

Fear the Flow: COPD and Asthma in the Hospitalized Patient

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Disclosures

- I have no relevant financial relationships to disclose.

Learning Objectives:

At the conclusion of this session, participants should be able to:

1. Recognize the complexity of COPD and asthma and the morbidity and mortality associated with decompensated disease.
2. Determine the appropriate diagnostics and testing that may be necessary for hospitalized patients with COPD and asthma exacerbations.
3. Employ knowledge of various methods of measuring and delivering oxygen.
4. Distinguish the need for certain treatment options including but not limited to systemic steroids, inhaled anticholinergics, beta agonists, glucocorticoids, antibiotics, and other adjunctive therapies.
5. Assess severity of illness and determine when patients may need a higher level of care.

Quick Facts: Asthma and COPD

- **COPD** affects > 5% of the population
 - 4th leading cause of death in the US
- **Asthma** affects 1-18% of the population

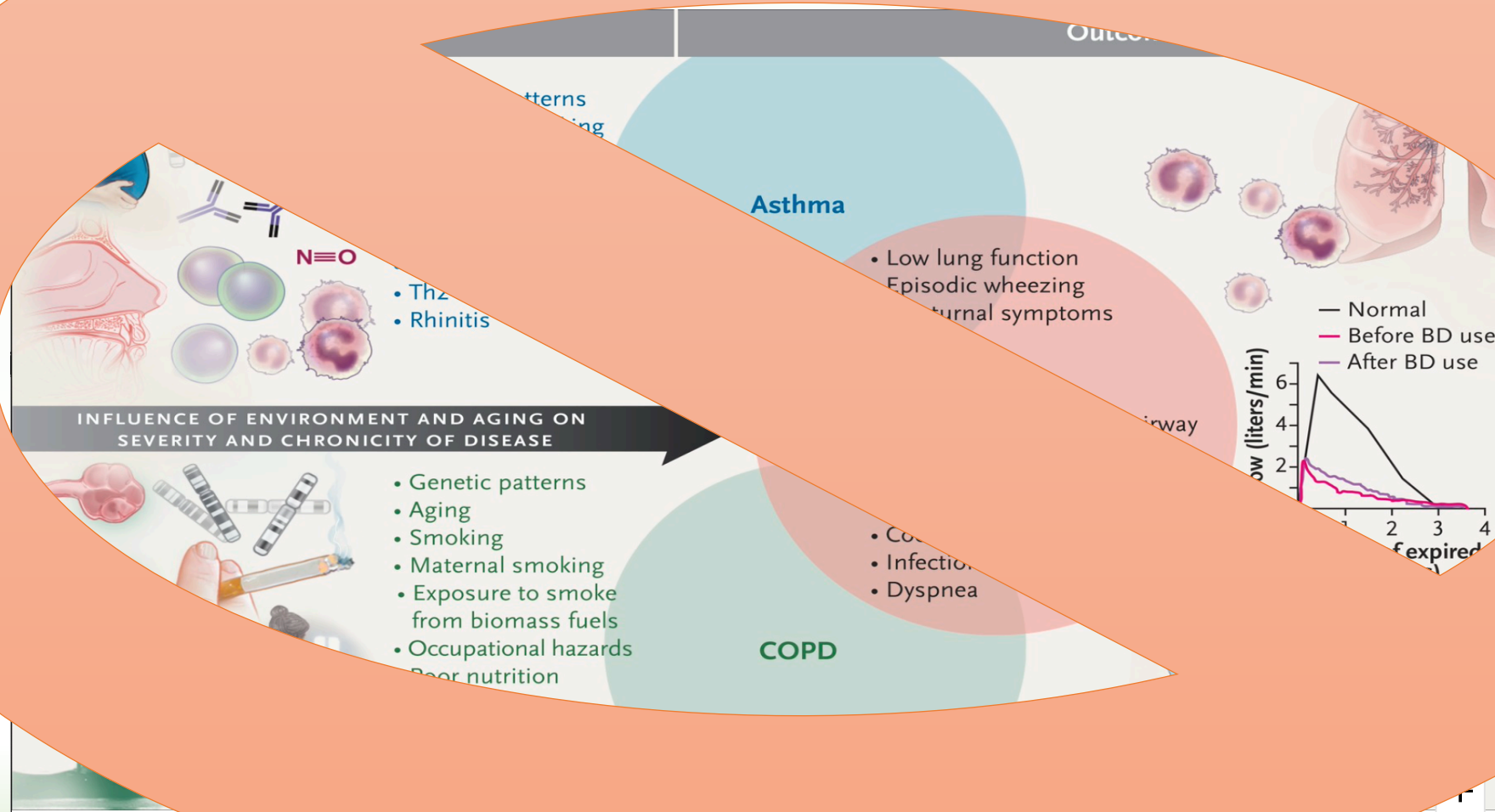


GLOBAL INITIATIVE FOR
CHRONIC OBSTRUCTIVE
LUNG DISEASE



GLOBAL INITIATIVE
FOR ASTHMA

Asthma





Case #1 Mr. Daniels

- 63 YO M with 'difficulty breathing and chest tightness'
- **PMHx:**
 - COPD, diagnosed 10 years ago
- **Meds:**
 - Fluticasone/vilanterol 25mcg/100mcg 1 puff inhaled daily
 - Albuterol 2.5mg nebulized q4 hours prn SOB or wheezing
- **VS:**
 - BP 162/86 mmHg
 - HR 102 bpm
 - RR 26 br/min
 - T 98.8 F
 - SpO2 78% on room air



Mr. Daniels HPI

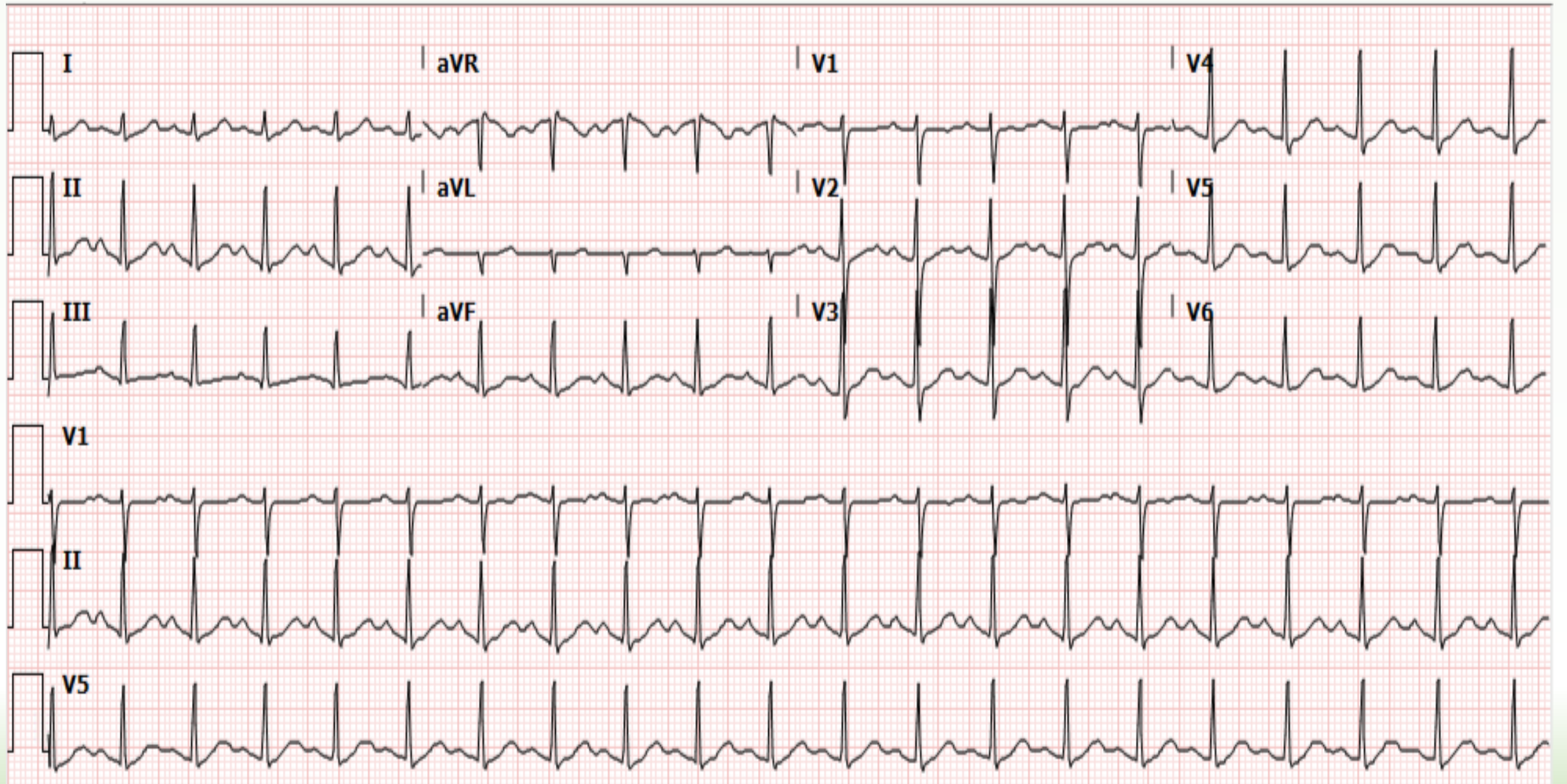
- Chest tightness x3 days
- Difficulty breathing x5 days, but worse today
- Cough seems to have increased some according to his wife, sputum is thicker and more yellow-colored
- Saw PCP 4 days ago, was given albuterol nebulizer which he has been using sparingly with no improvement
- Current smoker with 40 pack-year history
- Last FEV1 was 60% predicted 3 years ago
- Hospitalized once for an exacerbation about 8 years ago



Mr. Daniels Physical Exam

- **Gen:** Thin-appearing elderly gentleman sitting upright in bed and leaning over with his hands on his knees
- **CV:** Tachycardic, regular rhythm, no m/r/g, distal pulses 2+, no peripheral edema
- **Lungs:** Tachypneic, diffuse end-expiratory wheezing, prolonged expiratory phase, paradoxical abdominal movement with breathing, no retractions or accessory muscle use, no rales/rhonchi
- **Abdomen:** BS present, non-tender to palpation, no rebound/rigidity/guarding
- **Extremities:** Muscular atrophy noted, scattered ecchymoses
- **Skin:** Diaphoretic, slight purplish discoloration in hands and feet, no clubbing
- **Neuro:** Alert and oriented x3







Mr. Daniels
ABG

Value	Measure	Normal Range
pH	7.23	7.25-7.35
pCO ₂	58 mmHg	35-45 mmHg
pO ₂	66 mmHg	80-110 mmHg
HCO ₃	28 mmHg	21-28 mmHg



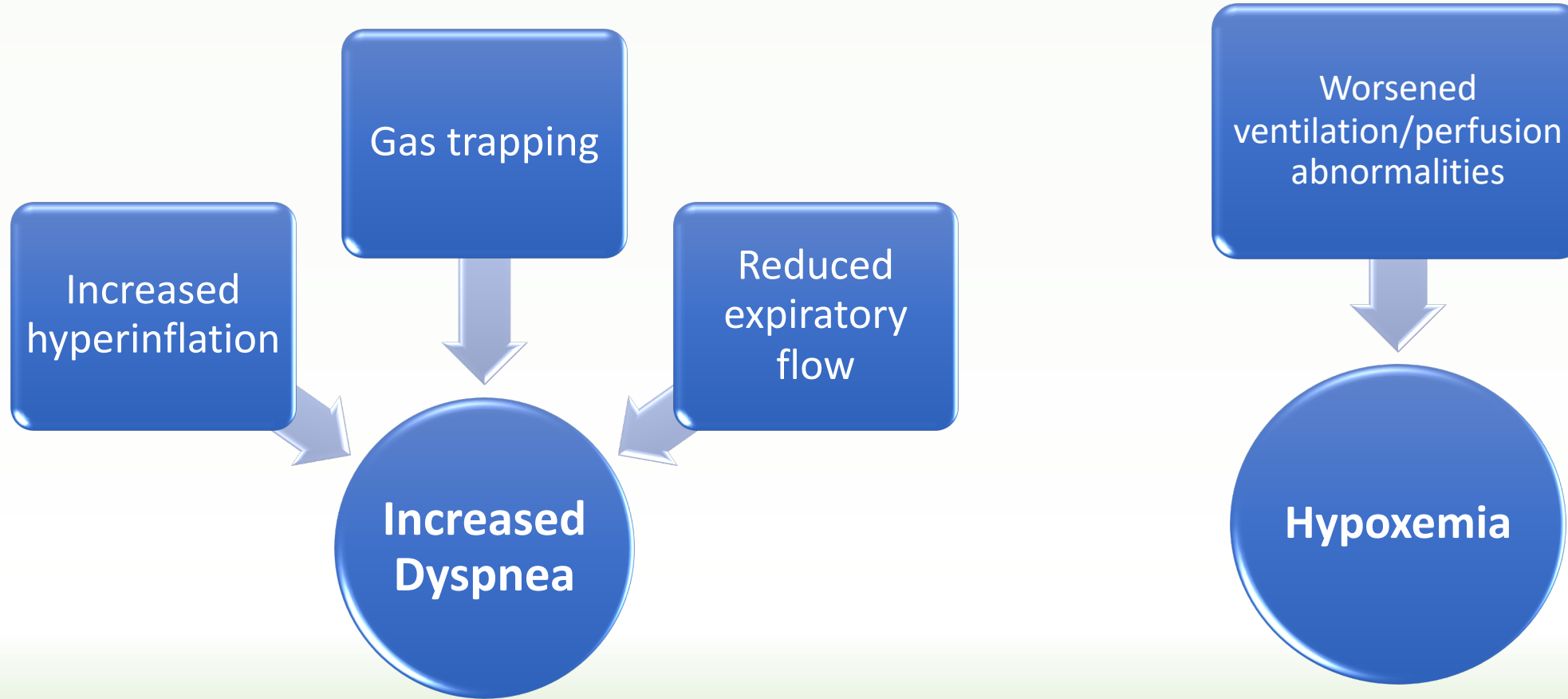
Mr. Daniels
Labs & Diagnostics

- CXR → hyperinflated lungs; no infiltrate, effusion, or pneumothorax
- ECG → sinus tachycardia; no ischemic ST-T changes
- ABG → acute respiratory acidosis, acute hypoxic hypercarbic respiratory failure
- CBC → unremarkable
- Troponins → 0.01 x3
- D dimer → < 500 ng/mL
- Rapid Influenza A/B PCR → negative
- Viral PCR → positive for *human rhinovirus*
- COVID-19 PCR → negative
- Sputum culture → pending

COPD Exacerbation

- **GOLD Definition:** “An acute event characterized by a worsening of the patient's respiratory symptoms that is beyond normal day-to-day variations and leads to a change in medication”
- Clinically, an **acute change** in one or more of the following cardinal symptoms:
 - Cough – increased frequency and severity
 - Sputum production – increased volume production and/or changes character
 - Dyspnea – increased

COPD Exacerbation



COPD Exacerbation Differential Diagnosis

- Pulmonary embolism
- Acute respiratory distress syndrome
- Pneumonia
- Pleural effusion
- Pneumothorax
- Decompensated Heart Failure/Pulmonary edema
- Cardiac arrhythmia

COPD Exacerbation Causes

- Viral = 1/3 – 2/3
 - **Rhinoviruses**
 - Influenza
 - Parainfluenza
 - Coronavirus
 - RSV
 - Human metapneumovirus
- Bacterial = 1/3 – 1/2
 - *H. influenza (13-50%)*
 - *M. catarrhalis*
 - *Strep pneumoniae*
 - *Pseudomonas aeruginosa*
 - *Enterobacteriaceae*

70-80% due to infections

Assessment of Airflow Limitation

Classification of Airflow Limitation Severity in COPD (Based on post-bronchodilator FEV₁)

In patients with FEV₁/FVC < 70:

GOLD 1	Mild	FEV ₁ ≥ 80% predicted
GOLD 2	Moderate	50% ≤ FEV ₁ < 80% predicted
GOLD 3	Severe	30% ≤ FEV ₁ < 50% predicted
GOLD 4	Very Severe	FEV ₁ < 30% predicted

FEV₁ alone lacks precision to be used as a predictor of exacerbation!

Assessment of Symptoms

Modified MRC (British Medical Research Council) Dyspnea Scale

mMRC Grade 0	I only get breathless with strenuous exercise.
mMRC Grade 1	I get short of breath when hurrying on the level or walking up a slight hill.
mMRC Grade 2	I walk slower than people of the same age on the level because of breathlessness, or I have to stop for breath when walking at my own pace on the level.
mMRC Grade 3	I stop for breath after walking about 100 meters or after a few minutes on the level.
mMRC Grade 4	I am too breathless to leave the house or I am breathless when dressing or undressing.

Assessment of Symptoms

CAT™ Assessment (COPD Assessment Test)

I never cough	0	1	2	3	4	5	I cough all the time
I have no phlegm in my chest at all	0	1	2	3	4	5	My chest is completely full of phlegm
My chest does not feel tight at all	0	1	2	3	4	5	My chest feels very tight
When I walk up a hill or one flight of stairs I am not breathless	0	1	2	3	4	5	When I walk up a hill or one flight of stairs I am very breathless
I am not limited by doing any activities at home	0	1	2	3	4	5	I am very limited doing activities at home
I am confident leaving home despite my lung condition	0	1	2	3	4	5	I am not at all confident leaving my home because of my lung condition
I sleep soundly	0	1	2	3	4	5	I don't sleep soundly because of my lung condition
I have lots of energy	0	1	2	3	4	5	I have no energy at all

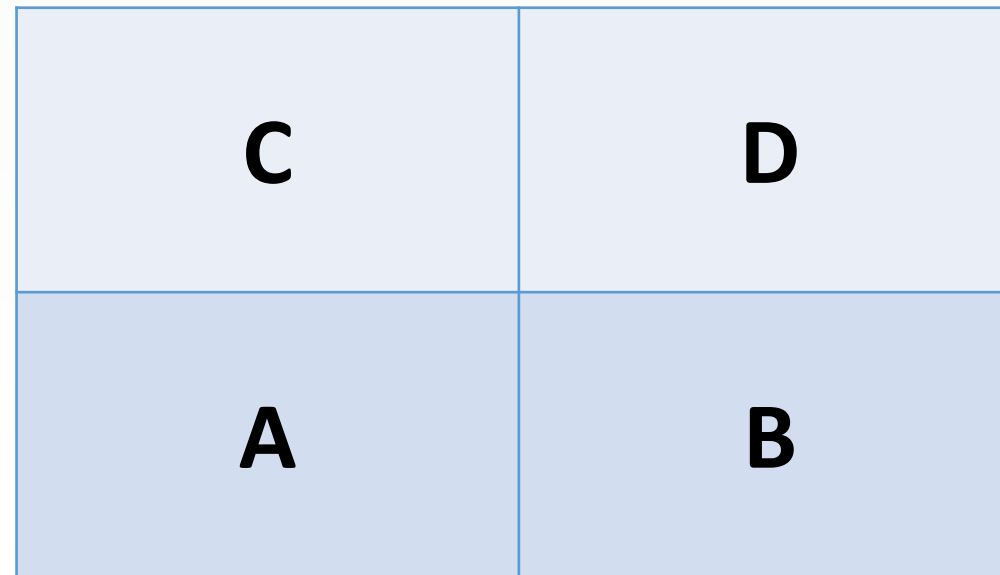
Assessment of Risk

- The best predictor of having frequent COPD exacerbations is a HISTORY of earlier treated events
 - Deteriorating airflow limitation is also associated with increase in exacerbations and hospitalizations.
 - A significant relationship between spirometric severity and risk of exacerbation and death exists.
- **Bottom line** = overall *impact* is BEST assessed by a few factors, no single individual factor

Refined ABCD Assessment

- Spirometry + (**Symptoms + Risk of Exacerbations**)

GRADE	FEV1 (% predicted)
GOLD 1	≥ 80
GOLD 2	50-79
GOLD 3	30-49
GOLD 4	< 30



mMRC 0-1 or
CAT < 10

mMRC ≥ 2 or
CAT ≥ 10

Symptoms

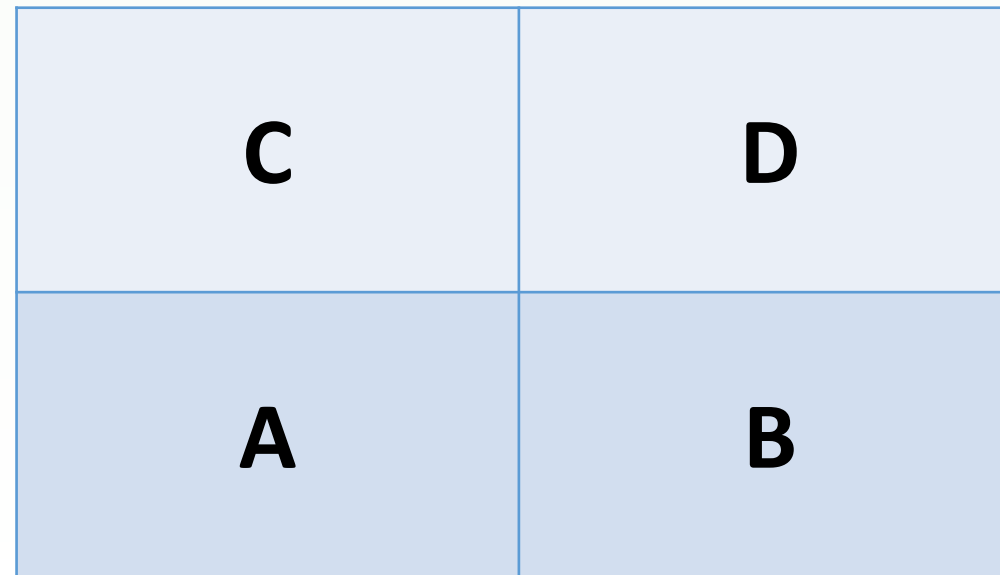
**Mod-Severe
Exacerbation History**

≥2 or ≥1
leading to
hospitalization

0 or 1 without
hospitalization

Mr. Daniels (At Baseline)

GRADE	FEV1 (% predicted)
GOLD 1	≥ 80
GOLD 2	50-79
GOLD 3	30-49
GOLD 4	< 30



mMRC 0-1 or
CAT < 10

mMRC ≥ 2 or
CAT ≥ 10

**Mod-Severe
Exacerbation History**

≥2 or ≥1
leading to
hospitalization

0 or 1 without
hospitalization

Symptoms



Mr. Daniels

- He is immediately given an ipratropium bromide + albuterol sulfate nebulized treatment and has mild symptomatic improvement, but he is still quite dyspneic
- He is placed on a Venturi mask with 35% FiO₂
- After 30 minutes an ABG is repeated.....



Mr. Daniels
Repeat ABG

Value	Measure	Normal Range
pH	7.23	7.25-7.35
pCO ₂	56 mmHg	35-45 mmHg
pO ₂	72 mmHg	80-110 mmHg
HCO ₃	28 mmHg	21-28 mmHg



Mr. Daniels Question #1

Should Mr. Daniels be admitted to the hospital, and if so, under what level of care?

1. No.
2. Yes, med-surg.
3. Yes, intermediate/progressive care.
4. Yes, intensive care.

Indications for Hospitalization

1. Severe symptoms
2. Acute respiratory failure
3. Onset of new physical signs
4. Failure of response to initial treatment
5. Presence of serious comorbidities
6. Insufficient home support or resources

Indications for ICU Admission

1. Severe dyspnea that responds inadequately to initial emergent therapy
2. Change in mental status
3. Persistent or worsening hypoxemia ($\text{PaO}_2 < 40\text{mmHg}$) and/or severe or worsening respiratory acidosis ($\text{pH} < 7.25$) despite supplemental O_2 and non-invasive ventilation
4. Need for invasive mechanical ventilation
5. Hemodynamic instability



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Treatment of COPD Exacerbation

- **Goals of treatment**

1. Minimize negative impact of current exacerbation
2. Reduce risk of future exacerbation

- **Outline of treatment**

1. Supplemental O₂ +/- noninvasive mechanical ventilation (NIV)
2. Increase dose and/or frequency of short acting bronchodilators +/- anticholinergic
3. +/- Systemic corticosteroids
4. +/- Antibiotics
5. Long-acting bronchodilators (LABA) +/- inhaled corticosteroids (ICS)

Bronchodilators in COPD Exacerbation

- Inhaled short-acting beta-adrenergic agonists are mainstay of therapy
 - Short-acting muscarinic antagonist (SAMA) often used in combo
- **Metered dose inhaler (MDI) = nebulizer**
 - If using nebulizer...air-driven > oxygen-driven
- Continue long-acting bronchodilators (LABA) +/- ICS or start as soon as possible before discharge



Mr. Daniels Question #2

Should Mr. Daniels be placed on glucocorticoid therapy? If so, what is an appropriate dose?

1. Yes, oral prednisone 40mg daily x 10-day course.
2. Yes, oral prednisone 40mg daily x 5-day course.
3. No.
4. Yes, IV methylprednisolone 60mg q 2 hours x 7-day course.

Steroids in COPD Exacerbation

- **Systemic glucocorticoids**
 - **Oral therapy = intravenous** in most cases
 - Prednisone 40mg PO daily x 5 days
- **Inhaled corticosteroids (ICS)** combined with LABA x10 days
 - Possible reduction in exacerbations, particularly in severe disease
- Several studies have shown better efficacy of ICS with higher eosinophil counts
 - Oral steroids may have the same benefit, but more studies needed

Eosinophils + COPD

- **INSPIRE study**¹⁹ → LABA/ICS associated with significantly reduced exacerbation rates in patients with eosinophil counts $\geq 2\%$ compared to LAMA
- **TRISTAN study**²⁰ → LABA/ICS associated with significantly reduced exacerbation rates in patients with eosinophil counts $\geq 2\%$ compared to placebo, but not vs. LAMA or LABA. No difference in patients with eosinophils $< 2\%$
- **CORTICO-COP study**²¹ → eosinophil-guided therapy was non-inferior compared with standard of care for # of days alive and out of hospital AND reduced systemic corticosteroid exposure

GOLD 2020 recommends cut-off *estimates*
< 100 cells/ μ L = low likelihood of treatment benefit with ICS
> 300 cells/ μ L = greatest likelihood of treatment benefit with ICS

Factors to Consider with Initiating ICS

Strong Support	Consider Using	Against Use
History of hospitalization(s) for COPD despite appropriate LABA therapy	1 moderate exacerbation of COPD per year despite appropriate LABA therapy	Repeated pneumonia
≥ 2 moderate COPD exacerbations per year	Blood eosinophils between 100-300 cells/ μ L	History of mycobacterial infection
Blood eosinophils > 300 cells/ μ L		Blood eosinophils < 100 cells/ μ L
History of/concomitant asthma		

Glucocorticoids in COPD Exacerbation

Potential Positive Effects

- Shorten recovery time
- Improve:
 - FEV₁
 - Oxygenation
 - Length of hospitalization
 - The risk of treatment failure and early relapse
 - Symptoms

Potential Negative Effects

- Even short bursts increase risk of pneumonia, sepsis, and death
- Opportunistic infections
- Undesirable side effects
- Poorly controlled diabetes
- Decreased bone density
- Steroid myopathy



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3. No.
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Mr. Daniels Question #3

Should Mr. Daniels be placed on antibiotic therapy? If so, what is an appropriate antibiotic choice?

1. Yes, azithromycin x 5-day course.
2. Yes, ciprofloxacin x 10-day course.
3. Yes, piperacillin-tazobactam x 7-day course.
4. No.

Antibiotics in COPD Exacerbation

- Most guidelines recommend antibiotics in moderate to severe exacerbation requiring hospitalization

GOLD recommends three scenarios in which antibiotics should be given:

- Increase in dyspnea + sputum volume + sputum purulence
- Increase in sputum purulence + one other cardinal symptom
- Mechanical ventilation required (invasive or non-invasive)

Procalcitonin-guided initiation of antibiotics?

Antibiotics in COPD Exacerbation

Empiric treatment options:

- Amoxicillin + clavulanic acid
- Macrolide
- Tetracycline

5-7 day course is recommended!

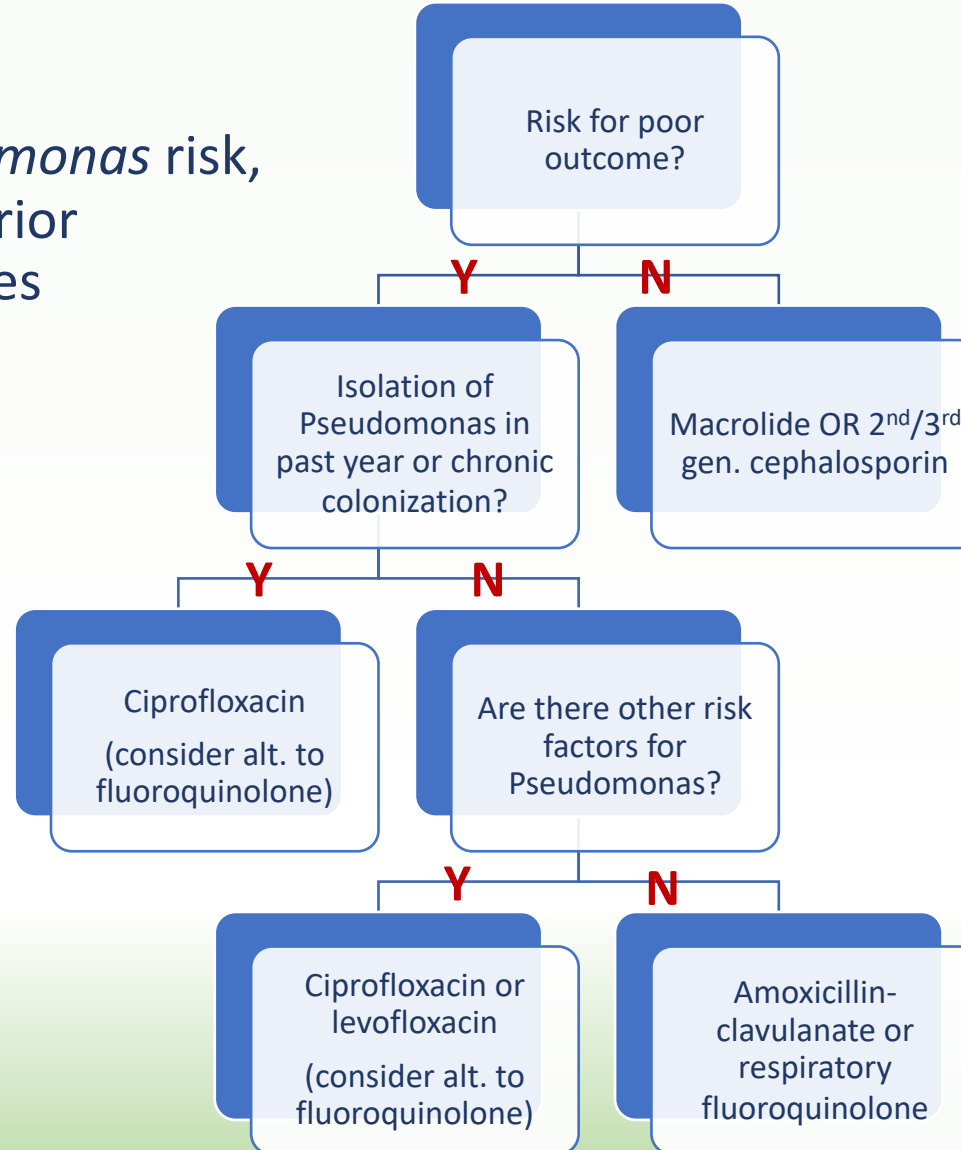
Factors to consider:

- Local bacterial resistance patterns
- History of *Pseudomonas*
- History of resistant pathogens

Sputum culture can be beneficial in guiding antibiotic therapy

Antibiotics in COPD Exacerbation

Typically guided by *Pseudomonas* risk, local resistance patterns, prior response and susceptibilities





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2. Yes, ciprofloxacin x 10-day course.
3. Yes, piperacillin-tazobactam x 7-day course.
4. No.

Supplemental Oxygen and Non-Invasive Ventilation in COPD Exacerbation

- Standard oxygen therapy
 - Nasal cannula → 6L/min, FiO₂ ~40%
 - Simple facemask → 6-10L/min, FiO₂ up to 55%
 - **Venturi mask** → precise FiO₂ of 24, 28, 31, 35, 40, or 60%
- High-flow oxygen therapy
 - Can deliver up to 60L/min
- Non-invasive ventilation (NIV)
 - Avoid the complications of invasive ventilation if possible!
 - Consider trial unless patient immediately deteriorating or absolute contraindication

Goal oxygen saturation = 88-92%

Bilevel Non-Invasive Ventilation

Indications in COPD Exacerbation:

- Acute respiratory failure leading to acute/acute on chronic respiratory acidosis
- Persistent hypoxemia despite supplemental oxygen
- Severe dyspnea
- Trial in patients who are considered to require invasive ventilation

Absolute Contraindications:

- Unstable cardiopulmonary status/arrest
- Facial/gastric/esophageal surgery
- Facial trauma or burns
- Reduced consciousness
- Air leak syndrome
- Inability to protect airway
- Apnea
- Uncooperative patient

Invasive Mechanical Ventilation

- No longer the 1st line treatment of acute respiratory failure during COPD exacerbation
- Status-post arrest or severe hemodynamic instability
- Severe ventricular/supraventricular arrhythmias
- Massive aspiration
- Inability to remove secretions
- Diminished consciousness/psychomotor agitation
- Failed/Unable to tolerate NIV and still hypoxemic



Mr. Daniels Treatment Plan

1. Admit to intermediate/progressive care with close monitoring.
2. Transition venturi mask → NIV trial with bilevel non-invasive ventilation.
3. Repeat ABG in 1-2 hours, sooner if clinical deterioration.
4. Start prednisone 40mg x 5-day course.
5. Start azithromycin 500mg x1, then 250mg daily for additional 4-day course.
6. Start ipratropium 0.5mg/albuterol 2.5mg nebulized q4 hours.
7. Start mucolytic therapy.
8. Start heparin 5000u SQ q8hrs for VTE prophylaxis.
9. Offer nicotine patch and educate on smoking cessation.

Prognosis

- Long-term prognosis following an exacerbation is POOR
 - 5-year mortality is about 50%
- Exacerbations contribute to progression of disease
 - The longer the recovery period, the more likely it is to contribute to worsened disease

Discharge and Follow-up

- Increased 90-day mortality without early follow-up (within one month)
- EDUCATION is key!
- Prevent exacerbations in severe asthma
 - Mucolytic therapy (N-acetylcysteine)
 - LAMA over LABA
- Reduce readmissions
 - Communication
 - Follow-up
 - Access to early pulmonary rehab
 - Patient-centered care, family involvement

Pharmacologic Management of COPD: ATS Clinical Practice Guideline 2020

- Strong Recommendations
 - LABA/LAMA combo therapy over monotherapy with dyspnea or exercise intolerance
- Conditional Recommendations
 - Opioid-based therapy with refractory dyspnea despite optimal therapy
 - Against maintenance oral corticosteroids
 - ICS withdrawal if on triple therapy and no exacerbations in past year
 - Triple therapy with ICS/LABA/LAMA over dual therapy LAMA/LABA if dyspnea or exercise intolerance and at least 1 exacerbation in past year



Mrs. Greene

- 34 YO F with **'difficulty breathing and wheezing'**
- **PMHx:** Asthma, diagnosed as a child
- **Meds:**
 - Budesonide 180mcg 2 puffs q12hr
 - Albuterol 90mcg 2 puffs q4-6hr prn SOB or wheezing
- **VS:**
 - BP 126/82 mmHg
 - HR 106 bpm
 - RR 30 br/min
 - T 98.6 F
 - SpO2 92% on room air



Mrs. Greene HPI

- Onset of SOB and wheezing 2 days ago when she woke up
- Roommate has a viral URI, she has felt congested x 5 days
- As needed albuterol providing some relief but very short lived
- No facial or tongue edema, no rashes or hives
- Symptoms well controlled up until this event; compliant with treatment
- No recent dosage changes
- Never been hospitalized for an exacerbation or intubated for asthma



Mrs. Greene Physical Exam

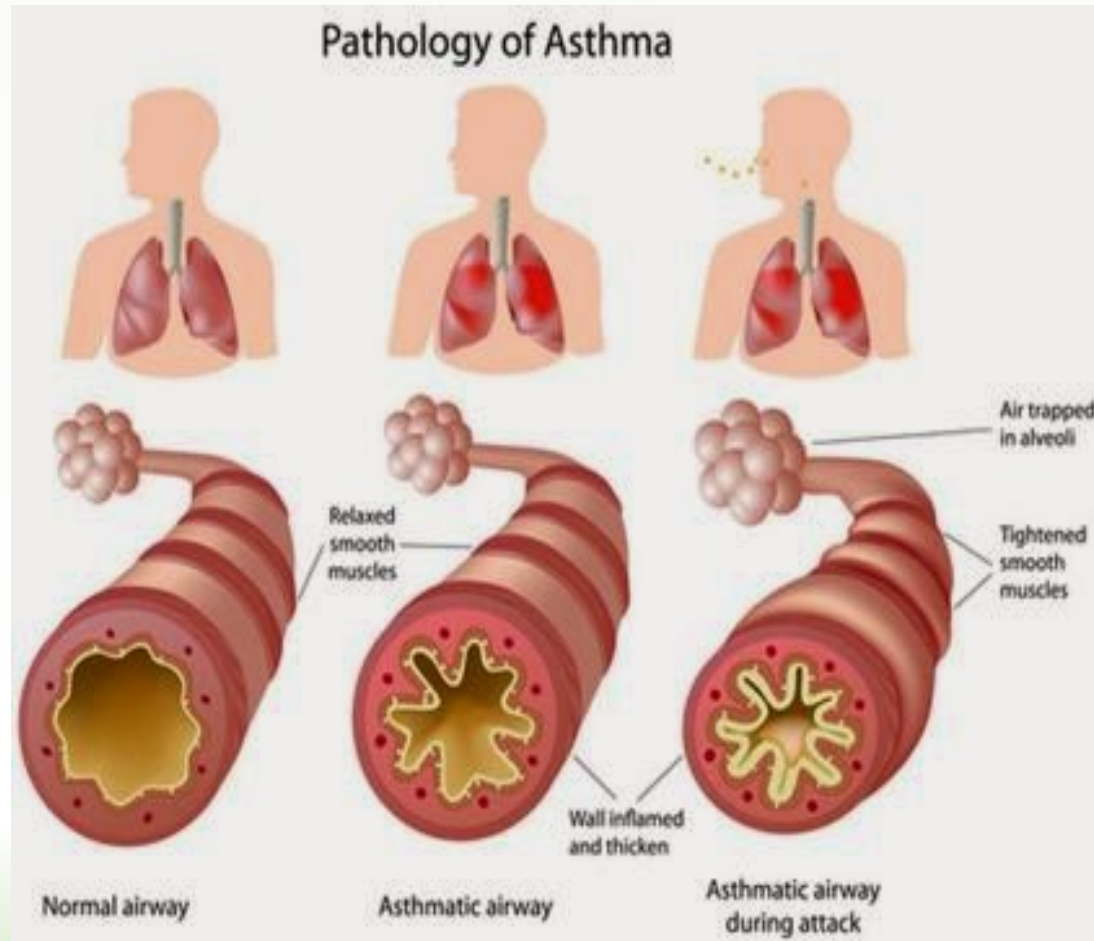
- **Gen:** WDWN female in mild respiratory distress; able to speak complete sentences but becomes slightly breathless after sustained conversation
- **HEENT:** no oropharyngeal edema
- **CV:** Tachycardic, regular rhythm; no murmurs, rubs, gallops
- **Lungs:** Slight wheeze is apparent without stethoscope; scattered end-expiratory wheezing bilaterally on auscultation; diminished breath sounds in bilateral upper lung fields; no rales or rhonchi
- **Abdomen:** BS present, non-tender to palpation, no rebound/rigidity/guarding
- **Extremities:** no cyanosis, clubbing, or edema
- **Skin:** pink and dry; no rashes, hives, or discoloration
- **Neuro:** alert and oriented x3

Mrs. Greene Labs & Diagnostics

- Influenza A/B PCR → negative
- CBC with differential → eosinophil count mildly elevated, otherwise normal
- Peak Expiratory Flow (PEF) → 62% of predicted



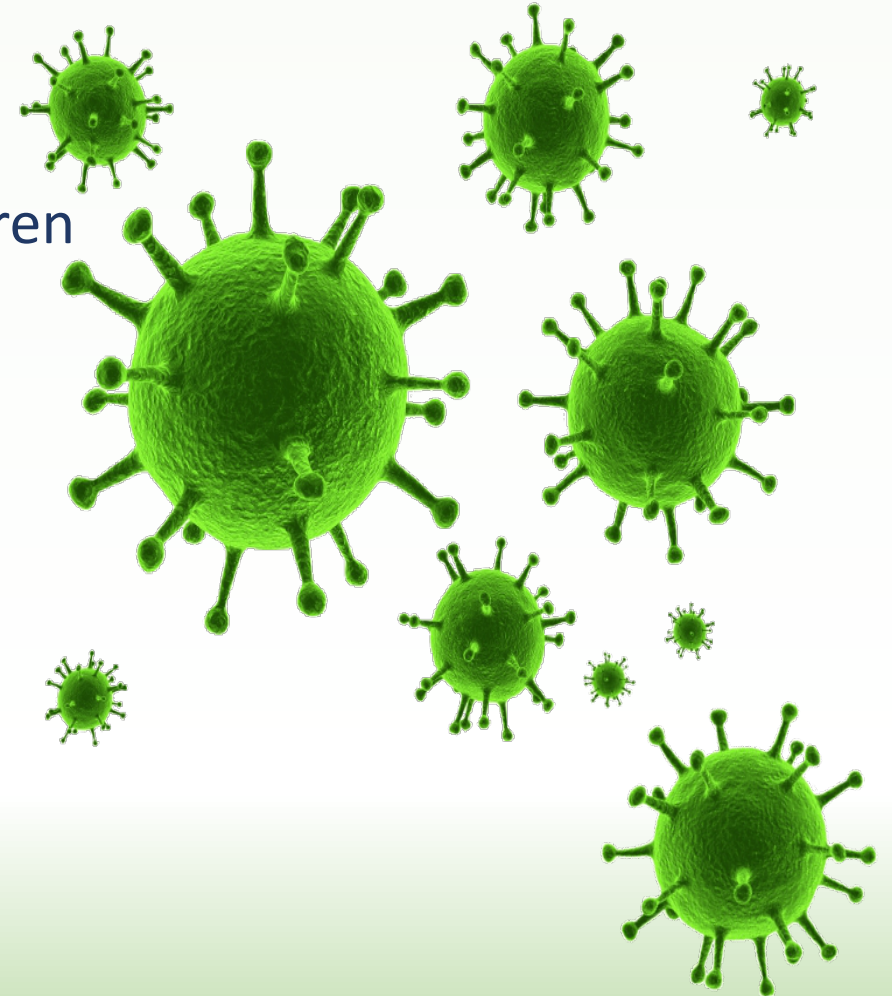
Asthma Exacerbation



GINA definition: “...episodes characterized by a progressive increase in symptoms of shortness of breath, cough, wheezing, or chest tightness and progressive decrease in lung function...”

Asthma Exacerbation Triggers

- Viral URI
 - **Rhinovirus**
 - Up to 85% of exacerbations in school-aged children
 - 50% in adults
- Pollutants
- Allergen exposures/seasonal changes
- Fungal spores
- Poor treatment compliance



Asthma Exacerbation Differential Diagnosis

- Acute bronchitis
- Bronchiectasis exacerbation
- Pneumonia
- Pneumothorax
- PE
- Anaphylaxis

Treatment of Asthma Exacerbation

- **Outline of Treatment:**

- Oxygenation
- Inhaled beta-agonist
- Inhaled anticholinergic
- Magnesium sulfate
- Systemic glucocorticoids

Early recognition and intervention are  !

- **Treatment Goals:**

- Rapid reversal of airflow limitation
- Correction of hypercapnia or hypoxemia if present

Assessment of Severity

Symptoms of Severe Exacerbation:

- Worsened respiratory distress when lying flat
- Agitation
- Sensation of air hunger
- Chest tightness

Signs of Severe Exacerbation:

- Tachypnea (> 30 breaths/min)
- Tachycardia (>120 beats/min)
- Pulsus paradoxus
- Accessory muscle use
- Diaphoresis
- Inability to speak in complete sentences

Fatal or Near-Fatal Asthma Exacerbation

- Factors that **increase risk**:
 - **History of asthma requiring intubation and mechanical ventilation OR admission to ICU for asthma exacerbation**
 - Poorly controlled asthma
 - Lack of treatment with inhaled corticosteroids
 - Current or recent use of oral glucocorticoids
 - ED or hospitalization in the past year for asthma related issues

Assessment of Severity

- **Peak expiratory flow (PEF)**

- Do NOT perform if signs of impending respiratory failure!
- Can compare to personal best
 - $PEF \leq 50\%$ predicted \rightarrow **severe**
 - $PEF >50$ but <70 and doesn't reverse with bronchodilator \rightarrow **moderate**

- **Oxygenation**

- $SpO_2 < 90\%$ or $PaO_2 < 60$ mmHg suggest possible life-threatening asthma

- **Hypercapnia**

- PEF is a useful screening tool for hypercapnia; rare when $\geq 25\%$ of normal or ≥ 200 L/min

Assessment of Severity

- **ABG** useful if:
 - Too ill to perform PEF
 - PEF < 50% predicted
 - Persistent dyspnea despite bronchodilator
 - Deterioration despite therapy
 - Signs/symptoms of hypercapnia such as decreased level of consciousness, slowed respiratory rate, myoclonus
- **Chest x-ray** useful if:
 - Complicating process suspected
 - Diagnosis uncertain or not responsive to treatments
 - Ruling out infectious process
 - High-risk patient

Oxygenation in Asthma Exacerbation

- **Goal SpO₂ 93-95%**
 - In severe exacerbation, this range is associated with better outcomes than with high concentration (100%) therapy
- Nasal cannula is typically sufficient

- **Magnesium sulfate** indicated if severe exacerbation, not responding to initial therapy
 - IV MgSO₄ 2g x1 infused over 20 min
 - **IV > inhaled**

Indications for Invasive Mechanical Ventilation

- 3-5% of patients hospitalized for asthma exacerbation
- Primary indication: acute respiratory failure
- Considerations:
 - Are they failing to protect/maintain their airway?
 - Are they failing to oxygenate/ventilate?
 - Is impending deterioration of the airway expected?
- Don't want to delay until emergent
- **Risks** must be weighed:
 - worsened bronchoconstriction
 - dynamic hyperinflation → cardiovascular collapse, barotrauma



Mrs. Greene Question #1

Which inhaled medication regimen is optimal in treating Mrs. Greene's asthma exacerbation?

1. SABA only.
2. SABA + anticholinergic.
3. Anticholinergic + inhaled corticosteroids.
4. Inhaled corticosteroids only.

Inhaled Beta Agonists

- Mainstay of therapy
- Short-acting beta-2-selective adrenergic agonists (SABA)
 - Albuterol MDI with spacer or valve-holding chamber (VHC) **4 to 8 puffs OR 2.5 to 5mg by jet nebulization every 20 minutes for the first hour**
 - Continue dosing at every 1– 4 hours as needed
 - **MDI = nebulized**
 - **MDI with VHC recommended as most cost-effective and efficient delivery** (less evidence for this in severe/near fatal asthma)

Inhaled Anticholinergics

- **SABA + ipratropium** (as compared to SABA alone) are associated with:
 - Fewer hospitalizations
 - Greater improvement in FEV1 and PEF
- Dose of **500mcg nebulized OR 4-8 puffs by MDI** in the ED
 - Every 20 min x 3 doses
 - Then, as needed for up to 3 hours
- Typically stopped once admitted into the hospital
 - Continue if admitted to ICU

Inhaled Corticosteroids

- Reduced need for hospitalization when given within the first hour of presentation to the ED in patients *not* receiving systemic corticosteroids
- Optimal dose, duration, agent in exacerbation are still unclear
- Upon discharge, patients should be prescribed ICS containing treatment, SABA treatment alone no longer recommended



Mrs. Greene Question #1

Which inhaled medication regimen is optimal in treating Mrs. Greene's asthma exacerbation?

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2. SABA + anticholinergic
3. Anticholinergic + inhaled corticosteroids
4. Inhaled corticosteroids only



Mrs. Greene
Question #2

Are systemic steroids and/or antibiotics indicated in her asthma exacerbation?

1. Yes, both.
2. Yes, systemic glucocorticoids only.
3. Yes, antibiotics only.
4. No.

Systemic Glucocorticoids

- Benefits:
 - Expedited recovery
 - Prevent relapse
- Administer within one hour of presentation
 - Oral = Intravenous
 - IV if impending respiratory arrest, extremely dyspneic, vomiting, or another reason for poor oral absorption
- Dosage equivalent to **prednisone 40-60mg**
 - 5-7 day course is optimal
 - Higher dose may be appropriate in critically ill



Mrs. Greene
Question #2

Are systemic steroids and/or antibiotics indicated in her asthma exacerbation?

1. Yes, both.
2. Yes, systemic glucocorticoids only.
3. Yes, antibiotics only.
4. No.

Failure to Respond to Therapy

- Most patients show improvement in 24-48 hours
- Status asthmaticus (acute severe asthma)?
- Consider complicating factors or alternative diagnosis:
 - Viral bronchitis
 - Bronchiectasis
 - Pneumonia
 - Rhinosinusitis
 - COPD overlap
 - GERD
 - Decompensated heart failure
 - PE

Prognosis

- ANY exacerbation of asthma may be potentially fatal
- Focus on educating patients to recognize signs and symptoms of exacerbation and seek care EARLY!
- Disparities in income, education, access to care are important contributors to mortality

Discharge and Follow-Up

- Wean O2 as soon as stable and assess ongoing need
- ICS upon d/c if not already on one; step up for 2-4 weeks if already on one
- Early follow-up
 - Within 2-7 days (preferably before patient finishes oral corticosteroids)
 - Regularly until symptom control established
- Asthma action plan
- Inhaler training
- Understanding of symptoms, causes of exacerbation, medications
- Modifiable risk factors

Asthma Guideline Updates

- National Asthma Education and Prevention Program (NAEPP)/National Heart, Lung, and Blood Institute (NHLBI) guideline update due to release in the next few months...stay tuned!
 - FeNO monitoring
 - ICS/formoterol quick relief
 - Bronchial Thermoplasty

Take Home Points

COPD

- Eosinophil-guided ICS treatment is likely beneficial
- Non-invasive ventilation can help avoid intubation
- Shorter courses of steroids and antibiotics are sufficient
- Rule out complicating process, alternate diagnoses

Asthma

- Peak expiratory flow can uncover severe obstruction in a patient without severe symptoms
- EARLY recognition and treatment make a significant difference
- Always assess risk for fatal or near-fatal asthma
- If in hospital → systemic corticosteroids

References

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