BEST PRACTICES

MANAGEMENT OF LIFE-THREATENING ASTHMA EXACERBATION

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ASSESSMENT

Impending respiratory failure:
Cyanosis, abdominal paradox, inability to maintain respiratory efforts, silent chest, depressed mental status, SpO2 <90%, $PaCO_2$ >40 mmHg, PEF <33% or unable to perform.

Severe exacerbation:
Speaks in single words.
Sits hunched forward.
Agitated and diaphoretic.
RR >30 breaths/minute.
Heart rate >120 beats/minute.
SpO_2 (on air) <90%.
PEF ≤50% predicted or personal best.
Increased pulsus paradoxus.

Abbreviations
RR: respiratory rate.
PEF: peak expiratory flow.
SpO_2: pulse oxygen saturation.
$PaCO_2$: carbon dioxide tension.
ETT: endotracheal tube.
RSI: rapid sequence intubation.
PRVC: pressure-regulated volume control.
IBW: ideal body weight.h

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MEDICAL THERAPY

Supplemental oxygen: titrate to maintain the SpO_2 >92% (>95% in pregnancy).
Albuterol: 2.5 to 5 mg by jet nebulization every 20 minutes for three doses then q1-4 hours as needed or continuous nebulization.
Systemic glucocorticoids: methylprednisolone 60 to 80 mg every 6 to 12 hours.
Inhaled ipratropium: 500 mcg by nebulization in combination with albuterol.
Magnesium sulfate: a single dose 2 g infused over 20 min.

NIV?
A brief trial of NIV may be reasonable in selected patients with impending respiratory failure with careful attention to comorbid conditions. Failure of NIV to improve oxygenation would be an indication for invasive mechanical ventilation.

Failure to improve?
The decision to initiate mechanical ventilation should be based on serial clinical evaluations to assess the response to medical therapy.

INTUBATION

ETT: use a large-bore (≥8 mm) endotracheal tube.
Route: oral intubation is preferred over nasal.
Technique: avoid airway manipulation.
Medications: use ketamine or propofol for RSI with succinylcholine or rocuronium, avoid opioids.

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Nonstandard Therapies?
Inhaled halothane, isoflurane, and sevoflurane.
Intravenous ketamine (0.5 to 1 mg/kg over 2-4 minutes, then IV infusion of 0.5 to 2 mg/kg/hr).
Heliox mixtures (eg, helium 70 to 80% mixed with oxygen 30 to 20%).
Extracorporeal life support.

MECHANICAL VENTILATION

FiO_2: 40-60%
Mode: volume control (PRVC)
Minute ventilation: ~100 mL/kg of IBW.
Tidal volume: 6-8 mL/kg
Respiratory rate: usually 10-12, adjusted for ventilation and adequate expiratory time.
Expiratory time: >3X RC (time constant) to avoid auto-PEEP and ensure full expiration.
PEEP: 5-8 cm H_2O, may Adding extrinsic PEEP to offset intrinsic PEEP
Peak Pressure: <50 cm H_2O.
Plateau pressure: <30 cm H_2O.
Permissive hypercapnia: pH ≤7.2 is generally corrected using sodium bicarbonate.

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