



Asthma Exacerbation

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Asthma Exacerbation

- **Significant Impairment in Quality of Life**
- **The Main Cause of Mortality & Morbidity**
- **Major Financial Burden for Asthmatic Patients**

Asthma **Action Plan**

- **Must Be Individualized**
- **Preferably Based On Symptoms**
- **Must Include Instruction on How to;**
 - **Recognize Loss of Control and How to Manage**
 - **Recognize a Severe Exacerbation and How to Manage**
 - **When and How to Contact Primary Care Physician**
 - **When to Call for an Ambulance**

Asthma Exacerbation

- **Management Principles;**
 - **Early Recognition**
 - **Assessment Of Attack Severity**
 - **Timely Intervention**
 - **Reassessment**

Asthma Exacerbation

- **Home – Office Management**

Asthma Exacerbation

- **Which Child Should be Managed at Emergency Department;**
 - **Signs of a Severe Exacerbation;**
 - **Marked Breathlessness**
 - **Speak in Short Phrases**
 - **Accessory Muscle Use**
 - **Drowsiness**
 - **Risk Factor for Fatal Asthma Exacerbation**

Fatal Asthma Risk Factors

- **Current or Recent Systemic Corticosteroids Use**
- **Not Currently Using Inhaled Corticosteroid**
- **Use of >2 Canisters Per Month of Salbutamol**
- **Underlying Medical – Psychiatric Conditions**

Fatal Asthma Risk Factors

- **Previous Severe Exacerbation (ICU Admission +/- Intubation)**
- **Hospitalization or ED Visit for Asthma in The Past Year**
- **Difficulty Perceiving Asthma Symptoms**
- **Difficulty Perceiving Severity of Exacerbations**
- **Lack of A Written Asthma Action Plan**

Asthma Exacerbation

- **Emergency Department Management**

Severity Assessment

- **Is Based On;**
 - **Symptoms**
 - **Physical Examination**
 - **Pulse Oximetry**
- **Determining Initial Treatment Approach**
- **Evaluating the Response to Treatment**

Severity Assessment

• Mild Asthma Exacerbation;

- Normal Alertness
- Slight Tachypnea
- Expiratory Wheezing Only
- Mildly Prolonged Expiratory Phase
- Minimal Accessory Muscle Use
- An Oxygen Saturation Of >95 Percent

• Moderate Asthma Exacerbation;

- Normal Alertness
- Tachypnea
- Whole Expiratory +/- Inspiratory Wheezing
- Inspiratory-Expiratory Ratio 1/2
- Significant Use Of Accessory Muscles
- Oxygen Saturation: 92 To 95 Percent

Severity Assessment

- **Severe Asthma Exacerbation;**
 - **Lethargy Or Agitation**
 - **Extreme Tachypnea - Very Poor Aeration**
 - **Inability to Repeat A Short Phrase**
 - **Inspiratory and Expiratory Wheezing**
 - **An Inspiratory-Expiratory Ratio Exceeding 1/2**
 - **Significant Use of Accessory Muscles**
 - **An Oxygen Saturation : <92 Percent**

Severity Assessment

- **Impending Respiratory Arrest;**
 - **Apparent Cyanosis**
 - **Respiratory Exhaustion: Shallow & Slow Breathing**
 - **Depressed Mental Status (Lethargy Or Agitation)**
 - **An Oxygen Saturation : <90 Percent**
 - **Respiratory Acidosis (Elevated Pco₂ in Blood Gas Sample)**

Pulmonary Index Score

Score	Respiratory Rate		Wheezing*	Insp/Exp Ratio	Accessory Muscle Use	O2 Saturation
	6>Year Old	6≤Year Old				
0	≤30	≤20	None*	2/1	None	99-100
1	31-45	21-35	End expiration	1/1	+	96-98
2	46-60	36-50	Entire expiration	1/2	++	93-95
3	>60	>50	Inspiration and expiration	1/3	+++	<93

The total score ranges from 0 to 15. The PIS is interpreted as follows:

- Mild exacerbation: <7
- Moderate exacerbation: 7-11
- Severe exacerbation: ≥12

However, the PIS may underestimate the degree of illness in an older child. Older children, with prolonged expiratory phases, may become bradypneic with a moderate-to-severe attack. As such, their score for respiratory rate may be falsely reassuring.

*A score of 3 is given for "wheezing" if there is no wheezing due to minimal air entry.

Asthma Exacerbation

- **Is Advanced Treatment Necessary ?**

Asthma Exacerbation

- **Indications for Starting Advanced Treatment;**
 - **Severe or Very Severe Asthma Exacerbation**
 - **Impending Cardio-Respiratory Arrest**
 - **Signs of Shock or Anaphylaxis**
 - **Disturbed Level of Consciousness**
 - **Poor Respiratory Effort – Silent Chest**

Asthma Exacerbation

- **Treatment Goals;**
 - **Correction Of Hypoxemia and/or Severe Hypercapnia**
 - **Rapid Reversal of Airflow Obstruction**
 - **Reduction Of The Likelihood Of Hospitalization - Recurrence**

Asthma Exacerbation

- **Management of Hypoxemia – Hypercapnia;**
 - **Humidified Oxygen as Needed**
 - **Maintain an Oxygen Saturation of ≥ 94 Percent**
 - **All Nebulized Medications Should Also be Delivered With Oxygen**
 - **Generally, at a Flow Rate of 6 To 8 L/Min**

Asthma Exacerbation

- **Management of Bronchospasm;**
 - **Salbutamol is the Standard Emergent Treatment**
 - **MDI with Spacer is as Effective as Nebulizer**
 - **Nebulizer May be Chosen When;**
 - **Poor Respiratory Effort**
 - **Continuous Therapy Needed**
 - **Simultaneous Administration (Salbutamol, O₂, Ipratropium)**

Asthma Exacerbation

- **Management of Bronchospasm - Salbutamol MDI;**
 - **1/4 - 1/3 Puff Per Kilogram (Minimum: 4 & Maximum: 8)**
 - **Must be Repeated Every 20 Minutes for 3 Doses**
 - **MDI Must be Administered Via VHC-Spacer (By mask if Age <5 year)**
 - **Spacer must be Held in Position for 5 to 6 Breath**

Asthma Exacerbation



Asthma Exacerbation

- **Management of Bronchospasm - Ventolin Nebulizer;**
 - 0.15 mg Per Kilogram (Minimum: 2.5 mg & Maximum: 5 mg)
 - 0.5 mg per Kilogram per Hr. for **Continuous** Nebulizer (Maximum: 20 mg)
 - Must be Repeated Every 20 Minutes for 3 Doses
 - Nebulizer Must be Administered Via Face Mask – Mouthpiece
 - **Blow-by techniques Should be Avoided**

Asthma Exacerbation



Asthma Exacerbation

- **Management of Bronchospasm - Ipratropium Bromide;**
 - **Bronchodilatory Effect due to Smooth Muscle Relaxation**
 - **Recommended for Moderate-to-Severe Asthma Exacerbation**
 - **Nebulizer: 250µgr for Wt<20Kg & 500µgr for Wt>20kg**
 - **MDI-Spacer: 4 – 8 puff**

Asthma Exacerbation

- **Management of Bronchospasm - Magnesium Sulfate;**
 - **Inexpensive, Widely Available & Minimal Adverse Effect**
 - **Suggested For Children Over 4 Years of Age With;**
 - **Severe Asthma Exacerbation**
 - **Moderate Asthma Exacerbation with Incomplete Response To Initial Therapy**
 - **Usual Dose: 50 mg/kg Up to 2 gr Slow IV Infusion over 20 Minutes**
 - **Fluid Bolus Maybe Administered to Prevent Clinically Significant Hypotension**

Asthma Exacerbation

- **Management of Bronchospasm – Parenteral Epinephrine;**
 - **Intramuscular or Subcutaneous**
 - **Can be Used When;**
 - **Poor Air Exchange: Silent Chest, Shock, Anaphylaxis**
 - **Poor Cooperation due to Extreme Agitation**
 - **Epinephrine Bronchodilator Dose: 0.01 mg/kg up to 0.5 mg**
 - **Can be Repeated Every 20 min Up to 3 Dose**
 - **In the Severely ill Child Can be Used Every 5 min**

Asthma Exacerbation

- Management of Inflammation - **Systemic Corticosteroids;**
 - Indicated for **All** Moderate – Severe Exacerbation
 - **Most** Children with Mild Exacerbation also Need Systemic Corticosteroid
 - Must be Administered as soon as Possible
 - Oral Administration Preferred (IM – IV also Acceptable);
 - Dexamethasone: 0.6 mg/kg Maximum 16 mg
 - Prednisolone: 1-2 mg/kg Maximum 60 mg
 - Methylprednisolone: 1-2 mg/kg Maximum 125 mg

Asthma Exacerbation

- **Very Severe Exacerbation – Impending Respiratory Failure;**
 - **IM Epinephrine as Needed**
 - **Continuous Nebulizer Therapy (Albuterol without Ipratropium)**
 - **Systemic Corticosteroid**
 - **IV Magnesium Sulfate**
 - **ICU Admission**
 - **Non-Invasive Ventilation: CPAP or BiPAP**
 - **Intubation if Needed**

Asthma Exacerbation

- **Other Treatment Options;**

- **Ketamine is the Drug of Choice For Sedation & Analgesia**

- **No Benefit** in Non-Intubated Patients

- **High Dose Inhaled Corticosteroid** Recommended by GINA from 2021

- **Nebulized Magnesium Sulfate for Children Over 2 years old**

- **LTRA is not** recommended for Children With Asthma Exacerbation

Asthma Exacerbation

- **Ongoing Monitoring;**
 - **Respiratory Rate - Heart Rate**
 - **Oxygen Saturation**
 - **Degree Of Alertness**
 - **Accessory Muscle Use - Retractions**

Asthma Exacerbation

- **Advice Related To COVID-19 Pandemic;**
 - Continuing **Usual** ED Management in Patients With Asthma
 - **Use Of Nebulized Medication Should Be Minimized**
 - **If Nebulizer Therapy Is Necessary,**
 - **All Health Care Workers Should Wear Full Personal Protective Equipment**
 - **Every Patient With Fever Need To Be Tested For Coronavirus**

Asthma Exacerbation

- **Further Evaluation - When to Order Chest X-Ray;**
 - **To Rule Out Pneumonia, Atelectasis, Air Leak;**
 - **Fever (>39°C)**
 - **Presence of Focal Examination Findings**
 - **Persistent Crackles or Decreased Breath Sounds, Crepitus**
 - **Persistent Tachypnea, Hypoxemia, or Chest Pain**
 - **Severe Disease**
 - **Uncertain Diagnosis**

Asthma Exacerbation

- **Further Evaluation - When Wheezing is Not Asthma;**
 - **Bronchiolitis (Infants)**
 - **Croup (Toddlers – Preschools)**
 - **Foreign Body Aspiration (Toddlers – Preschools)**
 - **Atypical Infection – Mycoplasma & Chlamydia (School Age)**
 - **Esophageal Foreign Body**
 - **Bacterial Tracheitis**

Asthma Exacerbation

- **When to Discharge the Patient;**
 - **β -Agonist therapy Tapered to More than 4 hours**
 - **Normal: O2 Sat, RR, PR, No Respiratory Distress**
 - **Adequate Access to Medical Care**
 - **Good Social – Family Support**
 - **Complete Understanding and Ability for Home Treatment**
 - **Written Asthma Action Plan**

Asthma Exacerbation

- **Discharge Medication - Education;**
 - **Salbutamol as Needed (Every 4-6 hr. for 2 Days after Discharge)**
 - **Return to Emergency D. If Needed Earlier than 4 Hours**
 - **Oral Corticosteroid (2 Day Dexamethasone – 5 Day Prednisolone)**
 - **Controller Therapy Initiation (Inhaled Corticosteroid)**
 - **Signs and Symptoms Necessitating a Return Visit to the ED**
 - **Follow up Visit in 2 Days After Discharge**

**Thank You for
Your Attention**

