Breakout Session: Challenging Case: Difficult to Control Asthma During the COVID-19 Pandemic

Date: Saturday August 6, 2022

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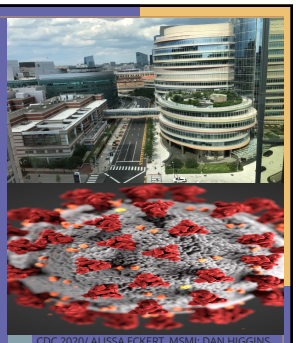

CDC 2020/ ALISSA ECKERT, MSMI; DAN HIGGINS

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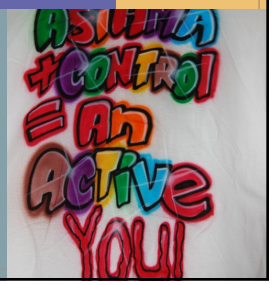
No disclosures/artwork by one of my patients



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Objectives:

1. The leaner will be able to describe the elements of a comprehensive evaluation

2. The learner will be able to describe the importance of not overlooking the basics of asthma management.

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Visit 1 in 2019/HPI:
E is a 16-year-old female here for a follow up visit for asthma with her parents who provide a reliable history. Last seen 07/2018 for an initial evaluation and this is my first visit with her. At the last visit the patient was started on fluticasone 44 and it was stepped up to 110 last month (mom called the office). E is doing better.

In the interim since the last visit the patient has had upper respiratory tract infections with headache, rhinorrhea, productive cough (clear to green secretions), chest tightness and dyspnea lasting about a week. During her most recent cold the patient also wheezed and had a fever to 103. Mom treated E during her cold with albuterol Q four hours. E reports cough and dyspnea after twenty minutes of physical activity-she does not premedicate with albuterol as previously prescribed. Also, E does not brush her teeth or rinse her mouth after taking fluticasone MDI.

Review of Systems/notable for:

Constitutional exercise intolerance, three times a week gym class

Skin eczema affects skin at hairline, belly and face

Eyes ocular allergy symptoms: puffiness in spring and fall

Ears/Nose/Throat allergic rhinitis symptoms: sneezing

Respiratory see HPI

Cardiac CHOP cardiology for palpitations without evidence of heart failure, possibly having runs of supraventricular tachycardia from the description of the events. Consumes a fair amount of caffeine. Recommended placing a monitor to capture one of these events to rule out possible SVT.

Holter showed sinus tachycardia but no evidence of tachyarrhythmia. I recommended avoiding caffeine due for follow up

Today denies palpitations and has cut back on caffeine

Gastrointestinal appetite: not a breakfast eater, denies symptoms of reflux

Allergy / Immunology has not undergone allergy skin testing/has not been immunized with the influenza vaccine for the current season

Development in 10th grade

Sleep quiet breathing

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Visit 1 in 2019

PAST MEDICAL HISTORY:

ER/Hospitalizations: none since last seen in this office

Last course of prednisone/dexamethasone as per EPIC: 2012

SOCIAL\ENVIRONMENTAL HISTORY:

The patient lives with her mother and father who smoke in the home, a cat, a dog and a guinea pig

Physical Examination:

Blood pressure 121/63, pulse 73, resp. rate 20, height 1.671 m (5' 5.79"), weight 80.3 kg (177 lb 0.5 oz), SpO2 99 %.

General appearance: alert, well appearing, cooperative, not in distress

Head and Face: normal

Eyes: normal without scleral icterus

Ears, Nose, Mouth and Throat: Ears: TMs normal Nose: mucosal edema Mouth: no oral thrush

Neck: neck supple, no significant adenopathy

Respiratory: clear breath sounds with a couple of inspiratory squeaks and good air entry

Cardiovascular: heart rate and rhythm regular

Abdomen: soft, non-distended, non-tender with normal active bowel sounds

Extremities/ Lymph nodes: no clubbing, no cyanosis

Skin: no rashes noted

Psych: interactive and normal, no obvious anxiety or depression

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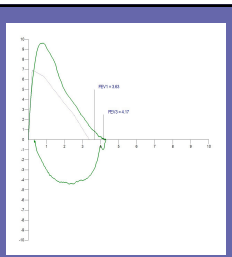
Spirometry

Change in FEV1 %Pred
FEV1 decreased >= 10%
FEV1 decreased 5-9%
FEV1 is unchanged

ATS

		Ref	Pre	% Ref	Z-score
FVC	L	3.37	4.29	127	2.02
FEV_1	L	3.01	3.63	121	1.59
FEV_1 / FVC	%	88	85	97	-0.46
FEF_{25-75}	L/s	3.76	4.05	108	0.33
PEFR	L/s	6.93	9.72	140	2.17
FET	sec		6.71		
FIF50	L/s		4.41		
FEF_{50} / FIF_{50}			1.01		
FEV.5	L	2.07	2.89	140	
Back Volume			0.11		



Visit 1 in 2019

Normal FVC, FEV1, FEV1/FVC ratio, FEF25-75% and flow volume loop. Normal spirometry that is stable

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Visit 1 in 2019/ASSESSMENT/PLAN:

Moderate persistent asthma, Allergic rhinoconjunctivitis

E is a 16-year-old with moderate persistent asthma that has come under improved control.
Based on severity classification, adherence to therapy and control, continue fluticasone110 mcg MDI 2 puffs BID.

E will take rescue medication: albuterol before activity and PRN as per asthma care plan.

MDIs to be administered via a chamber and a new one was dispensed today.

Continue cetirizine 10 mg PO once daily.
Recommended and offered to immunize E with the influenza vaccine. The parents said that they will have her get it at her PCP office next week because E panics.

EDUCATION:

Patient/family taught/reviewed proper MDI chamber/mouthpiece administration technique by demonstration and given written instructions that include how to properly clean the chamber. Instructed E to rinse her mouth or brush her teeth after taking Flovent. Informed the parents that both second and third hand smoke are asthma triggers. Additional teaching provided for the listed diagnoses, medications/treatments as per the instructions provided in the after-visit summary and understanding confirmed.

Patient Instructions

Continue current medications and asthma care plan
Your child should rinse his/her mouth out with water (sip of water, swish in mouth and spit out) or brush teeth after taking steroid inhaler: Flovent
Always administer inhaler(s) by chamber.

*Call the CHOP pulmonary medicine office if you have any **QUESTIONS, CONCERNS ABOUT POSSIBLE SIDE EFFECTS or PROBLEMS FILLING YOUR CHILD'S PRESCRIPTIONS at the pharmacy**.

Please make an appointment with Allergy for allergy evaluation/testing. If your child is scheduled for allergy skin testing, **STOP her antihistamine seven days before the allergy appointment.** *If your child is on this medication, skin testing can not be done.*

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VISIT 2: 10/2021 After being lost to follow up

E presents today status post hospitalization three weeks ago for status asthmaticus and COVID-19 infection (after vaccination). E attends Drexel University and was at school when she got sick. E returned to school a week and a half after discharge. She reports doing well for a week after discharge while taking albuterol Q four hours. Today she reports a week of increased cough, increased need for albuterol (uses a chamber to administer it) Q two to three hours with a positive response. Her cough has been triggered by cold air. She denies fever. E also reports wheeze, dyspnea especially with walking, chest tightness and chest pain. She reports her energy level is normal, but her activity endurance is reduced.

E received two doses of the COVID-19 vaccine and the influenza vaccine

Review of Systems:

Constitutional afebrile, exercise intolerance

Skin facial eczema

Eyes no ocular allergy symptoms

Ears/Nose/Throat no nasal allergy symptoms, denies any problems with sense of smell or taste

Respiratory see HPI

Gastrointestinal appetite: variable

Neurologic headaches when wakes up coughing, denies dizziness

Sleep snores when sick, notes dyspnea when she wakes up to go to the bathroom

PAST MEDICAL HISTORY:

ER: TJUH tested+ for COVID-19 and RSV, CHOP

Hospitalizations: CHOP for three days for status asthmaticus and COVID-19

Last course of **prednisone**/dexamethasone as per EPIC: at discharge

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VISIT 2: 10/2021

SOCIAL\ENVIRONMENTAL HISTORY:

E is a freshman at Drexel. She lives in a dorm with one roommate. She denies exposure to smoking and vaping.

Physical Examination:

BP 119/58 (Site: LEFT ARM, Position: SITTING, Cuff Size: ADULT) | Pulse 100 | Temp 98.2 °F (36.8 °C) (Temporal) | Resp 25 | Ht 1.688 m (5' 6.46") | Wt 88.4 kg (194 lb 14.2 oz) | SpO2 97% | BMI 31.02 kg/m²

General appearance: alert, well appearing, cooperative, not in distress

Head and Face: normal

Ears, Nose, Mouth and Throat: Ears: TMs normal Nose: pale mucosal edema Throat: tonsils & pharynx normal Mouth: no oral thrush

Neck: neck supple, no significant adenopathy

Respiratory: clear breath sounds with fair air entry, no wheezes, no crackles, coughed up sputum that was thin clear-yellowish, examined after treatment with albuterol in the PFT lab for testing

Cardiovascular: heart rate and rhythm regular

Abdomen: soft, non-distended, non-tender with normal active bowel sounds

Extremities/ Lymph nodes: no clubbing, no cyanosis

Psych: interactive and normal, no obvious anxiety or depression

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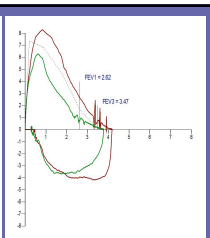
Spirometry

Change in FEV1 %Pred
FEV1 decreased >= 10%
FEV1 decreased 5-9%
FEV1 is unchanged

ATS ✓ ATS ✓

		Ref	Pre	% Ref	Z-score	Post	% Ref	Z-score	% Chg
FVC	L	3.52	3.78	107	0.54	4.18	119	1.37	11
FEV_1	L	3.11	2.62	84	-1.20	3.38	109	0.68	29
FEV_1 / FVC	%	89	69	78	-2.61	81	91	-1.24	17
FEF_{25-75}	L/s	3.68	1.69	46	-2.33	3.52	96	-0.17	108
PEFR	L/s	7.35	6.26	85	-0.83	8.28	113	0.71	32
FET	sec		7.20			7.53			5
FIF50	L/s		3.59			3.99			11
FEF_{50} / FIF_{50}			0.66			1.08			64
FEV.5	L	2.24	2.03	91		2.73	122		34
Back Volume			0.12			0.13			



VISIT 2:10/2021

Pre-bronchodilator the FVC and FEV1 were normal. The FEV1/FVC ratio and FEF25-75% were reduced. The expiratory curve of the flow volume loop was concave (green). Post-bronchodilator FEV1 increased by 29%. The FEV1/FVC ratio, FEF25-75% became normal and the expiratory curve of the flow volume curve (red) was normal.

Impression: Mild obstructive lung disease(worse than last testing) with a significant response to bronchodilator.

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VISIT 2: 10/2021

CHEST X-RAY:

SINGLE FRONTAL VIEW OF THE CHEST:

HISTORY: Asthma, Covid positive COMPARISON: None

REPORT: A single frontal view of the chest was obtained in the supine position. Normal heart size. Left-sided aortic arch and gastric bubble. Lungs are hyperexpanded. No focal infiltrate, pleural effusion or pneumothorax. Osseous structures appear intact.

IMPRESSION: No evidence of infiltrate

CHEST HISTORY: COVID+ assess for worsening/new PNA-two days later

COMPARISON: film as noted above

FINDINGS: The lung volumes are normal. There is no pulmonary opacity, pleural abnormality or pneumothorax. The cardiomediastinal silhouette is normal. The visualized upper abdomen, bones and soft tissues are normal.

IMPRESSION: Normal radiographic examination of the chest, no sign of focal opacities.

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VISIT 2: 10/2021

ASSESSMENT/PLAN:

Severe persistent asthma with acute exacerbation

Allergic rhinitis

History of COVID-19

Hospital discharge follow-up

E is a 19-year-old with severe persistent asthma that is currently poorly controlled and today she has an exacerbation.

Based on severity classification, adherence to therapy and control, step up to fluticasone/salmeterol diskus 500/50 one inhalation BID. Continue montelukast 10 mg PO once daily.

Prescribed prednisone 30 mg PO BID for five days.

E will take rescue medication: albuterol before activity and PRN up to Q four hours as per asthma care plan yellow zone.

Continue cetirizine 10 mg PO once daily and Flonase two sprays per nostril once daily.

MDIs to be administered via a chamber.

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VISIT 2: 10/2021

ASSESSMENT/PLAN:

EDUCATION: Reviewed/discussed the rationale for medication changes/treatment step up. Reviewed the updated asthma care plan and provided it to E in writing. Provided anticipatory guidance/counseling about all types of smoking: cigarettes, cigars, e-cigarettes, hookah, marijuana and the health risks from them especially for patients with asthma. Additional teaching provided for the listed diagnoses, medications/treatments/as per the instructions provided in the after-visit summary and understanding confirmed.

Patient Instructions

It was nice seeing you today for an in-person visit. Take prednisone twice a day for five days, continue albuterol up to every four hours as needed, continue fluticasone/salmeterol diskus, montelukast- follow the asthma care plan. Take cetirizine and fluticasone nasal spray every day.

Call or send me a MyCHOP to let me know how you are doing next Monday.

Always administer albuterol inhaler(s) with a chamber. **Bring your chamber to every visit.**

*Call the CHOP pulmonary medicine office if you have any **QUESTIONS, CONCERNS ABOUT POSSIBLE SIDE EFFECTS or PROBLEMS FILLING YOUR CHILD'S PRESCRIPTIONS at the pharmacy**.

Follow-up: Return in about 2 weeks with spirometry

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Visit 3 Follow up 11/2021

Today E says that she is doing better. She is taking albuterol once every other day. She last took a puff before bed last night for cough and wheeze with a positive response. She uses a chamber to administer her albuterol MDI. She says that her current symptoms are wheeze with physical activity, as well as cough day and night that can be productive of yellow secretions. She denies dyspnea, chest tightness and chest pain. She has been walking more but can't rush.

Physical Examination:

BP 130/66 (Site: LEFT ARM, Position: SITTING, Cuff Size: ADULT) | Pulse 106 | Temp 98.2 °F (36.8 °C) (Temporal) | Resp 25 | Ht 1.679 m (5' 6.1") | Wt 89.6 kg (197 lb 8.5 oz) | SpO2 98% | BMI 31.78 kg/m²

General appearance: alert, well appearing, cooperative, not in distress

Ears, Nose, Mouth and Throat: Ears: TMs normal Nose: pale mucosal edema Mouth: no oral thrush

Neck: neck supple, no significant adenopathy

Respiratory: clear breath sounds with good air entry and few mild wheezes

Cardiovascular: heart rate and rhythm regular

Abdomen: soft, non-distended, non-tender with normal active bowel sounds

Extremities/ Lymph nodes: no clubbing, no cyanosis

Skin: no rashes noted

Psych: interactive and normal, no obvious anxiety or depression

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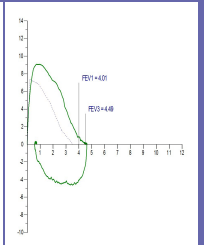
Spirometry

Change in FEV1 %Pred
FEV1 decreased >= 10%
FEV1 decreased 5-9%
FEV1 is unchanged
ATS ✔

		Ref	Pre	% Ref	Z-score
FVC	L	3.53	**4.63**	131	2.28
FEV_1	L	3.11	**4.01**	129	2.28
FEV_1 / FVC	%	89	**87**	98	-0.33
FEF_{25-75}	L/s	3.68	**5.34**	145	1.64
PEFR	L/s	7.35	**9.07**	123	1.31
FET	sec		**6.33**		
FIF50	L/s		**4.48**		
FEF_{50} / FIF_{50}			**1.49**		
FEV.5	L	2.24	**3.31**	148	
Back Volume			**0.12**		



Visit 3 Follow up 11/2021

The FEV1/FVC, FEV1, FEF25-75%, and FVC are normal. The expiratory flow-volume curve is normal. Excellent technique and reproducibility.

Impression: Normal forced flows and lung volumes and these results are improved compared to last testing.

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Visit 3 Follow up 11/2021

ASSESSMENT/PLAN:

Severe persistent asthma
Allergic rhinitis
Difficulty coping
History of COVID-19

E is a 19-year-old with severe persistent asthma that is currently not well controlled.
Based on severity classification, adherence to therapy and control, continue fluticasone/salmeterol 500/50 diskus one inhalation BID and montelukast.

E will take rescue medication: albuterol before activity and PRN as per asthma care plan.
Albuterol MDI to be administered via a chamber and new one was dispensed today.
Continue cetirizine 10 mg PO once daily and fluticasone nasal spray two sprays per nostril once daily.
MSW, LCSW met with E to assess her mental health concerns, support her and provide care coordination.

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Visit 4 Follow up 12/2021

E reports today that she is doing better. In the interim since our visit last month, she has not had any fevers or upper respiratory tract infections. Currently she is using albuterol once a day for dyspnea and wheezing with a positive response. She last took albuterol this morning for symptoms triggered by jogging. She jogs around the block and plans to start working out at the gym. E denies cough, chest pain and chest tightness

PAST MEDICAL HISTORY:

ER/Hospitalizations: none since last visit, last course of prednisone/dexamethasone as per EPIC: 10/21/21

Physical Examination:

BP 118/58 (Site: LEFT ARM, Position: SITTING, Cuff Size: ADULT) | Pulse 77 | Temp 98.7 °F (37.1 °C) (Temporal) | Resp 26 | Ht 1.691 m (5' 6.58") | Wt 93 kg (205 lb 0.4 oz) | SpO2 98% | BMI 32.52 kg/m²

General appearance: alert, well appearing, cooperative, not in distress
Head and Face: normal
Eyes: normal without scleral icterus
Ears, Nose, Mouth and Throat: Ears: TMs normal Nose: no congestion, no secretions Mouth: no oral thrush
Neck: neck supple, no significant adenopathy
Respiratory: clear breath sounds with good air entry
Cardiovascular: heart rate and rhythm regular
Abdomen: soft, non-distended, non-tender with normal active bowel sounds
Extremities/ Lymph nodes: no clubbing, no cyanosis
Psych: interactive and normal, no obvious anxiety or depression

SPIROMETRY:

Normal FVC, FEV1, FEV1/FVC ratio, FEF25-75% and flow volume loop. Normal spirometry and these results are stable compared to last testing

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Visit 4 Follow up 12/2021

ASSESSMENT/PLAN:

Severe persistent asthma
Allergic rhinitis
History of COVID-19

E is a 19-year-old with severe asthma that has come under improved control.
Based on severity classification, adherence to therapy and control discontinue fluticasone/salmeterol and switch to budesonide/formoterol 160/4.5 mcg MDI 2 puffs BID SMART plan and continue montelukast10 mg PO once daily.

E will also take budesonide/formoterol 1-2 puffs before physical activity 1-2 puffs PRN Q six to four hours up to 12 puffs in 24 hours maximum. SMART: Single Maintenance and Reliever Therapy-see Asthma Management Guidelines: Focused Updates 2020-www.nhlbi.nih.gov
budesonide/formoterol MDI to be administered via a chamber.
Continue cetirizine 10 mg PO once daily and fluticasone nasal spray two sprays per nostril once daily.
CHOP cardiology evaluation (post COVID-19 with chest pain) scheduled for 12/20/21.
Recommended E get vaccinated with the COVID-19 vaccine booster next month.

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Visit 4 Follow up 12/2021

CHOP cardiology evaluation (post COVID-19 with chest pain)

HPI: Normal exercise tolerance and activity, no chest pain, syncope or palpitations. She denies any episodes of palpitations and symptoms during exercise. E had COVID in September 2021, for which she was admitted here at Children's Hospital of Philadelphia. She had worsening of her asthma during COVID, as well as chest pain. Since hospital discharge, E has had intermittent chest discomfort- yesterday she had one event associated with anxiety and being scared.

A complete cardiac evaluation revealed quiet precordium, with a normal S1 and S2, there are no clicks, gallops or murmurs and diastole is silent.

E was able to raise heart rate appropriately doing jumping jacks in the office

An electrocardiogram performed in the clinic today demonstrates normal sinus rhythm and sinus bradycardia rate 56

Normal cardiovascular evaluation

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Conclusions:

Questions/concerns about this patient:

- What do you think about her symptoms?
- What do you think about her asthma?
- What is the role of COVID-19?

Chart review revealed:

During the time she was lost to follow up, she was stepped up from a medium dose ICS to combination DPI.

According to the Epic medication dispense history (done at the time of post-hospital visit):

*04/07/21-10/20/21 fluticasone/salmeterol diskus 250/50 was only dispensed **ONCE** 05/05/21 and albuterol was dispensed **SEVEN** times.*

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Conclusion/Lessons learned:

- Don't overlook the asthma management basics
- Adherence
- Proper medication administration
- Patient education
- Barriers to care/medications
- Comorbid conditions/complications
- Smoking
- Transition from pediatric to adult care
- Mental health

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