Inpatient Management of Chronic Obstructive Pulmonary Disease (COPD) Exacerbations

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**
  - Oral route preferred, if tolerated
  - Prednisone 40 mg a day for 5 days
  - If IV, methylprednisolone 0.5 mg/kg to 1 mg/kg daily, and change to oral when tolerated

- **Antibiotics**
  - Oral route preferred, if tolerated:
    - Levofoxacin 750mg daily for 5-7 day course is preferred antibiotic
  - Other oral options include:
    - Azithromycin 500mg on day 1, followed by 250mg daily for 4 additional days
    - Doxycycline 100mg q12 hours
  - If IV antibiotics are needed:
    - Ceftriaxone 1gm q24 hours
    - Pipercillin-Tazobactam 4.5gm q8 hours (Pseudomonas risk)
  - 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**
  - 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) 6–12 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:**
  - Symptoms returning to baseline (i.e., dyspnea)
  - Ability to tolerate 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
  - 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.**
  - Ask case management about medication/insurance compatibility before discharge
  - 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.
  - Order "Home Oxygen Qualification" (PUL546)

- **Consider referral to the OSU Lung Center for evaluation and pulmonary rehabilitation**
  - **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](http://www.goldcopd.org/).

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**


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**Disclaimer:** Clinical practice guidelines and algorithms at [The Ohio State University Wexner Medical Center](http://www.osuwmc.org/) are standards that are intended to provide general guidance to clinicians. Patient choice and clinician judgment must remain central to the selection of diagnostic tests and therapy. OSUWMC’s guidelines and algorithms are reviewed periodically for consistency with new evidence; however, new developments may not be represented.

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