CASE 4.1
Asthma | Level 1

Manar O. Lashkar and Hanna Phan

LEARNING OBJECTIVES

1. Identify the presenting signs and symptoms of asthma in a pediatric patient.
2. Identify the criteria for intensive care unit admission.
3. Evaluate the stage of asthma control for a pediatric patient and construct an appropriate treatment.
4. Recommend pharmacologic therapy for moderate persistent asthma.
5. Provide treatment goals and outcomes for each of the identified healthcare problems presented in the case.
6. Detect a medication-related problem requiring intervention in the patient case.

CHIEF COMPLAINT: Unable to breathe

History of Present Illness: This is a 7-year-old African American male with asthma presenting to the emergency department (ED) this morning after missing 2 days from school this week due to shortness of breath that was not alleviated with rescue inhaler use every 4 hours. Since school started 3 months ago, he has missed school a day or two in each month, and he used about two albuterol canisters in the past month. He has not been able to participate in gym class as he coughs during the school day; but, according to his mother, "this is normal, he has always had breathing problems, it was just worse than normal this time." He wakes up at night coughing and asks for his inhaler almost every other day, but it has been daily in the past week. He was admitted to the hospital last fall for similar symptoms, was started on a controller inhaler at that time, and diagnosed with asthma. His mother states that she has not followed up with his pediatrician regularly for his asthma; he was seen once in the last year.According to mother, the patient has visited urgent care and the ED for asthma symptoms two times this year, one of which he was prescribed an oral steroid course for 5 days and the other he was admitted to the pediatric intensive care unit (PICU) for 2 days (not intubated). Today, in the ED, the patient's symptoms did not improve with albuterol and ipratropium, and the patient continued with severe symptoms at rest including dyspnea to the point that he is unable to speak full sentences. It was determined to admit the patient to the PICU and is in transit to unit.

Review of Systems: Positive for inspiratory and expiratory wheezing, shortness of breath, runny nose, watery eyes, and dyspnea (in which he is unable to speak full sentences)

Past Medical History: Asthma (diagnosed 1 year ago), allergic rhinitis, and attention deficit hyperactivity disorder (ADHD)

Past Surgical History: None

Development History: No concerns

Social History: Lives with parents and a sister and attends 1st grade

Family History: Mother with history of childhood asthma, father with history of seasonal allergies

MEDICATION HISTORY

Medication	Sig	Start Date	End Date	Taking	Authorizing Provider
Fluticasone 44 mcg HFA MDI inhaler	2 puffs bid with spacer	10/2012		Yes	Dr. Smith
Albuterol 90 mcg HFA MDI inhaler	2–4 puffs q 6 hr prn wheeze or cough	10/2012		Yes	Dr. Smith
Loratadine tablet	5 mg po daily	10/2012		Yes	Dr. Smith
Methylphenidate LA tablet	30 mg po daily	08/2012		Yes	Dr. Smith

Diet: Regular for diet

Immunizations: Last vaccinations were prior to kindergarten admission last year; no age-scheduled or seasonal vaccination since then

Allergies: Seasonal allergies, NKDA

PHYSICAL EXAM

BP 100/60 mm Hg | Pulse 140 beats per min Temp 36.8°C (oral) | RR 42 breaths per min Wt 30 kg | Ht 120 cm | SpO_2 85% on RA, PEF personal best 200 L/min, current PEF 70 L/min

General Appearance: Awake, agitated, in discomfort, and talks in words

Eyes: PERRLA, EOMs intact, conjunctivitis

Ears: TM clear bilaterally

Throat: Moist MM, throat normal, no posterior pharynx exudate

Neck: No lymphadenopathy, supple with no meningismus, trachea midline

Lungs: Increased anterior-posterior diameter of the chest, hyperinflation with nasal flaring

Heart: RRR, no murmur/gallop/clicks, 2+ distal pulses

Abdomen: Soft, nontender, +BS, nondistended, no HSM

Musculoskeletal: Well perfused, capillary refill less than 2 seconds, no edema

Skin: No rashes, no petechiae, no purpura

Neurological: No gross deficits, strength 5 out of 5 upper and lower extremity, sensation intact, reflexes normal, interacting appropriately for age

LABORATORY DATA

BASIC METABOLIC PANEL		
Component	**Value**	**Range**
Glucose	115	60–110 mg/dL
BUN	10	8–19 mg/dL
Sodium	140	138–145 mmol/L
Potassium	3	3.4–6 mmol/L
Chloride	100	98–107 mmol/L
CO_2	28	20–28 mmol/L
Anion gap	12	6–16 mmol/L
Creatinine	0.6	0.2–0.7 mg/dL
Calcium	9	8.9–10.1 mg/dL
OSMOLALITY		
Serum osmolality	290	285–295 mOsm/kg
CBC WITH DIFF		
WBC count	7.0	4.5–13.5 x 10^3/µL
RBC count	4.8	4–5.2 million/µL
Hemoglobin	11.6	11.5–15.5 g/dL
Hematocrit	35	35% to 45%
MCV	78	77–95 fL
MCH	26	25–33 pg
MCHC	33	32–35 g/dL
RDW	11.6	11.5% to 4.5%
Platelets	200	150–450 x 10^3/µL
MPV	9.6	9.4–12.4 fL
Neutrophils	50	34.0% to 71.1%
Immature granulocytes	0	0.0% to 0.5%
Neutrophils absolute	3.5	1.56–6.13 x 10^3/µL
Lymphocytes	30	19.3% to 51.7%
Lymphocytes absolute	2.1	1.18–3.74 x 10^3/µL
Monocytes	10	3.0% to 13.0%
Monocytes absolute	0.7	0.24–0.86 x 10^3/µL
Eosinophils	1	0.7% to 5.8%