

Inhaler Workshop

- Ruthann Kennedy, APRN-CNP
 - MSN, ACNP-BC
- Outpatient Pulmonary Clinic/Outpatient Care East
- Pulmonary Fibrosis Support Group Facilitator
- Tobacco Dependency Clinic/ Care Point East



I have no disclosures in regards to this presentation.

The mention of specific brand or trade names used in this presentation is for the sole purpose of providing education and in no way constitutes an endorsement.



Adults only

- Disclaimer #2
- I have no experience in the care of children, and this presentation applies to the care of the adult with respiratory conditions.



OBJECTIVES

▪ Participant will be able to understand inhaler pharmacology.

▪ Participant will be able to demonstrate correct use of various inhaler devices.

THE OHIO STATE UNIVERSITY

WEXNER MEDICAL CENTER

At a Glance

Respiratory Inhalers

Short-acting beta₂-agonist bronchodilators

Long-acting beta₂-agonist bronchodilators

Inhaled corticosteroids

Combination inhaled corticosteroid and long-acting beta₂-agonist

Combination inhaled anticholinergic and long-acting beta₂-agonist

Biologics

Short-acting beta₂-agonist bronchodilators

Long-acting beta₂-agonist bronchodilators

Inhaled corticosteroids

Combination inhaled corticosteroid and long-acting beta₂-agonist

Combination inhaled anticholinergic and long-acting beta₂-agonist

Biologics

THE OHIO STATE UNIVERSITY

WEXNER MEDICAL CENTER

At a Glance

Respiratory Treatments

Short-acting beta₂-agonist bronchodilators

Long-acting beta₂-agonist bronchodilators

Inhaled corticosteroids

Combination inhaled corticosteroid and long-acting beta₂-agonist

Combination inhaled anticholinergic and long-acting beta₂-agonist

Biologics

Oral corticosteroids

Oral phosphodiesterase-4 inhibitors

Oral leukotriene receptor antagonists

Oral mucolytics

Oral antibiotics

Oral antifungals

Oral antivirals

Oral immunosuppressants

Oral antidiabetics

Oral antihypertensives

Oral anticholinergics

Oral antacids

Oral laxatives

Oral diuretics

Oral electrolyte supplements

Oral vitamins

Oral minerals

Oral trace elements

Oral essential fatty acids

Oral omega-3 fatty acids

Oral omega-6 fatty acids

Oral omega-9 fatty acids

Oral omega-11 fatty acids

Oral omega-12 fatty acids

Oral omega-13 fatty acids

Oral omega-14 fatty acids

Oral omega-15 fatty acids

Oral omega-16 fatty acids

Oral omega-17 fatty acids

Oral omega-18 fatty acids

Oral omega-19 fatty acids

Oral omega-20 fatty acids

Oral omega-21 fatty acids

Oral omega-22 fatty acids

Oral omega-23 fatty acids

Oral omega-24 fatty acids

Oral omega-25 fatty acids

Oral omega-26 fatty acids

Oral omega-27 fatty acids

Oral omega-28 fatty acids

Oral omega-29 fatty acids

Oral omega-30 fatty acids

Oral omega-31 fatty acids

Oral omega-32 fatty acids

Oral omega-33 fatty acids

Oral omega-34 fatty acids

Oral omega-35 fatty acids

Oral omega-36 fatty acids

Oral omega-37 fatty acids

Oral omega-38 fatty acids

Oral omega-39 fatty acids

Oral omega-40 fatty acids

Oral omega-41 fatty acids

Oral omega-42 fatty acids

Oral omega-43 fatty acids

Oral omega-44 fatty acids

Oral omega-45 fatty acids

Oral omega-46 fatty acids

Oral omega-47 fatty acids

Oral omega-48 fatty acids

Oral omega-49 fatty acids

Oral omega-50 fatty acids

Oral omega-51 fatty acids

Oral omega-52 fatty acids

Oral omega-53 fatty acids

Oral omega-54 fatty acids

Oral omega-55 fatty acids

Oral omega-56 fatty acids

Oral omega-57 fatty acids

Oral omega-58 fatty acids

Oral omega-59 fatty acids

Oral omega-60 fatty acids

Oral omega-61 fatty acids

Oral omega-62 fatty acids

Oral omega-63 fatty acids

Oral omega-64 fatty acids

Oral omega-65 fatty acids

Oral omega-66 fatty acids

Oral omega-67 fatty acids

Oral omega-68 fatty acids

Oral omega-69 fatty acids

Oral omega-70 fatty acids

Oral omega-71 fatty acids

Oral omega-72 fatty acids

Oral omega-73 fatty acids

Oral omega-74 fatty acids

Oral omega-75 fatty acids

Oral omega-76 fatty acids

Oral omega-77 fatty acids

Oral omega-78 fatty acids

Oral omega-79 fatty acids

Oral omega-80 fatty acids

Oral omega-81 fatty acids

Oral omega-82 fatty acids

Oral omega-83 fatty acids

Oral omega-84 fatty acids

Oral omega-85 fatty acids

Oral omega-86 fatty acids

Oral omega-87 fatty acids

Oral omega-88 fatty acids

Oral omega-89 fatty acids

Oral omega-90 fatty acids

Oral omega-91 fatty acids

Oral omega-92 fatty acids

Oral omega-93 fatty acids

Oral omega-94 fatty acids

Oral omega-95 fatty acids

Oral omega-96 fatty acids

Oral omega-97 fatty acids

Oral omega-98 fatty acids

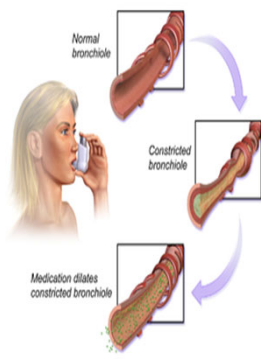
Oral omega-99 fatty acids

Oral omega-100 fatty acids

THE OHIO STATE UNIVERSITY

WEXNER MEDICAL CENTER

2




Normal bronchiole

Constricted bronchiole

Medication dilates constricted bronchiole


Short acting beta agonists (SABA)

- Mechanism of Action
- Bronchodilation
 - due to the relaxation of the B-2 adrenergic agonists receptors.




Definitions

- Beta 1 – these receptors are on the heart muscle
- Beta 2 – these receptors are on the bronchial smooth muscles.
- Adrenergic – nerve cells that have epinephrine or norepinephrine as a neurotransmitter.
- Agonist- substance that initiates a response when combined with a receptor



History of Bronchodilator Use

- Chinese used bronchodilators > 5000 years ago
- 1903 – James Burnett first used a bronchodilator with a reported improvement in asthma
- Adrenaline & Isoproterenol
 - UNSELECTIVE Beta Agonists
- 1960s Beta 2 Agonists were developed by modifying epinephrine - Fenoterol, salbutamol and terbutaline



Examples of short acting Beta 2 agonist inhalers

- Albuterol – generic name
- ProAir, Ventolin, or Proventil- common trade names



THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Albuterol dosing

- 1-2 puffs every 4-6 hours as needed

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Combivent



THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Combivent dosing

- MDI – 1- 2 puffs every 4-6 hours as needed
- Respimat **one puff 4 times per day**

Focus on inhaler instruction

- Patient teaching
 - Have the patient demonstrate inhaler use during your visit
 - Practice correct use
 - Consider spacer

MDI's 60th Birthday – 2016



Long Acting Beta 2 Agonists

- Mechanism of action
- LABA: Similar to the short acting beta agonists, but by adding a long lipophilic side chain, the active part of the molecule can attach repeatedly to the site of the beta receptors.

Smart Study 2003

- Single use of LABA **ONLY** is contraindicated
- Inhaled corticosteroids plus LABA are recommended
 - Coming soon in this lecture!
- These agents are commonly combined with other agents, like inhaled steroids or anticholinergics.

Using LABAs alone to treat asthma without an ICS to treat lung inflammation is associated with an increased risk of asthma-related death. Therefore, the **Boxed Warning** stating this will remain in the labels of all single-ingredient LABA medicines, which are approved to treat asthma, chronic obstructive pulmonary disease (COPD), and wheezing caused by exercise.

Source: U.S. Food & Drug Administration, Safety Announcement, 12-20-2017

Common LABA Medications



THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

LABA Dosing

- Use in combination with ICS or LAMA
- Serevent – 1 puff twice per day
- Striverdi – 2 puffs once per day

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Inhaled Corticosteroids

- Mechanism of Action:
- Reduce muscle spasm in the airway by suppressing inflammation.
- Additional actions include reversing mucosa swelling and reducing mucus secretions.

• Source Ann Allergy. 1987 Jan; 58 (1): 1-6

History of Inhaled Steroid Use

- 1936 Mayo clinic – extracted cortisone from adrenal glands
- 1956 - First controlled study with systemic steroid use
- 1960s first inhaled steroid – Beclomethasone
- 1970s Beclomethasone was initiated to hospitalized patients, so that side effects could be monitored.

ICS MECHANISM of ACTION

- Mechanism of Action:
- Reduce muscle spasm in the airway by suppressing inflammation.
- Additional actions include reversing mucosa swelling and reducing mucus secretions.

• Source Ann Allergy, 1987 Jan; 58 (1): 1-6

Examples of Inhaled Steroids

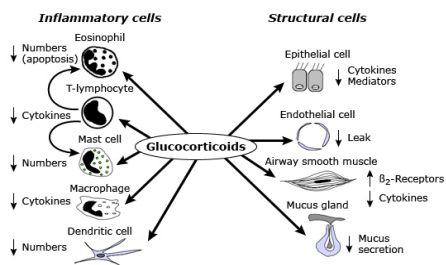


ICS dosing

- Flovent diskus – 1 puff twice per day
- Asmanex – 1-2 puffs once or twice per day
- Arnuity – 1 puff each day

Cellular effects of Glucocorticoids

Source UpToDate –graphic 78772 Version 2.0, 2018



Possible side effects with ICS

- Voice changes – dysphonia
- Topical candidiasis
 - Rinse and spit protocol
- Cataracts
- Potential for glaucoma
 - Regular eye exam
- Increased risk for osteopenia/osteoporosis
 - DEXA

Anticholinergic Medications

▪ AKA – Muscarinic Antagonists

▪ Mechanism of Action:

- The airway is innervated by the Vagal Nerve.
- Bronchoconstriction occurs with an increase in parasympathetic action
 - The transmitter is acetylcholine
- There are 2 receptors: nicotinic and muscarinic

Definitions

- Anticholinergics are also known as muscarinic antagonists.
- When the muscarinic receptor is blocked, the result is relaxation of the muscles in the airway

History of Anticholinergic Medications

- Belladonna – anticholinergic alkaloid (atropine)
- Used thousands of years ago in India
- British colonists – early 19th century
- 1859 Atropine was used to prevent a severe asthma attack
 - INJECTED DIRECTLY INTO THE VAGUS NERVE
- 20th Century- Atropine use declined with the development of epinephrine and ephedrine

Belladonna Plant

- Native plant in parts of Europe and Asia, known as deadly nightshade. Possibly used to kill Juliet?



THE OHIO STATE UNIVERSITY
WEAVER MEDICAL CENTER

Synthetic Derivatives of Atropine

- Ipratropium – the most studied anticholinergic
- Tiotropium – the first long acting inhaled anticholinergic

THE OHIO STATE UNIVERSITY
WEAVER MEDICAL CENTER

Long Acting Muscarinic Agents (LAMA)

- Mechanism of action:
 - antagonizes the effect of acetylcholine, the main neurotransmitter of the parasympathetic nervous system of the airways.
 - competitively and reversibly attaches to M3 receptors, which results in relaxation of the bronchial smooth muscle and bronchodilation


Common Long Acting Muscarinic Agents (LAMA)





LAMA dosing

- Spiriva respimat – 2 puffs daily
- Incruse – 1 puff daily
- Tudorza – 1 puff twice per day



COMBINATION INHALERS

- Inhaled steroid & long acting beta2 agonist (LABA)





COMBINATION ICS and LABA

- Mechanism of Action:
- ICS-Reduce muscle spasm in the airway by suppressing inflammation.
- LABA-Similar to the short acting beta agonists, but by adding a long lipophilic side chain, the active part of the molecule can attach repeatedly to the site of the beta receptors.

ICS/LABA dosing

- Advair diskus – 1 puff twice per day
- Symbicort – 2 puffs twice per day
- Remember to rinse and spit following ICS use!

Combination Inhalers

- New editions of Inhaled steroid and LABA



More ICS/LABA dosing

- Dulera – 2 puffs twice each day
- Breo – 1 puff daily

Combination Inhalers 2.0

- Combined LAMA (anticholinergic or long acting muscarinic agent) and LABA



Combination Effect of LAMA + LABA

- Mechanism of Action:
- LAMA:
 - Antagonizes the effect of acetylcholine, the main neurotransmitter of the parasympathetic nervous system of the airways competitively and reversibly attaches to the M3 receptors, which results in relaxation of the bronchial smooth muscle and broncho dilatation
- LABA:
 - With the addition of a long lipophilic side chain, the active part of the molecule can attach over and over again to the site of the beta receptors.

LAMA/LABA dosing

- Anoro – 1 puff daily
- Stiolto – 2 puffs daily
- Bevespi – 2 puffs twice per day

The TOTAL COMBINATION INHALER

- TRELEGY



Trelegy dosing

- ONE PUFF ONCE EVERY DAY DELIVERS ICS/LAMA/LABA


Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management and prevention of COPD. *Global Initiative for Chronic Obstructive Lung Disease. 2017.*

 THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

GOLD GUIDELINES 2017

▪ Evidence based treatment plan:

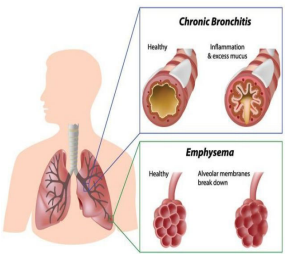
- Step 1: $FEV_1/FVC < 70\%$
- Step 2: Determine obstruction
 - GOLD 1: Mild ($FEV_1 \geq 80\%$ predicted)
 - GOLD 2: Moderate ($50\% \text{ predicted} \leq FEV_1 < 80\% \text{ predicted}$)
 - GOLD 3: Severe ($30\% \text{ predicted} \leq FEV_1 < 50\% \text{ predicted}$)
 - GOLD 4: Very severe ($FEV_1 < 30\% \text{ predicted}$)


 THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Chronic Obstructive Pulmonary Disease (COPD)


COPD is a mixture of conditions:

- Emphysema
- Chronic bronchitis
- and/or
- Broncho-spastic airway disease



 THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

	Pre-Bronch				
	Pred	LLN	ULN	Actual	% Pred
---- SPIROMETRY ----					
FVC (L)	3.40	2.84	3.96	*2.55	*74
FEV1 (L)	2.65	2.21	3.09	*1.58	*59
FEV1/FVC (%)	79	66	92	*62	*78
FEV1/SVC (%)	78	65	91	*62	*79
FEF 25-75% (L/sec)	2.50	2.09	2.91	*0.77	*30
FEF 25% (L/sec)	5.43	4.53	6.33	*3.41	*62
FEF 50% (L/sec)				0.97	
FEF 75% (L/sec)	1.23	1.03	1.43	*0.30	*24
FEF Max (L/sec)	6.47	5.40	7.54	*4.06	*62
FIF 50% (L/sec)	3.37	2.81	3.93	3.63	107
FEF50%/FIF50% (%)	90-100	79	119	27	


 THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

GOLD STAGE

- What is the GOLD stage?
- What is the recommended treatment?

 THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

The ABCDs of the GOLD Guidelines		
A	Less symptomatic Mild or infrequent symptoms (ie, breathless with strenuous exercise or when hurrying on level ground or walking up a slight hill) or CAT <10	Recommendation: Short-acting bronchodilator or combination of short-acting beta-agonist and anticholinergic, as needed. Alternative: Long-acting bronchodilator if beneficial.
B	More symptomatic Moderate to severe symptoms (ie, patient has to walk more slowly than others of same age due to breathlessness, has to stop to catch breath when walking on level ground at own pace, or has more severe breathlessness) or CAT ≥10	First choice: Regular treatment with a long-acting bronchodilator, either LABA or LAMA, based on symptom relief. Short-acting bronchodilator available for symptom control as needed. For persistent symptoms: Regular treatment with a combination of LABA and LAMA.
C	Less symptomatic Mild or infrequent symptoms (ie, breathless with strenuous exercise or when hurrying on level ground or walking up a slight hill) or CAT <10	First choice: Regular treatment with a LABA; SABA available for symptom control as needed. For further exacerbations: Regular treatment with a LABA plus LABA OR (less preferred) LABA plus ICS.
D	More symptomatic Moderate to severe symptoms (ie, patient has to walk slower than others of same age due to breathlessness, has to stop to catch breath when walking on level ground at own pace, or has more severe breathlessness) or CAT ≥10	First choice: Regular treatment with combination LABA plus LABA; LABA plus inhaled glucocorticoid may be preferred, if features of asthma/COPD overlap. SABA available for symptom control as needed. LABA alone, if LABA contraindicated. For further exacerbations: Regular treatment with combination of LABA plus LABA plus ICS OR (less preferred in absence of asthma overlap) switch to LABA plus ICS. If exacerbations continue despite triple therapy, additional options for selected patients include roflumilast (if chronic bronchitis and FEV1 <50% predicted), theophylline, chronic therapy with a macrolide, and stopping inhaled glucocorticoids. Refer to UpToDate topic on the management of asthma/COPD.

 THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

COPD

- Short acting Beta Agonists
- Long Acting Muscarinic Agents (LAMA)
- LAMA/LABA
- ICS or ICS/LABA

Example treatment plan for COPD

- Albuterol
- Spiriva or
- Stiolto
- Or
- Albuterol
- Incruse or
- Anoro

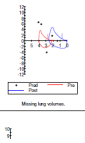
Example of COPD Treatment Plan

- The patient has symptoms while taking albuterol and Anoro.
- What is the next approach?
- Add an inhaled steroid

What is the interpretation of this spirometry?

--- SPM/CMTRY ---	Pre-Bronch			Post-Bronch				
	Pred	LINLUN	Actual	Pred	Actual	Pred < Chng		
FVC (L)	3.07	2.56	3.58	+2.19	+7.1	2.63	85	+20
FEV ₁ (L)	2.59	2.16	3.02	+1.35	+5.2	+1.94	+74	+43
FEV ₁ /FVC (%)	85	71	99	+62	+72	74	86	+39
FEV _{50%} /FVC (%)	84	70	98	+58	+68			
FEF _{25-75%} (L/sec)	3.02	2.52	3.52	+1.08	+19	+2.12	+70	+264
FEF _{50%} (L/sec)	5.91	4.93	6.93	+1.02	+17	+2.17	+79	+279
FEF _{50%} (L/sec)				0.85	2.42			+184
FEF _{75%} (L/sec)	1.77	1.48	2.06	+1.22	+12	+1.04	+56	+776
FEF _{75%} (L/sec)	6.63	5.62	7.72	+1.10	+22	+2.22	+77	+279
FEF _{75%} (L/sec)	4.12	3.44	4.80	+2.62	+63	+2.72	+64	+1
FEF _{50%/FVC} (%)	90-100	79	119	32	91			+129

Mean lung volume, ml



Asthma

- Medical Decision Making
- Listen to the patient's history of present illness
- How severe are the symptoms?
- How often do the symptoms occur?

Classifying asthma severity and initiating treatment in youths greater than or equal to 12 years of age and adults

12 months or older and not pregnant		Classification of asthma severity (≥ 12 years of age)			
Components of severity		Intermittent	Mild	Persistent	Severe
Intermittent Nocturnal symptoms less than 2 times per week No day or night awakenings due to asthma No need for rescue inhaler No oral corticosteroids No limitation of daily activities	Symptoms Nocturnal awakenings less than 2 times per week No day or night awakenings due to asthma No need for rescue inhaler No oral corticosteroids No limitation of daily activities	≤ 2 day/week Nocturnal awakenings less than 2 times per week No day or night awakenings due to asthma No need for rescue inhaler No oral corticosteroids No limitation of daily activities	≤ 2 day/week Nocturnal awakenings less than 2 times per week No day or night awakenings due to asthma No need for rescue inhaler No oral corticosteroids No limitation of daily activities	Daily Nocturnal awakenings more than 2 times per week Day or night awakenings due to asthma Need for rescue inhaler Oral corticosteroids No limitation of daily activities	Throughout the day Nocturnal awakenings more than 2 times per week Day or night awakenings due to asthma Need for rescue inhaler Oral corticosteroids Limitation of daily activities
		None	Mild limitation	Some limitation	Extensively
		• Normal FEV ₁ • Normal spirometry • Normal methacholine challenge • FEV ₁ > 80% predicted • FEV ₁ > 80% predicted • FEV ₁ > 80% predicted	• FEV ₁ > 80% predicted • Normal spirometry • Normal methacholine challenge • FEV ₁ > 80% predicted • FEV ₁ > 80% predicted • FEV ₁ > 80% predicted	• FEV ₁ > 80% predicted • Normal spirometry • Normal methacholine challenge • FEV ₁ > 80% predicted • FEV ₁ > 80% predicted • FEV ₁ > 80% predicted	• FEV ₁ > 80% predicted • Normal spirometry • Normal methacholine challenge • FEV ₁ > 80% predicted • FEV ₁ > 80% predicted • FEV ₁ > 80% predicted
Risk	Exacerbations requiring systemic corticosteroids and/or hospitalization or death	Low 1-2/year	Low 3-4/year	Moderate 5-6/year	High 7-8/year
		Consider severity and intermittent but not concentration	Consider severity and intermittent but not concentration	Consider severity and intermittent but not concentration	Consider severity and intermittent but not concentration
		Lowest severity Lowest concentration	Lowest severity Lowest concentration	Lowest severity Lowest concentration	Lowest severity Lowest concentration
Recommendation	Recommended step for initiating	Step 1	Step 2	Step 3	Step 4 or 5
		See box 10 in research, available below	See box 10 in research, available below	See box 10 in research, available below	See box 10 in research, available below

Assessing severity and initiating treatment for patients who are not currently taking long-term control medication. The following is a clinical, not research, classification of asthma severity-making required to meet individual patient needs. Level of severity is determined by the number of days per year that symptoms occur, the frequency of symptoms, the recall of previous two to four weeks and spirometry. Assign severity to the most severe category in which the patient meets the criteria. Patients may have periods of stability and periods with different levels of asthma severity. In general, more frequent and intense exacerbations (e.g., symptoms not controlled on low-dose therapy) indicate more severe disease. Patients with severe exacerbations, frequent hospitalizations, or frequent use of oral corticosteroids require long-term treatment with high-dose inhaled corticosteroids and systemic glucocorticosteroids in the past year may be considered the same as patients with severe exacerbations. **Severity categories:** Mild intermittent asthma: symptoms occur ≤ 2 days per week, ≤ 2 exacerbations per year, forced expiratory volume in one second (FEV₁) forced vital capacity (FVC), nocturnal awakenings ≤ 2 per month. Moderate intermittent asthma: symptoms occur ≤ 4 days per week, ≤ 4 exacerbations per year, FEV₁, FVC, nocturnal awakenings ≤ 4 per month. Mild persistent asthma: symptoms occur ≥ 2 days per week, ≥ 2 exacerbations per year, FEV₁, FVC, nocturnal awakenings ≥ 2 per month. Moderate persistent asthma: symptoms occur ≥ 4 days per week, ≥ 4 exacerbations per year, FEV₁, FVC, nocturnal awakenings ≥ 4 per month. Severe persistent asthma: symptoms occur ≥ 7 days per week, ≥ 7 exacerbations per year, FEV₁, FVC, nocturnal awakenings ≥ 7 per month.

GINA
GUIDELINES

■ GLOBAL

■ INITIATIVE FOR

■ ASTHMA

A simplified perspective for treatment of obstructive lung diseases

■ COPD

→ → →

LAMA

LABA

ICS

← ← ←

■ ASTHMA

Asthma – GINA Guidelines

Intermittent asthma

Persistent asthma: Daily medication

Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3.

Step 1

Preferred: SABA PRN

Alternative: Cromolyn*, LTRA, or theophylline

Step 2

Preferred: Low-dose inhaled glucocorticoids

Alternative: Cromolyn*, LTRA, or theophylline

Step 3

Preferred: Low-dose inhaled glucocorticoids + LABA

OR

Alternative: Medium-dose inhaled glucocorticoids

Step 4

Preferred: Medium-dose inhaled glucocorticoids + LABA

AND

Alternative: Medium-dose inhaled glucocorticoids + either LTRA, theophylline, or albuterol

Step 5

Preferred: High-dose inhaled glucocorticoids + LABA

AND

Consider omalizumab for patients who have allergies

Step 6

Preferred: High-dose inhaled glucocorticoids + LABA + oral systemic glucocorticoids

AND

Consider omalizumab for patients who have allergies

Step up if needed (first, check adherence, environmental control, and comorbid conditions)

Assess control

Step down if possible (and asthma is well-controlled at least three months)

Each step: Patient education, environmental control, and management of comorbidities. Steps 2 to 4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma (see footnotes).

Quick-relief medication for all patients: * SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: Up to three treatments at 20-minute intervals as needed. Short course of oral systemic glucocorticoids may be needed. * Use of SABA > 2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and the need to step up treatment.

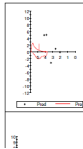
20

Treatment plan for this patient

- SABA
- ICS or ICS/LABA
- LAMA?

Case Study #1

--- SPECTROMETRY ---	Pre-Bronch		Post-Bronch	
	Prod	LIN/LIN	Actual % Prod	Actual % Change
FEV ₁ (L)	2.41	2.01 2.81	2.18	90
FEV ₁ /FVC (%)	1.88	1.57 2.19	+1.11	+58
FEV ₁ /FVC (L)	78	65 91	+51	+55
FEV ₁ /SVC (%)	78	65 91	+51	+65
FEF 25-75% (L/sec)	1.81	1.51 2.11	+0.39	+21
FEF 25% (L/sec)	5.11	4.27 5.95	+1.35	+26
FEF 50% (L/sec)			0.47	
FEF 75% (L/sec)			+0.19	+19
FEF Max (L/sec)	5.09	4.25 5.93	+1.03	+60
FEF 50% (L/sec)	3.09	2.58 3.60	+1.92	+62
FEF50%/FEF50% (%)	90.100	79 119	25	




Case study #1

- Impression
 - Gold Stage II
 - Treatment
 - Incruse and Advair
 - Is this appropriate?

Case Study #2


- Pulmonary Function Test 3/8/2018
 - FVC-Pre 3.43 L
 - FVC-%Pred-Pre 75 %
 - FEV1/FVC-Pre 53%
 - FEV1-%Pred-Pre 53 %
 - FEV1-Pre 1.83 L



THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Case Study #2 interpretation

- Gold Stage
- Treatment
- Personalized treatment plan




THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Case Study #3

--- SPIROMETRY ---	Pred	Pre-Bronch			Post-Bronch		
		LIN	ULN	%Pred	Actual	%Pred	%Chng
FVC (L)	3.07	2.56	3.58	+2.19	*71	2.63	85 +20
FEV1 (L)	2.59	2.16	3.02	+1.35	*52	*1.94	*74 +43
FEV1/FVC (%)	85	71	99	+62	*72	74	86 +19
FEV1/SVC (%)	84	70	98	+58	*68		
FRF 25-75% (L/sec)	3.02	2.52	3.52	+0.58	*19	*2.12	*70 +264
FRF 25% (L/sec)	5.91	4.93	6.89	+2.22	*37	*4.68	*79 +110
FRF 50% (L/sec)				0.85		2.42	+184
FRF 75% (L/sec)	1.77	1.48	2.06	+0.22	*12	*1.04	+576
FRF Max (L/sec)	6.63	5.54	7.72	+3.64	*54	*4.72	*71 +29
FRF 50% (L/sec)	4.12	3.44	4.80	+2.62	*63	*2.67	*64 +1
FRF 50%/FRF 50% (%)	90/100	79	119	32		91	+179





THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Interpretation of Case Study #3?

- Interpretation: spirometry has positive post bronchodilator response, consistent with Asthma
- Stage or Class: Depends on the symptoms
- Treatment: SABA, ICS

Additional Pharmacologic Agents to consider

It's not always just about the inhalers

Considerations when inhalers alone are ineffective

- Daliresp
- Azithromycin
- Prednisone
- Theophylline
- NAC

A WORD OF CAUTION

- There are several different delivery devices for inhaled medications
- RespiMat is the name of the device, not the medication
- Other examples are the Ellipta Device, the MDI, Twisthaler
- HFA?? This is the propellant: Hydrofluoroalkane. This replaced CFC.

Metered Dose Inhaler

- Remove the cap – check mouthpiece
- Shake the inhaler
- Blow out from your lungs
- Place mouthpiece between the lips
- Press the canister and inhaler slowly
- Use of a spacer

Diskus

- Hold horizontally
- Slide open the diskus
- Blow out air from your lungs (so not blow into the device)
- Place lips around the mouthpiece
- Take in a deep breath

Ellipta

- Slide open the cover
- Blow air out of the lungs
- Place lips onto mouthpiece
- Take in a deep breath

Respimat

- TWIST
- OPEN
- PRESS
- T O P

Questions?

Thank you
