Key Points

- Chronic Obstructive Pulmonary Disease (COPD) exacerbations can be defined as:
  - A patient with diagnosed COPD (or presumed if presenting initially with exacerbation)
  - A change in the patient’s baseline level of dyspnea, cough, and/or sputum beyond day-to-day variability
- Exacerbations are triggered by infectious and non-infectious etiologies

Diagnosis

Assessment

- Comorbidities such as:
  - cardiac disease
  - heart failure
  - diabetes mellitus
  - renal disease
- Severity of illness based on prior spirometry if available
- Frequency of exacerbations
- Smoking history
- Medication history (inhaler use, frequency, route)
- Vaccination history (influenza and pneumococcal)

Physical Exam

- Hemodynamics
- Respiratory effort-tachypnea, accessory muscles, work of breathing, cyanosis
- Presence of findings after initial therapy

Diagnostic Examinations

- Oxygen saturation
- Arterial blood gas (ABG)
- Chest radiograph
- Electrocardiogram (ECG)
- Complete blood count, serum electrolytes, renal function, and glucose
- Sputum gram stain and culture if patient has failed antibiotics, has severe airflow limitation or requires mechanical ventilation

Patient Disposition

- See OSUWMC Level of Care Guidelines
- Indications for hospitalization include:
  - The presence of high risk comorbidities such as pneumonia, heart failure, cardiac arrhythmias, renal failure, liver failure, diabetes
  - Failed outpatient management
  - Respiratory distress
  - Inability to eat or drink due to symptoms
  - Hypoxemia (beyond baseline)
  - Hypercapnia (beyond baseline)
  - Altered mental status
  - Inability to care for self
  - Unclear diagnosis

Management

- Indications for admission to the ICU include:
  - Severe dyspnea that does not respond to initial therapy
  - Mental status changes
  - Persistent hypoxemia (PaO₂ < 40 mmHg) despite supplemental oxygen and/or severe respiratory acidosis (pH < 7.25) despite noninvasive ventilation
  - Presence of other end-organ failure
  - Hemodynamic instability

- Use of NPPV requires frequent monitoring and respiratory care
- A combination of pressure support and CPAP should be used
- Supplemental Oxygen
  - Goal SaO₂ 88-92% (PaO₂ > 60 mmHg)
  - Adjust oxygen delivery device to achieve oxygenation and patient comfort
- Use of COPD orderset(s) is recommended

Pharmacotherapies

- Bronchodilators
  - Patients with exacerbations should be placed on short-acting bronchodilators
  - Schedule bronchodilators for severe exacerbations, then re-order as PRN if stabilized
  - Beta-2 agonists and antimuscarinic can be used in combination
  - Use a metered-dose inhaler with a spacer or a nebulizer
  - Transition to long-acting bronchodilators once stable

- Systemic Corticosteroids
  - Oral route generally preferred, if tolerated
  - Prednisone 40mg a day for 5 days
  - If IV, methylprednisolone 0.5 mg/kg to 1 mg/kg daily, change to oral when tolerated
  - Consider IV therapy in patients who have failed outpatient oral therapy as or patients admitted to the ICU
**Antibiotics**
- Indicated if symptoms include: increased sputum purulence with increased dyspnea or sputum volume OR if using NPPV or intubated
- Oral route preferred, if tolerated:
- Duration: 5-7 day course
- Oral options include:
  - Levofloxacin 750mg daily
  - Azithromycin 500mg on day 1, followed by 250mg daily
  - Doxycycline 100mg q12 hours
  - Amoxicillin-clavulanic acid 875 mg q12 hours
- The patient’s prior exposure to antibiotics, hospital bacteria resistance patterns, and/or patient’s bacterial sensitivities from sputum can help direct antibiotic therapy
- In patients with radiographic evidence of pneumonia utilize anti-pseudomonals (Fluoroquinolones or Piperclillin-Tazobactam) if ≥ 2 exacerbations per year, severe COPD (FEV1<50% predicted), or NPPV/ventilator support

**Consults and Rehabilitation**

- **Pulmonary Rehabilitation**
  - Consider inpatient pulmonary rehabilitation consult for assistance in ambulation and patient education.
  - Consult may be placed to pulmonary rehab in IHIS.

- **Pulmonary Consultation**
  - If a patient is a patient of the OSU Lung Center, consider a pulmonary consultation
  - Patients who are not improving with therapy, have worsening respiratory status, and/or a questionable diagnosis should be considered for pulmonary consultation

- **Tobacco Cessation**
  - All patients who are currently smoking should be provided with cessation counseling and the appropriate pharmacotherapy and/or nicotine replacement therapy
  - See OSUWMC’s Inpatient Tobacco Cessation protocol

- **Vaccinations**
  - Patients with underlying lung disease should receive pneumococcal vaccination.
    - If < 65 years of age, give the pneumococcal 23-valent vaccination once and then once again when > 65 years of age
    - If ≥ 65 years of age and have not previously received pneumococcal vaccine or whose pneumococcal vaccine history is unknown, give Pneumococcal 13-Valent (PCV13) followed by Pneumococcal 23-Valent (PPSV23) 12 months later
  - For adults, if the patient has already received PPSV23, wait 12 months before giving PCV13
  - All patients with underlying lung disease should receive yearly influenza vaccinations
  - See CDC Recommended Adult Immunization Schedule Based on Medical and Other Indications or CDC Pneumococcal Vaccination Who Needs It?

**Discharge Planning**

- **Indications for discharge include:**
  - Dyspnea symptoms returning to baseline
  - Tolerating oral medications and intake
  - Hemodynamic stability
  - Oxygenation returning to baseline
  - Less frequent inhaler requirements that are no more than every 4 hours
  - Ambulating
  - Patient and/or caregiver understand medication plan

- **Re-assess inhaler technique and proficiency**
- Schedule primary care provider or pulmonologist follow-up within 1-2 weeks of discharge (or pulmonary transition clinic)
- **To prevent recurrent exacerbations patients admitted with an acute exacerbation of COPD should be discharged on a combination of long-acting antimuscarinic and long-acting beta-2 agonist (LAMA/LABA) inhaler if possible. Alternative therapy includes a combination of an inhaled long-acting beta-2 agonist and inhaled corticosteroid (LABA/ICS).**
  - Ask case management about medication/insurance compatibility before discharge

- **Patients requiring oxygen during hospitalization should be evaluated for the need for home oxygen.**
  - If oxygen saturation is ≤ 89% with the patient resting on room air, the patient qualifies for oxygen and should be discharged on continuous oxygen
  - If oxygen saturation is > 88% with the patient resting on room air, but drops to < 88% with exercise or during sleep, home oxygen therapy can be considered based on patient preference and symptoms
    - Order “Home Oxygen Qualification”
  - If a new prescription for oxygen is provided, the patient should be reevaluated as an outpatient in 2-4 weeks to see if supplemental oxygen is still required

- Patient medications should be reconciled and discharged on home inhalers, as appropriate.
- At discharge, a referral for outpatient pulmonary rehabilitation should be strongly considered. (OSU Main pulmonary rehabilitation: 614-293-2820; OSU East pulmonary rehabilitation: 614-688-6307.)
**Order Sets**

- OSU IP PUL: Admission COPD Exacerbation
- OSU IP PUL: COPD (Secondary Diagnosis)
- OSU IP ED: Dyspnea (aka COPD)
- OSU IP ED: CDU/OBS Asthma/ COPD Exacerbation
- OSU IP ED: Asthma/COPD Exacerbation

**Quality Measures**

- Length of stay
- Readmission rate
- Steroid and antibiotic use
- Discharge with a long acting inhaler
- Pulmonary Consultation
- Use of COPD ordersets

**Reference**


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**Guideline Approved**

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