The McMaster at night Pediatric Curriculum

Primary Resource: Canadian Thoracic Society 2012 Guidelines

ASTHMA
Objectives

• Medical Expert
  • Review different presentations and prognostic factors of pediatric asthma
• Scholar
  • Highlight most recent consensus recommendations for management of pediatric asthma
• Health Advocate
  • Recognize impact of pediatric asthma on childhood function
Background

- Pediatric Asthma is most common chronic illness in childhood
- Accounts for more school days lost than any other chronic condition
- Poor control can cause significant function impact (loss of school, exercise) and indirect costs (parent time off work, ER visits)
Background

What is the definition of Asthma?
2012 CTS Guideline Definition

• **Inflammatory disorder of the airways** characterized by paroxysmal or persistent symptoms such as dyspnea, chest tightness, wheezing, sputum production and cough, associated with **variable airflow limitation** and airway **hyperresponsiveness** to endogenous and exogenous stimuli.
The Case

- Johnny is a 4 year old boy referred to your office with an 8 month history of cough.

What more do you want to know?
History

- Cough occurs during the day and at night
- Some days better, different week to week
- Worse during times of viral infections, exercise
- Associated with occasional shortness of breath
- Brought to ER three times in past year with URTI symptoms and told to take “blue puffer” for a few weeks during illness → improved
- Has missed about 3 weeks of school this year due to cough
- No hospital admissions or serious infections
- Hx of atopic dermatitis as an infant
- Family history – Asthma in mother, older sibling
- Both parents smoke in home
Is it Asthma?

• Beware:
  – Neonatal symptoms/Prematurity
  – Wheeze associated with feeding, recurrent vomiting
  – Sudden onset of cough/choking
  – Steatorrhea
  – Stridor
  – Weight loss/Failure to Thrive
Physical Exam

What would you look for?
Physical Exam

- Johnny is well appearing initially, normal growth parameters
- After running in circles for a few minutes within the confines of your office you notice an audible high pitched noise on exhalation
- He also appears to be laboured in his breathing with nasal flaring, subcostal and intercostal retractions
- Auscultation
  - Decreased air entry bilaterally to bases
  - Intermittent diffuse wheeze
Workup

What would you order?
Diagnosis of Asthma in Children

- Age < 6 years
  - !!! History and Physical !!!
    - Attention to atopy, family hx, environmental RFs, response to inhalers
- Age > 6 years
  - Spirometry → evidence of reversible airflow obstruction
  - Methacholine/Exercise challenge
# Differential Diagnosis

<table>
<thead>
<tr>
<th>Upper Respiratory</th>
<th>Lower Respiratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Frequent URTIs</td>
<td>- Bronchopulmonary dysplasia</td>
</tr>
<tr>
<td>- Allergic rhinitis/sinusitis</td>
<td>- GERD, Aspiration</td>
</tr>
<tr>
<td><strong>Middle Respiratory</strong></td>
<td><strong>Bronchiolitis</strong></td>
</tr>
<tr>
<td>- Laryngomalacia</td>
<td>- Cystic Fibrosis</td>
</tr>
<tr>
<td>- Pertussis</td>
<td>- Pneumonia</td>
</tr>
<tr>
<td>- Vocal Cord Paralysis</td>
<td>- Tuberculosis</td>
</tr>
<tr>
<td>- Tracheoesophageal Fistula</td>
<td>- Pulmonary Edema (CHF)</td>
</tr>
<tr>
<td>- Foreign Body</td>
<td>- Medications (B-blockers, ACEIs)</td>
</tr>
<tr>
<td></td>
<td>- Primary Ciliary Dyskinesia</td>
</tr>
</tbody>
</table>
Types of Asthma

1) Transient, Early Wheezer
   – Within first 3 years of life
   – Typically resolve by 6 years
   – Positive maternal smoking is RF

2) Late Onset Wheezer
   – After 3 years
   – More likely family history of asthma
Types of Asthma

3) Persistent Wheezer
   – Present at any time
   – +ve Maternal smoking, asthma
   – More likely to have
     • Positive skin testing
     • Elevated IgE, eosinophilia
     • Personal hx of atopy
Asthma Management Principles

• Confirm Diagnosis
• Identify triggers and improve environment
  – Quit smoking!
• Confirm inhaler technique
  – http://www.youtube.com/watch?v=55ShvBAWGww
• Regularly reassess control, growth parameters
• Minimum amount of controller medication to optimize control
• Formal testing when old enough
## Assessing Asthma Control

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency or Value (Goal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daytime symptoms</td>
<td>&lt;4 Days/week</td>
</tr>
<tr>
<td>Night-time symptoms</td>
<td>&lt;1 night/week</td>
</tr>
<tr>
<td>Physical activity</td>
<td>Normal</td>
</tr>
<tr>
<td>Exacerbations</td>
<td>Mild, infrequent</td>
</tr>
<tr>
<td>Absence from work or school due to asthma</td>
<td>None</td>
</tr>
<tr>
<td>Need for fast-acting Beta2-agonist</td>
<td>&lt;4 doses/week</td>
</tr>
<tr>
<td>FEV1 or PEF</td>
<td>&gt;90% personal best</td>
</tr>
<tr>
<td>PEF Diurnal variation</td>
<td>&lt;10-15%</td>
</tr>
</tbody>
</table>
ASTHMA ACTION PLAN

Name: ___________________________ Date: ___________________________

ASTHMA IS UNDER CONTROL

Green Level—Good Control

- Normal breathing
- No cough or wheeze
- Normal activity
- Normal sleep
- No need for Reliever medicine

WHAT SHOULD I DO?

CONTROLLER

<table>
<thead>
<tr>
<th>MEDICINE</th>
<th>PUFFS/DOSE</th>
<th>TIMES/DAY</th>
</tr>
</thead>
</table>

RELEIVER

| As needed |

Keep Up The Good Work!

- Reliever medicine can be used for asthma symptoms (cough, wheeze, difficulty breathing).

TIME TO TAKE ACTION!

Yellow Level—Caution

- Cold symptoms
- Symptoms at night
- Symptoms with activity
- Reliever medicine used more than 3 times a week for symptoms

- Start or increase Controller medicine
- When better, return to Green Level

CONTROLLER

<table>
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<th>MEDICINE</th>
<th>PUFFS/DOSE</th>
<th>TIMES/DAY</th>
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</table>

RELEIVER

| As needed |

- If Reliever medicine is needed every 4 hours, call your doctor.
- See your doctor if asthma symptoms are not improving after two days.

GET HELP!

RED LEVEL—DANGER

- Reliever medicine needed in less than 3 hours
- Reliever medicine does not begin to improve asthma symptoms in 10 minutes

GO TO THE CLOSEST EMERGENCY IMMEDIATELY!

- Use Reliever medicine as much as needed on the way to the Emergency!

Comments: ___________________________ Phone Number: ___________________________

Visit www.asthma-education.com

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The Children’s Asthma Education Centre 2012.
<table>
<thead>
<tr>
<th>CONTROLLERS</th>
<th>CONTROLLED RESPIRATORY DEVICES</th>
<th>RELIEVERS (Short-Acting Bronchodilators)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-Inflammatories</td>
<td>Combination Medications</td>
<td>Long-Acting Bronchodilators</td>
</tr>
<tr>
<td><strong>FLOVENT DISKUS</strong> (Fluticasone propionate) Available in 50, 100, 200 &amp; 400 mcg per inhalation GlaxoSmithKline</td>
<td><strong>ADVAM DISKUS</strong> Inhibition Device (Salbutamol / fluticasone propionate) Available in 50/250, 50/500 mcg per Inhalation GlaxoSmithKline</td>
<td><strong>SEREVENT DISKUS</strong> Inhalation Device (Salmeterol xinafoate) 50 mcg per inhalation GlaxoSmithKline</td>
</tr>
<tr>
<td><strong>FLOVENT HFA</strong> (Fluticasone propionate) Available in 84, 168 &amp; 336 mcg per Inhalation GlaxoSmithKline</td>
<td><strong>ADVAM HFA</strong> (Salmeterol xinafoate/fluticasone propionate) Available in 25/125 &amp; 50/250 mcg per inhalation GlaxoSmithKline</td>
<td><strong>SPRIVA HandiHaler</strong> Inhalation Device (Ipratropium bromide monohydrate) 18 mcg per inhalation Boehringer Ingelheim</td>
</tr>
<tr>
<td><strong>PULMICORT TURBUHALER</strong> (Budesonide) Available in 100, 200 &amp; 400 mcg per Inhalation AstraZeneca</td>
<td><strong>SYMPLICORT TURBUHALER</strong> (Budesonide/salmeterol fumarate) Available in 60/6 &amp; 200/6 mcg per inhalation AstraZeneca</td>
<td><strong>OCZEY TURBUHALER</strong> (Beclomethasone fumarate dihydrate) Available in 6 &amp; 12 mcg per inhalation AstraZeneca</td>
</tr>
<tr>
<td><strong>ALVESCO</strong> (Ciclesonide) Available in 100 &amp; 200 mcg per inhalation ALENDA Pharma AG</td>
<td><strong>QVAR</strong> (Budesonide fumarate) Available in 50 &amp; 100 mcg per inhalation 3M Pharmaceuticals</td>
<td><strong>VITALON</strong> <strong>LISINOL</strong> (Salmeterol flunisolide) 100 mcg per inhalation GlaxoSmithKline</td>
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<td><strong>ATROVENT</strong> <strong>HFA INHALATION AEROSOL</strong> (Ipratropium bromide) 20 mcg per inhalation Boehringer Ingelheim</td>
<td><strong>AIRWAVE INHALATION AEROSOL</strong> (Ipratropium bromide) 100 mcg per inhalation 3M Pharmaceuticals</td>
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This is not a complete list of available agents. Please consult the CPS for others.
2012 Asthma Management Continuum
Children (6 years and over) and Adults

Regularly Reassess
- Control
- Spirometry or PEF
- Inhaler technique
- Adherence
- Triggers
- Comorbidities
- Sputum eosinophils

Adjust Therapy to Achieve Control and Prevent Future Risk

Inhaled Corticosteroid (ICS)*
*Second-Line: Leukotriene Receptor Antagonist (LTRA)

Low Dose
≥12 yrs: ≤250 mcg/day†
6-11 yrs: ≤200 mcg/day†

Medium Dose
251 – 500 mcg/day†
201 – 400 mcg/day†

High Dose
>500 mcg/day†
>400 mcg/day†

SABA on Demand
SABA or ICS/LABA‡ on Demand

Environmental Control, Education and Written Action Plan

Confirm Diagnosis

Controlled
Uncontrolled

† HFA Beclomethasone or equivalent; *Second-line: LTRA; † Approved for 12 years and over;
‡ Using a formulation approved for use as a reliever;
§ In adults 18 years and over with moderate to severe asthma.
Key Points from 2012 Guidelines

• All children:
  – LABA should never be monotherapy (only to be used in combination inhaler – eg. symbicort)

• Low dose ICS inadequate control:
  – 6-11 years → increase ICS to medium dose
  – > 12 years → Add LABA combination inhaler

• Asthma remains uncontrolled:
  – 6-11 years → Add LABA or LTRA
  – >12 years → consider LTRA vs. referral to specialist
“Yellow Zone” Recommendations

• <12 years:
  – Increased use of ventolin reliever
  – If ineffective, prednisone 1 mg/kg x 3-5 days
  – ***NOT recommended to increase ICS for 7-14 days***

• >12 years
  – Trial of 4-fold increase in ICS x 7-14 days
  – In ICS/LABA controller/reliever patients (BUD/FORM ‘Symbicort’) ➔ Increase to maximum of 4 puffs BID x 7-14 days (8 puffs daily)
  – If ineffective, prednisone 30-50 mg x >5 days
Test Your Knowledge

• What would be an appropriate starting regimen for Ventolin (salbutamol) +/- Flovent (fluticasone) in our patient?

A. Ventolin 90 mcg HFI 2–4 puffs via aerochamber q4H prn + Flovent 125 mcg 2 puff via aerochamber BID
B. Ventolin 90 mcg HFI 2–4 puffs via aerochamber q4H prn + Flovent 125 mcg 1 puff via aerochamber BID
C. Ventolin 90 mcg HFI 2–4 puffs q4H prn
D. Symbicort turbohaler (100/6) 2 puffs BID
The Answer

B. Ventolin (salbutamol) 90 mcg HFI 2–4 puffs via aerochamber q4H prn + Flovent (fluticasone) 125 mcg 1 puff via aerochamber BID
Summary

- Asthma is one of the most common pediatric conditions
- Different forms exist with significant differences in prognosis
- Carries significant amount of morbidity
- Objective diagnosis cannot be made until at least 6 years of age
- Step-up/Step-down approach with regular reassessment key to management
- Recommendations for controller and step-up medication vary based on age
Fin