

Emergency Department Clinical Guidelines

**ED/CCT Asthma Guidelines**

***Clinical Context and Purpose***

Acute asthma exacerbations are a common presenting complaint to Emergency Departments, and in some cases can be severe and potentially life threatening. The goal of this clinical guideline is to provide guidance in the assessment and management of patients presenting to the Emergency Department with severe and potentially life-threatening status asthmaticus.

***Background***

Asthma is a common chronic, inflammatory disease of the airways that leads to airway hyper-responsiveness, leading to intermittent episodes of airflow obstruction, wheezing, chest tightness, shortness of breath, and cough. The severity of acute asthma exacerbations can range from mild to life-threatening. The cornerstone of therapy in acute asthma exacerbations are bronchodilators e.g. albuterol and ipratropium, systemic steroids, and in severe cases adjunctive therapies e.g. magnesium sulfate, epinephrine, and non-invasive positive pressure ventilation. Rarely, patients with severe acute asthma exacerbations may require intubation and invasive mechanical ventilation. Invasive mechanical ventilation in severe status asthmaticus presents many potential challenges e.g. development of Auto-PEEP and cardiovascular collapse, requiring attention to initial ventilator settings, coordination with respiratory therapy, and adequate levels of sedation to optimize ventilator synchrony in the acute phase.

There are several clinical features that identify patients with severe acute asthma exacerbations. These include but are not limited to: Tachycardia HR>120, Tachypnea RR>30, accessory muscle use, diaphoresis, inability to speak in complete sentences, tripod positioning, and diminished air entry on lung examination. In addition, the following are risk factors for fatal asthma exacerbations: prior life-threatening asthma exacerbation, acute asthma exacerbation despite oral steroid use, more than one asthma hospitalization per year, 3 or more ED visits for acute asthma exacerbations per year, use of more than one beta-agonist inhaler per month, cardiopulmonary comorbidities, food allergy, not on inhaled steroids, lack of adherence to prescribed asthma medications, and difficulty perceiving acute asthma symptoms or their severity.

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**Asthma Guideline**

**Acute Asthma Exacerbation Severity Assessment:**

- Vital signs
- Altered mental status, lethargy, anxiety, agitation, diaphoresis
- Significantly increased work of breathing, accessory muscle use, air entry, ability to speak

Severe Acute Asthma Exacerbation

- Albuterol Neb 5mg q20min\*
- Ipratropium Neb 0.5mg q20min x 3\*
- Can consider continuous albuterol Neb if no improvement
- Administer steroids e.g. solumedrol 125 mg IV (dexamethasone may be used)
- Consider IV magnesium sulfate 2 grams
- Consider IV Fluid bolus if fluid tolerant (can consider weight-based 20-30 mL/kg fluid bolus)\*\*

No Improvement, unable to tolerate, and/or minimal air entry/silent chest

- Consider IM Epinephrine 0.3-0.5 mg if there is decreased air entry/silent chest\*\*\*
- Consider trial of Non-invasive Positive Pressure Ventilation (NIPPV) e.g. BiPAP

Impending respiratory arrest and/or worsening respiratory status

Unable to tolerate NIPPV, agitated

- Prepare for intubation preferably with a large ET Tube e.g. 8.0 if possible
- Consider ketamine and paralytic for RSI
- Ensure post intubation sedation, may require neuromuscular blockade if significant ventilator dyssynchrony
- Prepare for post intubation ventilator management:
  - Initial ventilator settings should target lower RR e.g. 10-12
  - Tidal Volume 6-8 ml/kg IBW
  - Increased expiratory time e.g. I:E ratio 1:4-1:5
  - PEEP 5
  - Monitor for signs of Auto-PEEP

- Can consider Ketamine\*\*\*\* to facilitate tolerance of BiPAP
- Closely monitor and prepare for possible intubation

Impending respiratory arrest and/or worsening respiratory status

\* Bronchodilator therapy may be administered via MDI, 4-8 puffs with proper technique q 20 minutes x 3 during the first hour.

\*\* Frequently reassess patients during and after receipt of fluid bolus therapy.

\*\*\*IM Epinephrine can be re-dosed every 20 minutes for up to 3 doses.

\*\*\*\*In rare circumstances, can consider ketamine in sub-dissociative doses (0.1-0.3 mg/kg) to facilitate NIPPV and potentially obviate the need for intubation if there is rapid improvement, however, the patient should be monitored with preparations for airway management and invasive mechanical ventilation should the need arise. Ketamine may lead to increased secretions, emesis, apnea, and/or laryngospasm.

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***Disposition Planning***

- 1) In patients with significant improvement and/or resolution of severe acute asthma exacerbation and no longer requiring NIPPV (if NIPPV was started), consider placement in observation unit (see Observation Unit Asthma Protocol).
- 2) In patients requiring intubation and invasive mechanical ventilation, NIPPV with continued need for close monitoring of respiratory status, or hemodynamic instability, consult with Medical Critical Care for admission to Critical Care Unit.
- 3) In patients who continue to require nebulizer therapy, and/or NIPPV, beyond the capabilities of observation unit, but who do not require admission to a Critical Care Unit, admit to Medicine. In patients who are not able to be weaned off of NIPPV, and who continue to require NIPPV, consider Critical Care Consultation for disposition planning.

***Resources/References***

Schauer SG, et al. Management of Acute Asthma in the Emergency Department. *EM Practice*. 2013. June; 6(33):1-28.  
 Leatherman J. Mechanical Ventilation for Severe Asthma. *Chest*. 2015. June;147(6) 1671-1680.