What Determines Asthma Control? (It’s Not as Complicated as the Guidelines)

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Objectives:
• Describe the pathophysiology of asthma
• Categorize asthma controller and rescue medications
• Explain asthma control (as opposed to asthma severity)
• Develop management plans to achieve and maintain good asthma control
• Appreciate the importance of spirometry in asthma management
Asthma in the US

• 1 in 12 people (about 25 million) have asthma
• Asthma costs the US about $56 billion in medical costs and lost school and work days

Asthma:
A disease of small airways
• Bronchospasm
  – bronchial hyperresponsiveness (BHR)
• Inflammation
  – Edema
  – Eosinophilic infiltrate / damage to epithelium
  – Mucus gland hyperplasia / increased mucus
  – collagen deposition / scar “remodeling”
Asthma Diagnosis
- Symptoms
- Triggers
- Personal and family history
- Spirometry

Asthma Symptoms
- Cough
  &/or
- Wheeze
  &/or
- Shortness of breath / chest tightness
Asthma “triggers”

• Viral URI/LRI
• Exercise
• Irritants-e.g. smoke, fumes, cold air
• Allergens
• Nocturnal

Asthma is inherited

• Atopic diseases
  – Asthma
  – Allergic rhinitis
  – Atopic dermatitis
  – Food allergy
• A patient with one atopic disease is at threefold risk to develop at least one of the others
• Atopic diseases also run in families
Those @#$% categories!

<table>
<thead>
<tr>
<th>Components of Severity</th>
<th>Classification of Asthma Severity (Children 5–11 years of age)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Persistent</td>
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<tr>
<td><strong>Symptoms</strong></td>
<td></td>
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<tr>
<td>Asthma exacerbations</td>
<td>12 days/week</td>
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<tr>
<td>Untreated asthma</td>
<td>12 days/week</td>
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<tr>
<td><strong>Difficulty breathing</strong></td>
<td>12 days/week</td>
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<tr>
<td>Nocturnal asthma</td>
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<tr>
<td><strong>Interference with normal activity</strong></td>
<td>None</td>
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<tr>
<td><strong>Lung function</strong></td>
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<tr>
<td>FEV1/Predicted</td>
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<tr>
<td><em>FEV1 &lt; 80% predicted</em></td>
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<tr>
<td><em>FEV1 &lt; 70% predicted</em></td>
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</tbody>
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What’s wrong with the asthma severity categories?

- It’s a moving target
  - If you treat them and they get better, does their category change?
  - If you have normal spirometry and few symptoms on lots of meds, what category is that?

Variability in asthma severity

- Are asthma severity categories stable over time?
Variability in asthma severity


Asthma severity vs. outcomes

• Do asthma severity classifications correlate with asthma outcomes?

Asthma severity vs. outcomes

QOL  ED  HOSP.

Asthma control

- Great idea…still too complicated!

Asthma Management

- Assigning an asthma severity category less important than achieving and maintaining good asthma control
- Good asthma control =
  - Few symptoms (i.e. need albuterol < 2X / week for symptom relief)
  - Normal spirometry
Need to monitor symptoms and spirometry

- There is an approximate 40% divergence comparing lung function and symptoms as outcomes

Asthma Management

- Avoid or manage asthma triggers
- Use appropriate medications

Asthma "triggers"

- Viral URI/LRI: limit exposure to other persons with URIs to the extent practical, annual flu shot
- Exercise: do NOT limit in any way
- Irritants: completely avoid cigarette smoke, limit exposure to fumes and cold air to the extent practical
- Allergens: if allergic, implement environmental control measures for indoor allergens
**Asthma medications: long-term / controller**

- Inhaled corticosteroids
- Long acting beta agonist bronchodilators
- Leukotriene modifiers
- Anticholinergics
- "Mast cell stabilizers"
- Theophylline
- Oral corticosteroids
- Omalizumab

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**Asthma medications: quick-relief / rescue**

- Short acting beta agonist bronchodilator (albuterol)
- Oral corticosteroids

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**Albuterol versus levalbuterol**

- Regular / racemic albuterol is a 50:50 mixture of:
  - (R)-albuterol (levalbuterol, pharmacologically active) and
  - (S)-albuterol (not pharmacologically active)
- The dose of levalbuterol is therefore 1/2 of that of albuterol for the same effect
Levalbuterol at one-half the mcg dose produces clinically comparable bronchodilation and systemic side effects as racemic albuterol.

Determine at each follow-up visit how well controlled the patient's asthma is:

- Albuterol use:
  - # of times per week? For what symptoms? Does it help?
  - How often awoken from sleep needing?
  - Need before running? Does it work?
Determine at each follow-up visit how well controlled the patient’s asthma is:

- Spirometry:
  - Normal? Compared to best ever?
  - If not:
    - how low?
    - How much response to albuterol?

SERIAL SPIROMETRY

- Follow spirometry over time
- “Best ever” FEV1 in % predicted is benchmark for life
Asthma Rx: needing albuterol < 2X / week and normal spirometry

- Albuterol MDI: 2 puffs q4h only prn for cough, wheeze or shortness of breath and if needed before running

Asthma Rx: needing albuterol > 2X / week &/or ↓ spirometry

- Anti-inflammatory Rx regularly
  - preferred: inhaled corticosteroids
  - alternative: LTRA
- + albuterol MDI: 2 puffs q4h prn

Asthma Rx: needing albuterol > 2X / week &/or ↓ spirometry

- Use enough of anti-inflammatory / controller medication to get to good asthma control (“as needed” use of albuterol < 2X / week and normal spirometry)
- Use combination Rx (medium dose inhaled steroid + LABA or LTRA) before going to high dose inhaled steroids
Determine at each follow-up visit how well controlled the patient’s asthma is:

- If needing albuterol > 2X / week &/or abnormal spirometry, asthma is not well controlled and something needs to be done
  - Confirm diagnosis
  - Review triggers, exacerbating conditions
  - Improve compliance / technique
  - Increase medication
What if it's not asthma?

- Post nasal drip; Rx nasal steroid or guaifenesin
- GERD/LPR; Rx PPI
- Vocal cord dysfunction; typically sudden onset stridor, Rx speech therapy
- Smoking (active or passive); ask, Rx stop
- Habit; doesn’t bother patient, never at night, Rx: reminder, lozenges, speech therapy

Determine at each follow-up visit how well controlled the patient’s asthma is:

- If needing albuterol < 2X / week and normal spirometry, asthma is well controlled
  - Continue present management or…
  - “Step-down”, i.e. try reducing medication

Asthma Rx: exercise-induced symptoms

- Short-acting beta agonist MDI
  - 2 puffs 15 min prior
- If still with symptoms, add controller medication
Asthma Rx: exacerbation

- Increase short-acting beta agonist MDI (q 2-4 hrs but still prn only)
- Increase inhaled corticosteroid MDI? (If so, 4X)
- Prednisone/prednisolone
  - 1-2 mg/kg/day (max. 60 mg/day)
  - divided bid to tid x 3-10 days
- Prevent the next exacerbation (whatever they were doing before the exacerbation was not enough)

Fatal asthma

- 3300 deaths in the US from asthma in 2011
Risk factors for fatal asthma

- Severe/poorly controlled asthma
- Previous respiratory failure
- Poor adherence
- Family dysfunction
- Depression
- Allergy

ASTHMA EDUCATION

- Patients and parents should be educated (and re-educated) about asthma
  - what it is
  - how the medications work
  - how to use the medications (demonstrate)
  - when to use the medications
  - who to call or where to go if acute asthma symptoms are not responding to albuterol
ASTHMA ACTION PLAN

• My “asthma action plan” is the same for all patients of all ages in all circumstances…
• “If you start needing your albuterol more often or it’s not helping, let me know.”

Asthma: treatment goals

• No hospitalizations
• No unscheduled visits
• No systemic corticosteroids
• No missed work/school
• No limits on exercise/sports
• No nighttime awakening
• Normal lung function

Will my child outgrow his asthma?

• Less likely to outgrow if “atopic”, i.e. positive skin tests, if runs in family or if more severe.
• Better to think of as quiescent or in remission rather than outgrown since may recur later in life
Allergy Referral

- Asthma which remains poorly controlled despite medication
- Asthma with apparent allergic component

References


Changes you may wish to make in practice

- Purchase and use a spirometer
- Assess asthma control (vs. severity) at each visit for asthma
- Intensify controller therapy after an exacerbation to prevent the next one