



EM CASES SUMMARY

Episode 192 Asthma Management – 5 Step Approach

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Step 1: Consider the asthma differential diagnosis carefully

“Not all that wheezes is asthma, and asthma does not always present with a wheeze.”

While the diagnosis of asthma is often straightforward, especially in patients with a history of exacerbations and repeat ED visits, it is crucial to consider several other conditions in patients presenting to the ED with wheezing, including:

- Heart Failure (“cardiac asthma”)
- Pulmonary embolism
- Pneumonia
- Pneumothorax
- Foreign body aspiration
- Bronchiolitis
- Anaphylaxis
- Stridor (primarily inspiratory, but can be expiratory, potentially mistaken for wheezing)

In cases where wheezing is absent, particularly in patients suspected of having an asthma exacerbation, be mindful that patients may exhibit a *silent chest*—a sign of a severe/life-threatening exacerbation where patients are unable to generate sufficient airflow to produce an audible wheeze.

Utilize adjuncts such as PoCUS and chest X-ray to help refine your differential diagnosis in conjunction with a thorough history and physical examination. Guard against diagnostic premature closure that might lead you to exclusively consider asthma upon hearing the term ‘wheeze’.

Step 2: Risk stratification based on history

Effective risk stratification of patients presenting to the ED with asthma exacerbations, grounded in a comprehensive assessment of their medical history and physical examination findings, is pivotal in directing appropriate management and disposition decisions. Patients exhibiting a greater number of the following risk factors are at heightened risk for experiencing a severe exacerbation and having poor outcomes.

Most predictive variables on history:

- Previous ED visit within the last year (>3/year is a risk factor for higher mortality)
- Previous hospitalization (>2/year is a risk factor for higher mortality)
- Previous intubation or critical care requirements
- Peak Expiratory Flow (L/min) worsening during ED stay or <25% predicted or <40% predicted post-treatment
- Not currently using or poorly adherent with puffer therapy
- Use of >2 canisters of rescue meds per month
- Concomitant food allergy (puts patients at higher risk for severe reactions)
- Currently using steroids, or recently stopped oral steroids

Other risk factors to consider:

- **Comorbidities:** Cardiovascular disease, other lung diseases, psychiatric illness
- **Social History:** Low SES, recreational drug use

Peak expiratory flow (PEF) in the ED – is it useful?

The efficacy of peak expiratory flow (PEF) monitoring in the ED for improving outcomes remains uncertain. While some guidelines advocate for incorporating PEF measurements, aiming for >60-80% of personal best (or predicted) in their discharge algorithms, the American College of Emergency Physicians (ACEP) conducted a comprehensive review of the literature and concluded that PEF monitoring in the ED does not improve outcomes, predict the need for hospitalization, or reduce mortality in adults with asthma exacerbations.

According to our experts, the decision to utilize PEF monitoring should be tailored to each patient and regarded as one factor among many in the clinical assessment to inform disposition decisions.

Step 3: Assess illness severity to guide treatment choices

Illness Severity	Clinical Features and Physical Exam	HR	SpO2 (RA)	Peak Flow (% of predicted or best)
Moderate	Talking in full sentences, not agitated Prefers sitting to lying flat Tachypnea (20-30 breaths per min) No accessory muscle use	100-120 bpm	90-95%	>50%
Severe	Speaking in words not full sentences Agitation Respiratory Rate >30 breaths per min Accessory muscle use	>120 bpm	<90%	≤50%
Life-Threatening	Drowsiness Confusion Silent chest on auscultation			Likely not able to perform PF

Step 4: Treatment options based on illness severity

	MDI with spacer (preferred) OR Nebulizers	Steroids *takes a few hours to work	Additional Medications	Supplemental Oxygen & Ventilation Strategies
Mild	SABA (i.e. Salbutamol) • MDI: 6-12 puffs q10-20min x 1 hour • Neb: 2.5 mg q10-20min x 1 hour			
Moderate	SABA (i.e. Salbutamol) • MDI: 6-12 puffs q10-20min x 1 hour • Neb: 2.5 mg q10-20min x 1 hour PLUS Anticholinergic (i.e. ipratropium) • MDI: 6 puffs q10-20 min x 3 doses • Neb: 0.5mg q10-20 min x 3 doses	Prednisone 40-60 mg PO OR Dexamethasone 12-16 mg PO OR Methylprednisolone 100-125 mg IV (if unable to tolerate PO)	MgSO4 IV 2g q20min x 1 hour	Supplemental O2 to target SpO2 of 93-95%
Severe	SABA (i.e. Salbutamol) • MDI: 6-12 puffs x3 back-to-back • Neb: 2.5 mg x3 back-to-back PLUS Anticholinergic (i.e. ipratropium) • MDI: 6 puffs x 3 back-to-back • Neb: 0.5mg x 3 back-to-back	Prednisone 40-60 mg PO OR Dexamethasone 12-16 mg PO OR Methylprednisolone 100 – 125 mg IV (if unable to tolerate PO)	MgSO4 IV 2g q20min x 1 hour Epinephrine Ketamine Consider mixed gases	Supplemental O2 to target SpO2 of 93-95% Consider NIPPV Consider Intubation (very severe cases)

*While steroids onset of action is delayed there is evidence to suggest that when given within the first hour of presentation there are improved outcomes compared to after 1 hour.

*When ever possible, re-assess these patients frequently (q15-20 minutes) especially patients in whom you have concern for a severe exacerbation.

Metered Dose Inhalers vs. Nebulizers – which is better?

There has been a significant shift in clinical practice favoring the use of Metered-Dose Inhalers (MDIs) over nebulizers for ED asthma treatment, primarily driven by concerns around aerosolization during the COVID pandemic. More drug is delivered to the alveoli with MDIs compared to nebulizers. Moreover, the question of potential medication wastage into the environment when utilizing nebulizers as opposed to MDIs with a spacer device has also been raised.

An additional benefit to employing MDIs in the ED is that it provides an opportunity for patients to receive instruction on proper inhalation techniques, equipping them for successful self-management upon discharge. However, it is essential to recognize that MDIs may pose a higher labor burden on nursing staff or RTs if patients require assistance with administration. In scenarios where patients are too unwell to self-administer with an MDI, a nebulizer may offer a more practical and effective treatment option.

Step 5: Good discharge instructions and appropriate discharge medications improves outcomes of patients with asthma exacerbations

Adequate time should be spent providing good discharge instruction and appropriate discharge medications to patients with asthma exacerbations, as there is evidence that such care improves outcomes. This is one of the most important aspects of care in the ED that is too often overlooked in our busy EDs.

Discharge Criteria (note that ED PEF measurements have not been shown to improve outcomes when used alone, but can be considered to help with disposition decisions along with other criteria):

1. Symptoms improved, not requiring ongoing beta-agonist treatments
2. PEF improving >60-80% of predicted or personal best
3. SpO₂>94% on RA
4. Resources at home adequate

Discharge Medications

- **SABA (i.e. Salbutamol):** for as long as patient has any symptoms of asthma; not to be used as monotherapy.
- ***Inhaled Corticosteroid** (swish and spit with water after use, to prevent oral thrush)
 - Budesonide 200-400 mcg daily x 3 – 6 weeks
 - Fluticasone 100-250 mcg daily x 3 – 6 weeks
- **+/- Oral Steroids**
 - Prednisone 40-60mg PO daily x 5-7 days
 - Dexamethasone 12-16 mg PO daily x 1-2 doses
- **Education/medication compliance:** ask about medication coverage, and involve social work as needed to help patients access their medications. Educate patients on the role of each medication in asthma management.

****Pitfall:** Observational data shows clearly that ED physicians seldom prescribe inhaled corticosteroid at ED discharge. Inhaled steroids used as a controller therapy improve lung function and symptom control, reduce airway inflammation, the risk of exacerbation, the need for repeat ED visits, and the total exposure to systemic steroids. Steroid inhalers should routinely be prescribed even when oral steroids are also prescribed.*

Inhaler Technique

Ensure patients have a spacer; have a team member, or you walk them through proper inhaler technique prior to discharge. Provide resources for patients to access if they need a refresher.

Return to Care Instructions

Patients should follow-up with their primary care team or respirologist within a few days after discharge for re-assessment following an asthma exacerbation. Patients should be advised to return to care urgently via EMS if they experience any of the following:

- Difficulty speaking due to asthma
- Shortness of breath at rest
- Lips or nails are turning blue
- Reliever puffers (i.e. SABA) not effective

Identification of Triggers

Encourage patients to identify and avoid or mitigate possible triggers for their asthma (i.e. pets, allergens, exercise, medications, smoking/ irritants, or workplace exposures).

Asthma Action Plan

There is good evidence to suggest that asthma action plans improve patient outcomes, yet these are seldom provided to patients from the ED. Patients should routinely be encouraged to fill in an [Asthma Action Plan](#) (see below) which can help them to identify worsening symptoms, plan for up titrating home therapies as well as recognize when to come into hospital for further management.

The form is divided into three vertical columns, each with a distinct color and header:

- Green Column: Asthma is well controlled**
 - Symptoms: No night-time asthma symptoms; Daytime symptoms less than 2 times/week; Can exercise with no symptoms; Need reliever less than 2 times/week.
 - Measurement: Peak flow and Other scales.
 - Table: Medication, Dose, Times per day.
 - Section: Additional Notes & Instructions.
- Yellow Column: Asthma is getting worse**
 - Symptoms: Disrupted sleep due to asthma symptoms; Daytime symptoms 2 or more times/week; Cannot exercise normally; Need reliever more than 2 times/week; Getting a cold or flu.
 - Measurement: Peak flow and Other scales.
 - Table: Medication, Dose, Times per day.
 - Section: Additional Notes & Instructions.
- Red Column: Time to get help**
 - Symptoms: Difficulty speaking due to asthma; Experiencing shortness of breath at rest; Lips or nails turning blue; Reliever does not work.
 - Measurement: Peak flow and Other scales.
 - Section: Additional Notes & Instructions.
 - Section: EMERGENCY (Severe breathing problems, Symptoms getting worse quickly, Reliever has little or no effect) with **DIAL 911**.

The Asthma Canada logo is located at the bottom right of the form.

Asthma Action Plan pdf: https://asthma.ca/wp-content/uploads/2020/06/Asthma-Action-Plan_optimized.pdf

By following this simple 5 step approach to asthma exacerbations in the ED outline here, being careful to consider the differential diagnosis and understand that “not all the wheezes is asthma and that asthma does not always wheeze”, taking a history that elicits risk factors for severe exacerbations requiring aggressive treatment, accurately categorizing patients based on physical exam findings, administering appropriate medications guided by these categories and ensuring adequate discharge instructions, education, prescriptions and follow up, you will very likely improve the outcomes of your patients who present to the ED with asthma exacerbations.

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