ACUTE ASTHMA EXACERBATION

Introduction

In 1991, the first Expert Panel on the Management of Asthma published *Guidelines for the Diagnosis and Management of Asthma.* In 1997, after a three year process of review and revision, the *Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma* was published, and subsequently followed in 2002 with an *Update on Selected Topics.* These documents cover the full spectrum of issues associated with asthma, including diagnosis, medical treatment and prevention.

- The EPR2, and update can be downloaded for free at http://www.nhlbi.nih.gov/guidelines/asthma/
- This website also provides practical guides for the practitioner

The diagnosis of asthma should be considered in any patient with recurrent wheezing or coughing. Children over the age of 5 can be diagnosed by:

- suggestive clinical history (episodic respiratory symptoms such as cough, wheeze or shortness of breath)
- evidence of airflow obstruction that is partially reversible (noted through spirometry)
- **exclusion of alternate diagnoses** (foreign bodies, vascular rings/slings, vocal cord dysfunction, or other pulmonary disease)

In children under the age of 5 years old, the same diagnostic steps are utilized, except spirometry can be utilized. Therefore, with appropriate clinical symptoms, a trial of asthma medication is warranted.

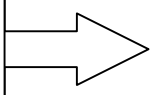
Criteria for Admission

On initial evaluation: Consider admission immediately, if:

- Severe symptoms
- Home therapy already given equivalent to ER management
- h/o respiratory failure in past
- Psychosocial concerns

Common ER Treatments:

- Albuterol nebulizer treatments
- Corticosteroids
- Supplemental oxygen
- Ipratropium bromide
- Magnesium sulfate
- SQ Epinephrine
- Terbutaline



These can be used selectively depending on the severity and success of prior intervention. Evidence will be discussed

After evaluation: After appropriate ER treatment (see UCCCH ER guidelines for treatment of asthma), admit if:

- Persistent oxygen requirement
- Requiring more frequent than q4 hour treatments
- Requiring care that family is unable to manage

Inpatient Interventions

A variety of interventions and medications are available during a hospitalization. Some have evidence to support their use; others are proven to be unsuccessful, while others have questionable effects.

- Short-acting Inhaled Beta-agonists
  - Use of inhaled albuterol versus albuterol via MDI with aerochamber
    - Multiple studies have demonstrated that MDI and nebulized preparations are equally efficacious when used appropriately
    - Some studies have indicated fewer side effects in the MDI groups
    - Most studies have been on ER patients, but the few studies in hospitalized patients showed similar effects, even in children
    - The cost effectiveness is much greater in the MDI groups

  - Albuterol vs. Levalbuterol (Xopanex):
    - Albuterol is a combination of S-Albuterol and R-Albuterol, whereas Levalbuterol is the pure R-Albuterol isomer.
    - Studies have shown a variable response to Levalbuterol, and although a recent pilot study indicated a decreased hospitalization rate with Levalubterol, it was not shown to decrease hospital length of stay.
    - In general, Levalbuterol does not improve efficacy, but can reduce side effects (alterations in heart rate, blood pressure, etc). *However,* it is more costly, and thus is likely better reserved for patients with cardiac disease or metabolic complications.

- Corticosteroids
  - Efficacy
    - Systemic corticosteroids have been shown to decrease the rate of relapse after an acute asthma exacerbation
    - Inhaled steroids alone show no benefit in acute exacerbation, but early initiation in combination with orals steroids in known asthmatics, can reduce severity and duration

  - Dosage
    - Evidence demonstrates no advantage to dosage higher than 60mg/day
    - Oral has equal efficacy to intravenous if GI function is normal
    - Once daily dosing is adequate

  - Systemic Effects
    - Side effects from short courses of oral steroids are negligible
    - Inhaled steroids have been shown to decrease the growth velocity for up to one year after initiation, but beyond the initial year, show no adverse effects (no significant difference in adult height)
    - Bottom Line: short course and inhaled steroids do not demonstrate chronic side effects

  - Tapering
    - Short courses of steroids have been recommended for anywhere from 3-10 days
    - Concerns revolve around hypothalamic-pituitary-adrenal axis suppression without taper
    - One study in children demonstrated transient suppression after 5days of prednisone 2mg/kg (max=60mg/d) *Note :these patients were all asymptomatic asthmatics*
    - Two notable studies in adults:
      - Adults seen in ER with acute exacerbation demonstrated no adrenal suppression differences in patients with 8d of prednisone 40mg/d versus and 8d taper
      - Adults admitted to hospital with acute exacerbation were given 40mg/d for 10 days with or without taper of 8days; no differences in PEFR or treatment failure
    - Bottom Line: most physicians feel comfortable without tapering if burst is 10 days or less

  - Controller Medication

- It is important to initiate and/or continue controller medications during an exacerbation

- Inhaled Ipratropium Bromide
  - Evidence is highly supportive of the role of Ipratropium bromide in the ER setting
  - Multiple studies have determined adding Ipratropium bromide to albuterol during the first hour of ER therapy results in decreased hospitalizations in moderate to severe asthmatics
  - There is NO evidence to support the use of inhaled Ipratropium bromide in the inpatient setting. Two convincing studies have demonstrated no difference between albuterol alone and with Ipratropium bromide in the hospitalized child

- Heliox
  - A Cochrane Review of the literature on the use of heliox in adults and children with acute asthma exacerbations, demonstrates no evidence to support its use
  - There have been individual studies that did show an improvement in symptoms with the use of heliox, but the studies were small and not double-blinded

- Other Medical Interventions
  - The following interventions have NOT been proven to work in the inpatient asthmatic:
    - Antibiotics
    - Methylxanthines
    - Anxiolytics
    - Chest physiotherapy
  - Many of these can actually be dangerous (e.g. anxiolytics causing respiratory depression, mucolytics and chest physiotherapy causing bronchospasm)

Discharge Planning

- Education
  - Educational programs that aid in self-management have been shown to improve lung function, absenteeism, ER visits, etc. The majority of such programs tend to have "multiple sessions and symptom based strategies"
  - Other studies have demonstrated the importance of patient-centered education strategies
  - Home asthma action plans are a necessary part of discharge planning

- Medications
  - Studies have shown a decrease compliance with medications when prescriptions are provided versus the medications given at the time of discharge
  - There is no benefit to scheduled home beta-agonist dosing after discharge

- Follow-Up
  - Recommendations are for follow-up with the primary care physician within 3-5 days
  - Physician to physician communication is also an important component

References

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Web Resource: http://www.nhlbi.nih.gov/guidelines/asthma/