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 infections and non-infectious etiologies.

Diagnosis

Assess

- Comorbidities such as:
  - cardiac disease
  - heart failure
  - diabetes mellitus
  - renal disease
- Severity of illness based on GOLD’s Classification of Severity of Airflow Limitation in COPD (page 11)
- Frequency of exacerbations
- Smoking history
- Medication history (inhaler use, frequency, and route)
- Vaccination history:
  - influenza
  - pneumococcal

Physical Exam

- Hemodynamics
- Respiratory effort-tachypnea, accessory muscles, work of breathing
- 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 or suspected resistance

Patient Disposition

- 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

- 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

Management

- Indications for the use of non-invasive positive pressure ventilation (NPPV):
  - If acute or acute-on-chronic respiratory failure is suspected, obtain ABG
  - If pH < 7.36, consider NPPV
  - If pH < 7.30, begin NPPV and monitor in progressive care unit or ICU
  - If pH < 7.25, begin NPPV and monitor in ICU with readily available intubation support
  - If excessive breathlessness and/or increase work of breathing, start NPPV
  - Re-check ABG after one hour and re-assess response
  - Worsening acidosis or persistent respiratory distress should prompt a transfer to the ICU
- 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

Pharmacotherapies

- Bronchodilators
  - Patients with exacerbations should be placed on short-acting beta-2 agonist
    - Ipratropium can be used in combination with a short-acting beta-2 agonist
  - Use a metered-dose inhaler with a spacer or a nebulizer
• **Systemic Corticosteroids**
  o Oral route preferred, if tolerated
  o Prednisone 40 mg a day for 5 days
  o If IV, methylprednisolone 0.5 mg/kg to 1 mg/kg daily, and change to oral when tolerated

• **Antibiotics**
  o Oral route preferred, if tolerated:
    o Levofloxacin 750mg daily for 5-7 day course is the preferred antibiotic
  o Other oral options include:
    ▪ Azithromycin 500mg on day 1, followed by 250mg daily for 4 additional days
    ▪ Doxycycline 100mg q12 hours
  o If IV antibiotics are needed:
    ▪ Ceftriaxone 1gm q24 hours
    ▪ Piperclillin-Tazobactam 4.5gm q8 hours (Pseudomonas risk)
  o Base antimicrobial therapy on patient’s exposure to antibiotics, hospital bacteria resistance patterns, and/or patient’s bacterial sensitivities from sputum.

**Consults and Rehabilitation**

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

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

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

• **Vaccinations**
  o 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) 6–12 months later.
    ▪ For adults, if the patient has already received PPSV23, wait 12 months before giving PCV13.
    o All patients with underlying lung disease should receive yearly influenza vaccinations.
    o 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:
  o Symptoms returning to baseline (i.e., dyspnea)
  o Ability to tolerate oral medications and intake
  o Hemodynamic stability
  o Oxygenation returning to baseline.
  o Less frequent inhaler requirements that are no more than every 4 hours
  o Ambulating
  o Patient and/or caregiver understand medication plan
  o Coordination of follow-up completed

• Patients admitted for acute exacerbation of COPD should be seen by their primary care provider or pulmonologist within 1-2 weeks of discharge (or pulmonary transition clinic)

• Patients admitted with an acute exacerbation of COPD should be discharged on a long-acting anticholinergic inhaler or combination inhaled corticosteroid-Plus-long acting beta2-agonist.
  o Ask case management about medication/insurance compatibility before discharge
  o These agents have been shown to be effective in preventing exacerbations.

• Patients requiring oxygen during hospitalization should be evaluated for the need for home oxygen.
  o Order “Home Oxygen Qualification” (PUL546)
• Consider referral to the OSU Lung Center for evaluation and pulmonary rehabilitation
  o Office: 614-293-4925

• Patient medications should be reconciled and discharged on home inhalers, as appropriate.
- For guidelines regarding appropriate outpatient medical management of COPD please refer to the GOLD guidelines
- Comprehensive discharge planning and discharge instructions should address:
  - A discharge follow-up appointment should be scheduled with pulmonary rehabilitation
  - Use of long acting bronchodilator

**Order Sets**

- OSU IP PUL: Admission COPD Exacerbation [2362]
- OSU IP PUL: COPD (Secondary Diagnosis) [3217]
- OSU IP ED: Dyspnea (aka COPD) [2399]
- OSU IP ED: CDU/OBS Asthma/ COPD Exacerbation [2402]
- OSU IP ED: Asthma/COPD Exacerbation [1764]

**Quality Measures**

- Length of stay
- Readmission rate
- Steroid and antibiotic use
- Discharge with a long acting inhaler

**Reference**


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**Guideline Approved**