematous, itchy, raised, blotchy rash, marked swelling of the eyes and lips, and raspy breathing.
• The child was given injectable epinephrine, diphenhydramine, and systemic corticosteroids.
• The symptoms improved, but the child was admitted to be observed overnight.
• The mother would like you to determine what triggered this reaction.

213., 2

• The MOST common triggers for events such as those experienced by this girl are
  A. Aeroallergens, contact allergens, latex, cleaning agents
  B. Foods, medications, hereditary angioedema, idiopathic triggers
  C. Infections (viral or bacterial), foods, medications, insect stings
  D. Mast cell disorders, hereditary angioedema, urticarial vasculitis
  E. Nonsteroidal anti-inflammatory drugs, antibiotics, narcotics, and radiocontrast media
Status Asthmaticus

PREP 2014 Question 195

• A 7-year-old boy has been “coughing and wheezing since dinner last night.”
• He required 2 albuterol treatments last night and 3 treatments since early this morning.
• The child is sitting upright and appears breathless.
• Vitals reveal T 37.1 °C, $S_aO_2$ 82% on room air, HR 120 bpm, and RR 40 rpm.
• He is using accessory muscles to breathe
• Lung sounds are diminished bilaterally with mild wheezing.
• He is barely able to speak.
• His peak expiratory flow is 35% of predicted.
• The MOST likely initial diagnosis is
  A. Acute moderate asthma exacerbation
  B. Acute severe asthma exacerbation
  C. Foreign body aspiration
  D. Pneumonia
  E. Pneumothorax

PREP 2014 Question 71

• A 9-year-old girl is in the emergency room (ER) for an asthma exacerbation.
• At home, she had back to back to back albuterol breathing treatments.
• On your examination, vitals reveal RR 40 rpm and $S_aO_2$ 92% on room air.
• There are intercostal and suprasternal retractions and bilateral wheezes.
• Peak expiratory flow is 40% of predicted value.
• You give her another albuterol treatment.
The best NEXT step in management is to
A. Add ipratropium bromide to the albuterol
B. Observe her to assess response to albuterol
C. Order a heliox administration
D. Order a loading dose of an oral corticosteroid
E. Order a subcutaneous terbutaline
Resources

Pediatric Review Education Program
American Academy of Pediatrics

References – Status Epilepticus


References – Status Epilepticus


References – Acute Exacerbation of Asthma

