Outpatient Asthma: Acute Treatment

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Guidelines Reviewed:
1. NHLBI 2007 Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma
2. Seattle Children’s Hospital Asthma Pathway v.2.2
3. Group Health Asthma Diagnosis and Treatment Guideline, 2012

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OBJECTIVE: To guide appropriate, evidence-based treatment of acute pediatric asthma exacerbation in outpatient clinic settings

Specific Objectives:
1. To provide criteria for diagnosing and treating acute asthma exacerbation and disposition based on clinical assessment
2. Potential measurable outcomes after initiation of guideline:
   a. Patients appropriately treated with oral steroids who meet criteria
   b. Number of ER visits for asthma among clinic patients
   c. Number of hospital admissions for asthma among clinic patients
   d. Percent of patients appropriately seen for follow-up

SUMMARY:
1. BRIEF summary of recommendations
   a. Recognize asthma exacerbation early and provide appropriate education and treatment before symptoms worsen and require ED or inpatient care.
      i. Reverse hypoxia with oxygen to maintain O2 sat>90%
      ii. Reverse airway obstruction rapidly with short-acting beta agonist (SABA) +/- systemic steroids for more severe exacerbations
      iii. Reduce short-term relapse with use of systemic steroids
   b. Use clinical exam to guide level of acuity.
   c. For mild exacerbation: use SABA (albuterol) metered dose inhaler (MDI) every 4 hours, consider short course of steroids, return to clinic if symptoms worsen or patient requiring more frequent albuterol dosing.
   d. For moderate exacerbation, use SABA + initiate oral steroids with dexamethasone (2 days; preferred) or prednisone (5 days).
   e. For severe exacerbation, initiate SABA + ipratropium, oral steroids, and follow response, refer to ED care if not responding adequately after 1 hour.
2. Highlights of this particular pathway: NA
3. Follow-up criteria/recommendations: f/u call within 1-2 days; f/u in-person within 2 weeks for moderate-severe, all patients should leave clinic with an asthma action plan and have clinic follow-up within 1-3 months
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1. Inclusion Criteria
   a. Ages 1-4, 5-11, 12+ to be evaluated with age-appropriate vital sign cut-points
   b. Dyspnea (tachypnea in young children) in patient with known or suspected asthma

2. Exclusion Criteria
   a. Other acute primary respiratory diagnosis including pneumonia, croup, and/or bronchiolitis
   b. Children with other chronic disease such as CF, congenital heart or pulmonary disease, immune disorders (consult specialists)
   c. Unilateral wheeze, suggestive of foreign body aspiration

3. Assessment
   a. Mild symptoms (dyspnea with activity only, end-expiratory wheeze, no or mild work of breathing (only intercostal/subcostal retractions), no tachycardia; equivalent to SCH Respiratory Score (RS) 1-5, or Peak Expiratory Flow (PEF) >80%)
      i. Albuterol MDI 4 puffs, observe response at 30 minutes (MDI strongly preferred, but if not available, give 2.5mg/3ml nebulized)
      ii. Consider oral steroid based on patient history of asthma severity (see high risk patient criteria below) and control, and likelihood to progress to more severe symptoms
      iii. If worsen or not improving, go to moderate pathway and give additional 4 puffs albuterol and then steroids
      iv. D/c to home with albuterol 2-4 puffs prn and follow-up prn. Check-in phone call encouraged in 1-2 days
   b. Moderate symptoms (dyspnea at rest, interfering with usual activity, expiratory wheeze heard throughout, mild work of breathing, mild tachycardia; equivalent to RS 6-12 or PEF 50-79%)
      i. Place pulse oximeter, provide oxygen prn to maintain SaO2 > 90%
      ii. Albuterol MDI 8 puffs (consider 4 puffs for children <4 years) (MDI strongly preferred, but if not available, give 5mg/3ml nebulized)
      iii. Start Dexamethasone 0.6mg/kg, max of 16mg (onset within 2 hours, peak effect at 6 hours)
      iv. Alternative steroid dosing for moderate to severe asthma is prednisone or prednisolone (2 mg/kg/day) for a total course of 5-10 days, depending on severity of exacerbation and history of severity. This dosing is used for patients admitted to SCH.
      v. If moderate at 1 hour, may repeat albuterol MDI 8 puffs and observe an additional hour
   c. Severe symptoms (dyspnea at rest, interfering with talking, loud inspiratory and expiratory wheezes, moderate to severe work of breathing, moderate tachycardia; equivalent to SCH RS 6-12 or PEF <50)
      i. Call 911 for ambulance

1 PEF is current percent predicted based on a previously calculated personal best when healthy
ii. Place pulse oximeter, provide oxygen prn to maintain SaO2 > 90%
iii. 8 puffs or albuterol continuous nebulized 5mg/hour with ipratropium 0.75mg
iv. Start Dexamethasone 0.6mg/kg, max of 16mg (onset within 2 hours, peak effect at 6 hours) (see note above about prednisone dosing)

4. Repeat assessment for moderate status
   a. Repeat assessments at minimum of 30 minutes, 1 hour to determine response to treatment and disposition
   b. If safe for discharge from clinic to home
      i. Provide second dose of dexamethasone 0.6mg/kg at 24 hours
      ii. Continue albuterol MDI 2-4 puffs at home every 4 hours for 24 hours and then prn

5. Disposition
   a. Criteria for ER:
      i. Moderate not responding to initial albuterol and steroid within 2 hours
      ii. Severe at presentation
   b. Moderate symptoms clinic follow-up within 2 weeks, then within 1-3 months
   c. Mild symptoms responding to lower-dose albuterol, return within 1-3 months
   d. All patients to have an asthma action plan when leave clinic

6. Differential Diagnoses to consider
   a. As above, must consider acute infection including pneumonia, croup, and/or bronchiolitis, and aspiration (especially in young children)

7. Pitfalls/Things to be aware of
   a. Medications that lack evidence
      i. No indication for ipratropium in mild to moderate asthma exacerbation, only for severe disease
      ii. Inhaled steroid initiation not equivalent to oral steroids in onset of action
      iii. Lack of evidence for peak flow zones to guide disposition
   b. Early initiation of systemic steroids
      i. If steroids given within 1 hour of presentation for acute care, more likely to prevent admission to the hospital
      ii. Dexamethasone for 2 days has been shown to be as effective as prednisone for 5 days in several studies for outpatient asthma medication dosing; this is the recommended strategy at SCH
   c. Unsafe practices
      i. Do not allow patients to take albuterol more often than every 4 hours for more than 24 hours at home without assessment
      ii. Patients should call their provider and be assessed in person if they start oral steroids at home
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High-risk patients:
- History of sudden severe exacerbations
- Prior ICU admissions
- Prior intubation for asthma
- Over 12 months, 2+ admits or 3+ ED visits
- Used > 1 albuterol canister per month
- Chronic use of oral corticosteroids
- Cannot sense airflow obstruction or its severity
- Sense of danger or fright from symptoms
- Medical comorbidity (e.g. obesity)
- Risk for medication non-adherence: depression, high stress, socioeconomic risks, attitudes/beliefs against medication benefit