Asthma in Infants/Young Children Updates

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الگوهای
دانش ورژی، اخلاق مداری و نوع دوستی

"هوالحكيم العليم"
Diagnosis of Asthma- Infants/Young Children

- **5 Symptoms** (wheezing, cough, tight chest, dyspnea, atopy)
- **Wheezing** in early childhood (1/3 in first 3 Yr.)
  - Episodic viral wheeze (2/3 of cases)
  - Multiple-trigger wheeze (Allergic wheezing)
- **Risk factors** - atopy in first grade relatives, low birth wt., prematurity, household smoking, aeroallergen sensitivity, eczema

Wheezeing
Common in young children but is it asthma?
Modified asthma predictive index

Children with \( \geq 4 \) wheezing episodes/ year during the first 3 years of life

**Major criteria**
- parent with asthma
- physician-diagnosed atopic dermatitis
- Sensitization to \( \geq 1 \) aeroallergen

**Minor criteria**
- wheezing unrelated to cold
- Blood eosinophils \( \geq 4\% \)
- Sensetization to food allergen/s

The index is positive when children meet at least one major criterion or two minor criteria.
Diagnosis of Asthma - Infants/Young Children-
cont`d

- No gold standard test or criteria!
- A symptom complex, not a single disease!
- Many phenotypes!
- P.E./spirometry!? A Clinical diagnosis (5 Sx’s)
- 60-75% atopic
- Empirical therapy!

Lung function Tests/Challenge Tests

- Peak-expirometry - Assessment of asthma control over time

1. Spirometry (>5yrs) — Airway obstruction
   - Challenge test (reversibility/BHR)

- Chest/paranasal x-rays - not routine!

- Allergy testing - atopy, triggers, avoidance,

- Sputum eosinophil – control status, severity

Diagnosis of Asthma - Infants/Young Children - cont`d

- **Endotype**: Pathophisiologic mechanism
  - Inflammation/BHR
  - Molecular biomarkers!

- **Precision**(Personalized) medicine!
  - Specific diagnosis
  - Targeted therapy
Precision(Personalized /Targeted Rx.)

- **Evaluation & Treatment**
  - Clinical Phenotype?
  - Molecular endotype?
  - Biomarkers (FeNO, eosinophils, IgE, IL4, IL5, IL13, periostin, neutrophils, IL6, IL8..)
  - **Targeted Rx.** (Monoclonal antibodies against selected Cytokines/Interlukins)

(Targeted Rx.) prescribing the optimal treatment to the right patient!
### Ped. Asthma- Differential Diagnosis

<table>
<thead>
<tr>
<th>Age</th>
<th>Common</th>
<th>Uncommon</th>
<th>Rare</th>
</tr>
</thead>
</table>
| Less than 6 months | Bronchiolitis  
Gastro-esophageal reflux | Aspiration pneumonia  
Bronchopulmonary dysplasia  
Congestive heart failure  
Cystic fibrosis       | Asthma  
Foreign body aspiration |
| 6 months - 2 years | Bronchiolitis  
Foreign body aspiration | Aspiration pneumonia  
Asthma  
Bronchopulmonary dysplasia  
Cystic fibrosis  
Gastro-esophageal reflux | Congestive heart failure |
| 2 - 5 years | Asthma  
Foreign body aspiration | Cystic fibrosis  
Gastro-esophageal reflux  
Viral pneumonia | Aspiration pneumonia  
Bronchiolitis  
Congestive heart failure  
Gastro-esophageal reflux |

Ped. Asthma – Comorbid Conditions

- Allergic Rhinitis
- Colds, Ear infections
- Sneezing in the morning
- Blocked nose, snoring, mouth breathing
- Gastro-esophageal reflux (GER)
- Nocturnal cough followed by vomiting
- Eczema
Tripod of Asthma Management

# Parent/Patient Education
- Asthma (Dx., triggers, Pathophysiology, Longterm management, adherance, common myths...!)

# Environmental/ Co-morbidities Control

# Pharmacotherapy
Treatment steps according to GINA guidelines on asthma (REF)

SABA: short acting β2 agonists
ICS: Inhaled corticosteroids
LABA: long acting β2 agonists
LAMA: Leukotriene receptor antagonists
OCS: Oral corticosteroids

- **Preferred controller treatment**
  - Step 1: SABA + ICS
  - Step 2: Low dose ICS
  - Step 3: Medium-high dose ICS initially or in periods
  - Step 4: Medium – high dose ICS + LABA
    - ICS + LABA + LTRA
    - ICS + LABA + LTRA + Anti-IgE or Anti-IL5 or Macrolides (phenotype dependent)
  - Step 5: + OCS

- **Other controller options**
  - Step 2: Low dose ICS + LABS
  - Step 3: Medium-high dose ICS initially or in periods
  - Step 4: Low dose ICS + LABS + LTRA + LAMA
  - Step 5: + Anti-IgE or Anti-IL5 or Macrolides (phenotype dependent)

- **Controller+Reliever**
  - Step 1: SABA + ICS
  - Step 2: SABA
  - Step 3: SABA or ICS + formoterol

- **Preferred controller treatment**
  - Step 1: Low dose ICS
  - Step 2: Medium-high dose ICS initially or in periods
  - Step 3: Low dose ICS + LABS
  - Step 4: Medium – high dose ICS + LABA
    - ICS + LABA + LTRA
    - ICS + LABA + LTRA + Anti-IgE or Anti-IL5 or Macrolides (phenotype dependent)
  - Step 5: + OCS
## Levels of Asthma Control

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Controlled (All of the following)</th>
<th>Partly controlled (Any present in any week)</th>
<th>Uncontrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daytime symptoms</td>
<td>None (2 or less / week)</td>
<td>More than twice / week</td>
<td></td>
</tr>
<tr>
<td>Limitations of activities</td>
<td>None</td>
<td>Any</td>
<td></td>
</tr>
<tr>
<td>Nocturnal symptoms / awakening</td>
<td>None</td>
<td>Any</td>
<td></td>
</tr>
<tr>
<td>Need for rescue / “reliever” treatment</td>
<td>None (2 or less / week)</td>
<td>More than twice / week</td>
<td></td>
</tr>
<tr>
<td>Lung function (PEF or FEV&lt;sub&gt;1&lt;/sub&gt;)</td>
<td>Normal</td>
<td>&lt; 80% predicted or personal best (if known) on any day</td>
<td></td>
</tr>
<tr>
<td>Exacerbation</td>
<td>None</td>
<td>One or more / year</td>
<td>1 in any week</td>
</tr>
</tbody>
</table>

- **Controlled**: All of the following characteristics are absent.
- **Partly controlled**: Any one of the characteristics is present in any week.
- **Uncontrolled**: Any one of the characteristics is present in any week, or more than twice a week.

**PEF**: Peak Expiratory Flow.
**FEV<sub>1</sub>**: Forced Expiratory Volume in 1 second.
# Asthma Not Well-Controlled

**The Rule of “2”**

<table>
<thead>
<tr>
<th>Category</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daytime asthma symptoms</td>
<td>&gt;2 days per week</td>
</tr>
<tr>
<td>Nighttime asthma symptoms</td>
<td>&gt;2 days per month</td>
</tr>
<tr>
<td>Canisters</td>
<td>&gt;2 per year</td>
</tr>
<tr>
<td>Rescue β2- agonist use</td>
<td>&gt;2 times per week</td>
</tr>
</tbody>
</table>
Partly controlled/ Mncontrolled Asthma-Reasons?

- Diagnosis?
- Dose of controllers?
- Adherence?
- Inhaler technique?
- Co-morbidities?
- Psychosocial factors?

**Difficult-to-treat asthmatics**
- ↑dose of ICS or
- Add montelukast
- Add LABA (> 6Yr)
- Add anti- IgE (> 6Yr)
- Add anti- IL5
Pediatrics Asthma Pharmacotherapy

Pitfall

- ICS phobia!
- Suppression of height (1<sup>st</sup> Yr, Uncontrolled asthma!)
- LABA (> 6-12 Yr)
- Controller medication- 3-6-m (the same dose x 6m, ↓50% Q 3m)
- **Spice** (symptoms, parental concerns, inhaler technique, compliance, environmental control)
"از توجه شما متشكرم"