Management of Life-Threatening Asthma in the Emergency Department

**Step One**

1. Continuous nebulized albuterol
   - Use oxygen for nebulization **not** room air
   - 8 liters per minute
   - Nebulizer will need to be refilled every 10-15 min
   - Dose is not important, **keep making smoke**

2. Nebulized ipratropium bromide
   - 500 mcg, added to albuterol q20 min x 3, then q1h

3. Methylprednisolone 125 mg (1.5 mg/kg) IV
   - Alternative: Dexamethasone 20 mg IM or IV

4. Magnesium sulfate 2 g (50 mg/kg, max 2 g) IV
   - Give over 20 minutes

5. Nebulized epinephrine
   - 0.5 mL of 2.25% racemic epi in 3 mL NS or 5 mL of standard 1:1000 L-epinephrine (1 mg in 1 mL)

**Consider the differential**
- CHF
- Pneumothorax
- ACS
- Arrhythmia
- Pulmonary embolism
- Airway obstruction / Foreign body
- Pericardial tamponade

**IF NO IMPROVEMENT**

**Step Two**

1. Epinephrine 0.5 mg (.01 mg/kg, max 0.5 mg) IM
   - Proper concentration of epi for IM injection is 1:1000 (1 mg in 1 mL), so 0.5 mg = 0.5 mL
   - May repeat q10 min, or start IV drip at 5 mcg/min and titrate to effect
   - Instant epi drip: 1 amp crash cart epi (1 mg in 10 mL) in 1 liter NS, start at 2 drops/sec, titrate up
   - Alternative to epi: Terbutaline 10 mcg/kg IV bolus over 10 min, then titrate from 0.4 mcg/kg/minute

2. Fluid bolus 20 cc/kg normal saline

3. Diagnostics: Chest X-ray, CBC, chemistry, venous blood gas, HCG, ECG if concern for non-sinus rhythm or cardiac ischemia

**Agitated Patient**
- **Ketamine**
  - 1.5 mg/kg IV over 30 seconds, then 1 mg/kg/hour
  - Titrate drip to effect
  - If no IV: 5 mg/kg IM

**Non-Invasive Ventilation**
- Inspiratory support / IPAP / PS: 8 cm H2O
- Expiratory support / EPAP / PEEP: 3 cm H2O
- Continue nebulizer treatments through NIV

**IF NO IMPROVEMENT**

**IF WORSENING**

**AVOID INTUBATION IF POSSIBLE**

**Cooperative Patient**

**Non-Invasive Ventilation**
- Inspiratory support / IPAP / PS: 8 cm H2O
- Expiratory support / EPAP / PEEP: 3 cm H2O
- Continue nebulizer treatments through NIV

**IF WORSENING**

**IF WORSENING**

**Intubation and Ventilation of the Asthmatic**

**Indications**
- Progressive fatigue / respiratory failure
- Progressive deterioration of mental status
- Cardiac arrest

**Technique**
- Maximize preoxygenation
- Optimize for first pass success
- Induce while patient is upright
- Use largest ETT possible
- Be mindful of tendency to bag-mask ventilate too aggressively; this leads to breath stacking

**RSI Meds**
- Ketamine 2 mg/kg +
- Rocuronium 1.2 mg/kg or
- Succinylcholine 2 mg/kg

**Initial Vent Settings**
- Assist control / Volume control
- Respiratory rate 8 breaths/min
- Tidal volume 7 mL/kg IBW
- PEEP 2 cm H2O
- Inspiratory flow: 90 lpm (or I:E 1:5)
- FiO2 100%

**Plateau pressure** is measured by using the **inspiratory pause** function and noting airway pressure during the inspiratory hold

**Intubation and Ventilation of the Asthmatic**

**Vent Management**
- Goal is plateau pressure < 30 cm H2O
- If Pplat too high, decrease rate, then tidal volume
- Continue nebulized albuterol
- Paralyze if needed, deep sedation/analgesia preferred
- External chest compression to assist exhalation
- Can accept saturation as low as mid 80s (goal ≥ 90%)
- Can accept high pCO2 for several hours (goal pH > 7.15)
- Aggressive airway suctioning
- Frequent electrolyte checks, watch for hypokalemia
- Consider inhalational anesthetic, heliox

**If Patient Crashes on Vent**
- **DISCONNECT VENTILATOR**
- External chest compression to assist exhalation
- Bag mask ventilation - do not overventilate
- Verify that ETT not displaced / clogged / kinked
- Bilateral thoracostomy
- Bolus fluid, epinephrine
- Consider ECMO/bypass