Asthma Clinical Practice Guideline: Emergency Department Management

Inclusion: ≥ 18 months old, presents with asthma symptoms, otherwise healthy, in acute asthma exacerbation

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Presents with asthma symptoms: wheezing, cough, SOB, increased WOB)

Initiate Caregiver Initiated Protocol (CIP)
- Place on oxygen for SpO_2 <90%
- Obtain Baseline CRS

CRS Score and Assessment

Purple shaded area represents CAREGIVER INITIATED PROTOCOL FOR ASTHMA #5-24

Literature shows CXR is **not** routinely indicated in the care of acute asthma exacerbation

CRS 0-2
- 6 puffs of Albuterol MDI
- **Repeat CRS post treatment**

CRS 3-5
- Albuterol via continuous nebulizer with 1 mg Ipratropium Bromide
- Give steroids x1 dose[1]
- Continuous HR and SpO2 monitoring
- **Repeat CRS 45-60 min post treatment**

CRS 6-8
- Albuterol via continuous nebulizer with 1 mg Ipratropium Bromide
- Give steroids x1 dose[1]
- Continuous HR and SpO2 monitoring
- **Repeat CRS 30 min post treatment**
- ***Off CIP- Physician Only:*** Consider Budesonide via nebulizer

CRS ≥9
Caregiver Initiated Protocol
- Begin Albuterol via continuous nebulizer with 1 mg Ipratropium Bromide and give 1.5 mg Budesonide via nebulizer
- Establish IV access
- Continuous HR and SpO2 monitoring
- Use heated/humidified oxygen between aerosols
- Make NPO
- **Contact provider for further orders**

Off CIP- Physician Only
- Give steroids[1]
- Give Magnesium Sulfate IV
- Consider Heliox
- Consider HFNC/NPPV
- Consider IV fluids
- Consider Ketamine IV
- Consider blood gas
- **Reassess CRS 30 min post treatment**

Clinically Improved?

NO → Give steroids x1, if not already given → **CRS?**

YES

CRS 0-2
- 4 puffs of Albuterol MDI
- **Repeat CRS 15 min post treatment**

CRS 3-5
- Albuterol via intermittent PEP nebulizer
- **Repeat CRS 45-60 min post treatment with SpO2**

CRS 6-8
- Albuterol via continuous nebulizer with 1 mg Ipratropium Bromide (if not already given)
- Consider Heliox
- Consider Budesonide, if not already given
- Establish IV access
- Give Magnesium Sulfate, if not already given
- Start maintenance IV fluids or fluid bolus
- Make NPO
- **If CRS improving, continue to monitor and reassess in 30 minutes**

CRS ≥9
- Albuterol via continuous nebulizer
- Consider Heliox
- Consider HFNC/NPPV
- Establish IV Access
- Give Magesium Sulfate, if not already given
- Start maintenance IV fluids or fluid bolus
- Make NPO
- **If CRS improving, continue to monitor and reassess in 30 minutes**

CRS ≤3?

YES → **Discharge Criteria met[2]?**

YES → **Discharge[3]**

NO → **Discharge Criteria met[2]?**

NO → **CRS ≤3?**

NO →
- **Admit to Hospital[4]**
- **Continue Albuterol via intermittent nebulizer Q2 hours as appropriate for patient condition**
- **Administer 6 hour continuous Albuterol nebulizer if patient going to PICU**
- **Ongoing reassessment-CRS Q1 hour. If condition changes (better or worse) notify physician**

Definitions

CRS: Clinical Respiratory Score
MDI: Metered Dose Inhaler
HFNC: High Flow Nasal Cannula
NPPV: Non-invasive Positive Pressure (BiPAP/CPAP)
PEP: Positive Expiratory Pressure

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Medications

Respiratory Medications

Albuterol Metered Dose Inhaler (MDI): 90 mcg/puff
- 4-6 puffs with spacer per guideline

Albuterol via continuous nebulizer:
- <15 kg use 7.5 mg/hr
- ≥15 kg use 15 mg/hr

Albuterol via Intermittent PEP nebulizer:
- <15 kg: 2.5 mg Albuterol and 5 cm H_2O
- 15-18 kg: 5 mg Albuterol and 8 cm H_2O
- 18-25 kg: 5 mg Albuterol and 10 cm H_2O
- >25 kg: 5 mg Albuterol and 12 cm H_2O

Ipratropium Bromide:
- 1 mg via continuous nebulizer, given over one hour

Budesonide 1.5 mg via continuous nebulizer, given over one hour

[1] Steroid Dosing

Dexamethasone: 0.6 mg/kg PO (Max dose 16 mg)
- <12 kg: *Per physician discretion only.* Consider Dexamethasone 4 mg QD **or** Prednisolone 1-2 mg/kg/day (QD or BID)
- 12 to <15 kg: 8 mg (packet of 2 tablets)
- 15 to <25 kg: 12 mg (packet of 3 tablets)
- ≥25 kg: 16 mg (packet of 4 tablets)
  - Do not give if patient had in past 24 hours
  - Give steroids PO unless patient is vomiting
  - Consider steroid taper if patient had 2 courses of steroids in past 60 days

Dexamethasone IM Dosing: 0.6 mg/kg (Max dose 16 mg)
Methylprednisolone IV: 2 mg/kg x1 (Max dose 60 mg) if CRS >9 or not tolerating PO

Additional Medications (CRS > 6)

Magnesium Sulfate 50 mg/kg IV over 20 min (Max dose 2 grams)
Ketamine 0.5-1 mg/kg IV x1; continuous infusion 0.3mg/kg/hr

Adjunct Therapies

*May consider **Ipratropium Bromide 0.5 mg** for cough (if not already given)*
Epinephrine (Concentration 1mg/mL) 0.01 mg/kg IM (Max dose 0.5 mg)
Terbutaline: 0.005- 0.01 mg/kg SQ
End Tidal CO2 monitoring

Discharge

[2] Discharge Criteria

- CRS ≤ 3
- Easy work of breathing with good air exchange
- SpO_2>90% on room air consistently
- Able to maintain O_2 sats, RR, WOB during feeding/activity
- Family verbalizes ability to manage patient at home

Discharge Risk Assessment

Risk Screen: (Consider Observation and/or discussion with PCP/Specialist)
- Hospitalized two or more times in past 6 months, history of ICU/intubation
- >3 ED visits in past 6 months
- 2 or more canisters of Albuterol in past 6 months
- Failed outpatient therapy (already on Q4 nebs or oral steroids >48 hours)
- Direct exposure to tobacco smoke

Consider Subspecialty Referral if:
- Hospitalized two or more times in past year
- >3 ED visits in past 12 months
- 2 or more courses of oral steroids in past 2 months
- 2 or more canisters of Albuterol in past 6 months

[3] Discharge Orders

- Follow up with PCP/ Subspecialist
- Education (watch asthma video if given continuous treatment)
- Asthma Management Plan (Asthma Basics)

Discharge Medications:
- Albuterol MDI with spacer
  - 4 puffs QID for 2 days then Q4 hours PRN cough/wheeze
- Inhaled steroids
  - Fluticasone propionate (Flovent) 44 mcg/puff - 2 puffs BID x1 canister (no refills) (For patients <12 years old)
  - Budesonide (Pulmicort respules) 0.5mg/2ml inhalation solution- BID via nebulizer
  - Fluticasone furoate (Arnuity Ellipta) 100 mcg/actuation- 1 puff daily (For patients ≥12 years old)
- Oral Steroid: Dexamethasone PO x1 24 hours after first dose
  - <12 kg: Provide prescription for Dexamethasone 4 mg x1 **or** Prednisolone 1-2 mg/kg/day (QD or BID) for 3-5 days
  - 12 to <15 kg: dispense 8 mg (packet of 2 tablets)
  - 15 to <25 kg: dispense 12 mg (packet of 3 tablets)
  - ≥ 25 kg: dispense 16 mg (packet of 4 tablets)
  - Consider steroid taper if patient had 2 courses of steroids in past 60 days

[4] Admission Criteria

Consider admission to the hospital if:
- CRS ≥ 4 despite 2nd hour of treatment (*including trial of* Ipratropium Bromide *if not contraindicated*)
- O2 requirement to keep SpO_2 > 90%
- Failed outpatient treatment ≥2 days

Consider PICU if:
- Acute Respiratory Failure
- CRS≥9
- FiO2 ≥50%
- Initiation of NPPV/ HFNC (see *High Flow Guidelines*)
- PEWS ≥5 (after ED care team discussion)