Adult asthma management: focus on control

Jennifer W. McCallister, MD
Associate Professor
Pulmonary, Allergy, Critical Care & Sleep Medicine
The Ohio State University Wexner Medical Center

Objectives

• Apply NHLBI National Asthma Education and Prevention Program (NAEPP) guidelines
  – Impairment
  – Risk
• Routine assessment of control
  – Practical tools

Evolution of the Asthma Guidelines

• 1991
  – Treatment recommendations based on consensus
• 1997
  – Evidence based treatment recommendations
• 2002
  – Further clarification of treatment of children
• 2007
  – Emphasis on assessment of control

NHLBI NAEPP EPR-3 2007

• Control
  – Degree to which the manifestations of asthma are minimized and the goals of therapy are met
• Impairment
  – Frequency and intensity of symptoms
  – Functional limitations
• Risk
  – Likelihood of exacerbations or loss of pulmonary function

NAEPP EPR-3 2007 Guidelines

- **Asthma severity**
  - Chronic status
  - Represents potential impairment & risk

- **Asthma control**
  - Volatile status
  - Represents a point in time where impairment & risk can be evaluated & measured

Application of EPR-3 Guidelines

- **Initial visit**
  - Classify severity
  - Determine initial therapy or adjust accordingly

- **Follow-up visit**
  - Evaluate control
  - Adjust therapy based step-wise approach

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**Case: 24 year AA female presents for asthma evaluation**

- Diagnosed in childhood
- 0 hospital stays since age 16, never intubated
- ED visit last month, no other exacerbations this year
- SOB with exertion, smoke, stress, sports
- Nocturnal symptoms 1-2/week
- SABA 10-12 puffs daily (sometimes prior to sports)
- Reports SOB, cough, occ. audible wheezing
Case: 24 year AA female presents for asthma evaluation

- Hx of GERD, allergic rhinitis
- Montelukast in past, “unsure if helped”, non-adherent to Advair
- Exam with boggy nasal turbinates, clear lungs
- CXR normal
- Spirometry with mild obstruction, reversible with albuterol

What therapy would you prescribe?

Stepwise Approach for Managing Asthma in Youths ≥12 Years of Age and Adults

- **Step 1**
  - Preferred: SABA PRN
  - Alternative: Corticosteroid, LTRA, or Theophylline

- **Step 2**
  - Preferred: Low-dose ICS OR Medium-dose ICS
  - Alternative: LTRA, Theophylline, or zileuton

- **Step 3**
  - Preferred: Low-dose ICS + LABA OR Medium-dose ICS + either LTRA, Theophylline, or zileuton

- **Step 4**
  - Preferred: Medium-dose ICS + LABA

- **Step 5**
  - Preferred: High-dose ICS + LABA AND Consider omalizumab for patients with allergies

- **Step 6**
  - Preferred: High-dose ICS + LABA + oral corticosteroid AND Consider omalizumab for patients with allergies

Benefits of Inhaled Corticosteroids

- Most effective long-term controller for persistent asthma
- Improve pulmonary function
- Reduce symptom severity, rescue inhaler use, and need for oral corticosteroids
- Reduce number of exacerbations, ED visits, and hospitalizations
- May prevent airway remodeling

Take home points about LABAs

- Black box warning for LABAs
- Should NOT be used as monotherapy for asthma
- No current data supporting increased risk of adverse asthma related events if used in combination with ICS

Chowdhury et al. NEJM 2011;364:2473-2475.

Leukotriene Modifiers

- Work better than placebo
- Do NOT work as well as ICS
- Do NOT work as well as long acting beta agonists in combination with ICS


Case follow-up

- Prescribed medium dose inhaled fluticasone with spacer
- Returns 6 weeks later
- Feels asthma is “better but not great”
- Back to running & aerobics but still using SABA albuterol 4-6 puffs max/day
- Nocturnal awakenings 2-3 times/month
Case follow-up

- Allergies and post-nasal drip improved with season change
- Exam normal

Is this patient’s asthma controlled?

How Should Control Be Measured in Asthma?

- Utilization of Healthcare Resources
- Functional Status
- Daytime Symptoms
- Inflammation
- Direct or Indirect
- Lung Function
- Nighttime Awakenings
- Use of a “Quick Relief” Inhaler and/or Nebulizer
- Missed Work and/or School
- Patient Self-Report of Control

Asthma Control


Patients Are Poor at Assessing Their Asthma Control

Patient assessment of control*

<table>
<thead>
<tr>
<th>Europe</th>
<th>USA</th>
<th>Asia Pacific</th>
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<tbody>
<tr>
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*Patients with severe persistent symptoms – past 4 wk: Sx ≥ 3x/day in the daytime; Most nights/every night.


www.asthmainamerica.com

Asthma Severity: Patient Perception

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Severe</th>
<th>Moderate</th>
<th>Mild</th>
<th>Intermittent</th>
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<tbody>
<tr>
<td>None</td>
<td>4.8%</td>
<td>10.4%</td>
<td>13.1%</td>
<td>48.6%</td>
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<tr>
<td>Mild</td>
<td>31.9%</td>
<td>47.2%</td>
<td>60.1%</td>
<td>42.3%</td>
</tr>
<tr>
<td>Moderate</td>
<td>41.3%</td>
<td>36.3%</td>
<td>22.1%</td>
<td>8.1%</td>
</tr>
<tr>
<td>Severe</td>
<td>21.9%</td>
<td>5.8%</td>
<td>4.5%</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

NAEPP Guidelines

Asthma Symptoms Correlate Poorly With FEV1

Monitoring Asthma Control: Asthma Control Test™

1. In the past 4 weeks, how much of the time did your asthma keep you from getting as much done at work, school, or at home? (0 = not at all, 1 = most of the time)
2. During the past 4 weeks, how often did you have shortness of breath? (0 = none of the time, 1 = less than half of the time, 2 = more than half of the time, 3 = all of the time)
3. During the past 4 weeks, how often did you use a rapid rescue inhaler? (0 = none, 1 = 2 or 3 times per week, 2 = more than 3 times per week)
4. How would you rate your asthma control during the past 4 weeks? (1 = completely controlled, 2 = mostly controlled, 3 = somewhat controlled, 4 = not controlled at all)

Asthma Therapy Assessment Questionnaire (ATAQ)

1. In the past 4 weeks did you miss any work, school, or normal activities due to your asthma? (1 point for yes)
2. In the past 4 weeks, did you wake up at night because of your asthma? (1 point for yes)
3. Do you believe your asthma was well controlled in the past 4 weeks? (1 point for yes)
4. Do you use an inhaler for quick relief of asthma symptoms? If yes, in the past 4 weeks, what was the highest number of puffs you used in one day? (1 point for >12)

Level of Control Based on Composite Score
20-25 = Controlled
14-19 = Suboptimal
<14 = Poorly Controlled

Regardless of patient's self assessment of control in Question 5

Simple Rules of Thumb

- **Rules of Two**
  - one should be on maintenance asthma therapy if any of the following apply:
    - rescue inhaler use more than TWICE a week
    - nighttime symptoms more than TWICE a month
    - refill of rescue inhaler prescription TWICE a year

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Case follow-up

- Prescribed medium dose inhaled fluticasone with spacer
- Returns 6 weeks later
- Feels asthma is “better but not great”
- Back to running & aerobics still with albuterol 4-6 puffs max/day
- Nocturnal awakenings 2-3 times/month

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ATAQ Questionnaire for case

1. In the past 4 weeks did you miss any work, school, or normal activities due to your asthma? (0 points)
2. In the past 4 weeks, did you wake up at night because of your asthma? (1 point)
3. Do you believe your asthma was well controlled in the past 4 weeks? (1 point)
4. Do you use an inhaler for quick relief of asthma symptoms? If yes, in the past 4 weeks, what was the highest number of puffs you used in one day? (0 points)

ATAQ 2/4 not well controlled

Level of Control Based on Composite Score
1-2 = not well controlled, 3-4 = very poorly controlled

What would you do next for this patient?

ICS vs ICS + LABA

- "Studies of adults in whom the dose of ICS was at least doubled demonstrate some improvements in lung function...although these results are generally less effective than adding a LABA (Ind et al. 2003)."
Conclusions

- Characterization of impairment & risk
  - Severity
  - Control
- Assessment of risk
  - Continuous & routine
  - Multiple methods

Case #1 – Inhaler Failure

- 12 yo with on low dose ICS therapy for asthma
- Presents for sore throat
- Asthma Control Test score is only 15 (<20 suggests poor control)

Asthma: Pediatric Nuances and Call to Action (Plans)

Elizabeth D. Allen, MD
Pediatric Pulmonary Medicine
Nationwide Children’s Hospital

Case #1: More Detail

- You started this 12 yo on low dose ICS 6 months ago
- He stopped having bad attacks, so family hasn’t followed up
- But he’s still having day to day symptoms
- Parent report (and pharmacy fill check) suggest good compliance, and they swear they use a spacer
Why Do Asthma Therapies Fail?

- Compliance issues
- Ongoing “trigger” exposures
- Co-morbidities
- Wrong diagnosis
- Inadequate medication issues

Ongoing “Trigger” Issues

- Second hand (or first hand) smoke
- Allergens
  - Pets
  - Indoor mold/dust
  - Outdoor allergens
- General airway irritants
  - Perfumes, candles, cleaning agents . . .

Co-Morbidities

- Chronic sinus disease
- Obesity
- Gastroesophageal reflux
- Vocal Cord Dysfunction
- Obstructive Sleep Apnea (?)

Case #2: Further History

- No smokers, no pets
- No nasal drainage
- No heartburn or other GER like symptoms
- No snoring
- Not obese
Case #1: Not Asthma?

• Still reports typical symptoms
• When he takes his albuterol, it helps
• Otherwise healthy
• Exam is normal
• Spirometry?

Pulmonary Function Tests and Kids

• Obtaining quality spirometry tests prior to age 6 yrs is challenging!
• Most asthmatics develop symptoms prior to age 5 yrs
• "Well" asthmatics often have normal spirometry
• Minimally symptomatic patients may have very abnormal spirometry!

Case #1: Spirometry

<table>
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<tr>
<th>Test</th>
<th>Pre</th>
<th>Post</th>
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<tr>
<td>FVC</td>
<td>82%</td>
<td>82%</td>
</tr>
<tr>
<td>FEV1</td>
<td>69%</td>
<td>88%</td>
</tr>
<tr>
<td>FEV1/FVC</td>
<td>75.7%</td>
<td>84%</td>
</tr>
<tr>
<td>FEF25-75</td>
<td>43%</td>
<td>63%</td>
</tr>
</tbody>
</table>

Change post albuterol

FEV1 - 19% increase
FEF 25-75 - 53% increase

Case #1: What Next?

• Child’s asthma is not controlled on current therapy (low dose ICS)
• Compliance & inhaler technique appear good
• Nothing to suggest ongoing major trigger or co-morbidity
• Symptom description and PFT’s confirm asthma IS the problem
• Time to Step Up Therapy
Options for Stepping Up Therapy

- Double ICS
- Add Montelukast
- Add LABA

Step-Up Therapy for Children...

- N=182, 6-17 yo’s, uncontrolled on 100 µg BID fluticasone
- Triple cross-over between:
  - 250 µg fluticasone BID
  - 100 µg fluticasone BID & leukotriene
  - 100 µg fluticasone & 50 µg LABA BID
- Based on exacerbation & control score & FEV₁:
  - Added LABA most likely to produce best response
  - Some children, however, responded best to moderate dose ICS, or to ICS & leukotriene

The LABA Controversy

- LABA’s used alone are a bad idea
- Used as intended (combined with ICS) there’s been no clear signal of trouble
- Decision to use should factor in:
  - Higher ICS doses increase risk of side effects
  - Leukotrienes can (uncommonly) have behavioral side effects
  - Most LABA combinations are only FDA approval for ≥ 12 year olds

ICS Side Effects - Kids

- Mild side effects – low-medium dose
  - Thrush
  - Growth velocity decrease
    - Related to dose/weight
    - CAMP study found 400 mcg budesonide/day led to mean 1.2 cm decrease in adult height *
    - Effect occurred within first 2 years; not cumulative
  - Serious side effects - rare, high doses
    - Adrenal suppression

*NEJM 2000;343:1054-1063
Stepping Up Therapy Recs

- In the pre-school set, first step-ups usually involve ↑ ICS dosing, or adding a leukotriene
- Consider LABA’s as a first step up if:
  - Older child
  - Frequent low grade symptoms
  - Exercise intolerance
- Regardless, follow-up (6-8 weeks) needed to make sure change worked

Case #1: Conclusions

- Asthma therapy can fail for a variety of reasons
- Spirometry can sometimes uncover severity of asthma that is not suspected from history
- Stepping up from low dose ICS therapy can be done in a variety of ways: different approaches work better for different kids
- Recheck progress!

NHLBI 2007 EPR-3 Asthma Guidelines
### Case #2: Ambulance Again
- 6 yo with h/o asthma for 3 years, 2 previous hospital stays, multiple ED visits
- Presented in severe distress, O₂ sat 85%

### Case #2: More Story
- Mom reports
  - Runny nose began 3 days ago
  - Frequent coughing began 2 days ago
  - Last night wheezing started - albuterol nebs begun
  - This morning 3 back-to-backs didn’t help . . .
  - Mom called 911!
- Now improving with aggressive inpatient therapy

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### Asthma Mortality & Morbidity
- Of 298 children admitted to PICU for status asthmaticus at Connecticut Children’s Medical Center, 55% were classified pre admission as “mild asthma”
- Of 20 children who died of asthma in UK Eastern Region between 2001-2006, 9 had “mild to moderate” asthma

* J Asthma 2008: 45(6);513-7
** Prim Care Respir J 2012; 21(1);71-7

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How does this scenario compare to what you **want** your parents/patients to do in response to an asthma event?
## Written Asthma Action Plans

- Reduce acute asthma visits & hospitalizations
- Work well based on symptoms alone (for kids); can also include peak flow readings
- List control medication
- Advise SABA therapy for asthma symptoms
- *Indicate steps to take if albuterol isn’t working*
- Need to be reviewed regularly!

## Acute Asthma: What Parents Should Know

- During acute flares, 3 things happen:
  - Smooth muscle constriction
  - Airway swelling
  - Mucus overproduction/plugging
- Albuterol ONLY helps the first issue!
- If albuterol is failing, oral steroids – quickly – are the next step in treatment
- Viral infection (esp rhinovirus!) is the most common cause of severe asthma attacks

## Acute Asthma: Reminders for Providers

- Home supply of oral steroids can be an important tool for educated patients
- Not helpful:
  - Antihistamines
  - Cough medications
  - Antibiotics (unless a bacterial infection is trigger)
  - Doubling ICS therapy

## Case #2: Conclusions

- Good asthma care includes educating patients and families of even mild asthmatics about how to respond to acute flares
- Written plans help – and are standard of care
- Instruction regarding next steps if albuterol isn’t working – especially during colds! – particularly important
## AAP’s on the Web

- [https://www.aaaai.org/Aaaaiai/media/MediaLibrary/PDF%20Documents/Libraries/NEW-WEBSITE-LOGO-asthma-action-plan_HI.pdf](https://www.aaaai.org/Aaaaiai/media/MediaLibrary/PDF%20Documents/Libraries/NEW-WEBSITE-LOGO-asthma-action-plan_HI.pdf)