



General

Guideline Title

Care of the hospitalized patient with acute exacerbation of COPD.

Bibliographic Source(s)

University of Michigan Health System. Care of the hospitalized patient with acute exacerbation of COPD. Ann Arbor (MI): University of Michigan Health System; 2016 May. 24 p. [60 references]

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

Note from the University of Michigan Health System (UMHS) and the National Guideline Clearinghouse (NGC): The following guidance was current as of May 2016. Because UMHS occasionally releases minor revisions to its guidance based on new information, users may wish to consult the [original guideline document](#) for the most current version.

Note from NGC: The following key points summarize the content of the guideline. Refer to the original guideline document for additional information.

The strength of recommendation (I-III) and levels of evidence (A-D) are defined at the end of the "Major Recommendations" field.

Key Points

Diagnosis

- The diagnosis of acute exacerbation of chronic obstructive pulmonary disease (AECOPD) is usually made by a clinical assessment that combines historical features, identification of triggers of worsening disease, physical exam findings and ruling out other conditions with similar clinical presentations.
- Testing should include a complete blood count (CBC), a chest x-ray (CXR), influenza nasal swab (seasonal), and an electrocardiogram (ECG) in most patients. Additional testing is indicated when an alternate condition is suspected [I, D].

Assessment of Severity and Intensity of Care

The early evaluation for patients with COPD should identify patients that will require hospitalization, ventilatory support, or intensive care unit

(ICU) admission (see Figure 1 in the original guideline document) [I, D].

Treatment

- Inhaled bronchodilators
 - Patients hospitalized with AECOPD should be treated with inhaled albuterol and/or ipratropium, with dose and frequency titrated to effect (see Table 3 in the original guideline document for COPD treatment modalities) [I, C].
 - Metered-dose inhalers (MDIs), with spacer devices, are the preferred delivery method for short-acting bronchodilators, unless the patient's condition or preference warrants the use of a nebulizer.
- Corticosteroids
 - Most patients who are hospitalized with an exacerbation of COPD should be treated with systemic corticosteroids, unless side-effects are limiting [I, A].
 - A dose of prednisone, 40 mg orally daily, for a 5-day course, is appropriate for most patients, and a dose taper is unnecessary (see Table 3 in the original guideline document for COPD treatment modalities) [I, A].
- Antibiotics
 - Most patients who are hospitalized with AECOPD should be treated with antibiotics (see Tables 3 and 4 and Figure 2 in the original guideline document) [II, A].
- A 5-day duration of antibiotics is likely adequate for inpatients that demonstrate rapid improvement [II, D]. Longer courses (7-10 days) may be considered for patients with severe illness or those who are slow to respond to treatment.
- Supportive care
 - Acute oxygen therapy. Oxygen should be provided to treat hypoxemia to a pulse-ox target of 88% to 92% [II, D].
 - Non-invasive positive pressure ventilatory support (NIPPV).
 - NIPPV in the form of bilevel positive airway pressure (BiPAP) (or continuous positive airway pressure [CPAP]) should be initiated in patients with AECOPD who have persistent or worsening respiratory distress, hypoxemia, or respiratory acidosis despite medical therapy (see Figure 1 in the original guideline document) [I, A].
 - NIPPV should be initiated early in AECOPD [I, A].
 - Predictors for success and contraindications should be highlighted when considering the use of NIPPV (see Table 5 in the original guideline document) [I, D].
 - Patients who are started on NIPPV should be monitored closely, and the decision whether or not to intubate should be made within 2 hours of starting NIPPV [I, D].
 - Preventative care in the hospital should include smoking cessation interventions [I, A], appropriate vaccinations [III, A], and venous thromboembolism prevention [I, A].
 - A comprehensive approach to discharge is recommended [I, D]
 - Key elements of the hospital discharge are summarized in Table 6 of the original guideline document.

Definitions

Levels of Evidence

- A. Randomized controlled trials
- B. Controlled trials, no randomization
- C. Observational trials
- D. Opinion of expert panel

Strength of Recommendation

- I. Generally should be performed
- II. May be reasonable to perform
- III. Generally should not be performed

Clinical Algorithm(s)

The following algorithms are provided in the original guideline document:

- Diagnostic Algorithm and Assessment of Severity
- An Approach to Antibiotic Choice and Use of Sputum Culture for Hospitalized Patients with AECOPD

Scope

Disease/Condition(s)

Acute exacerbation of chronic obstructive pulmonary disease (AECOPD)

Guideline Category

Diagnosis

Evaluation

Management

Treatment

Clinical Specialty

Emergency Medicine

Family Practice

Internal Medicine

Pulmonary Medicine

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Respiratory Care Practitioners

Guideline Objective(s)

To provide an evidence-based blueprint for the acute care of patients with chronic obstructive pulmonary disease (AECOPD), in order to standardize and improve the quality of care for these patients

Target Population

Adult, non-critically-ill hospitalized patients with acute exacerbation of chronic obstructive pulmonary disease (AECOPD)

Interventions and Practices Considered

Diagnosis/Evaluation/Risk Assessment

1. Clinical assessment (history, physical exam, signs, symptoms)
2. Complete blood count
3. Chest x-ray

4. Influenza nasal swab
5. Electrocardiogram (ECG)
6. Additional testing and imaging as appropriate (e.g., high-resolution computed tomography)
7. Assessment of severity and intensity of care (e.g., need for ventilatory support or intensive care unit admission)

Treatment/Management

1. Inhaled bronchodilators
 - Albuterol and/or ipratropium
 - Metered-dose inhalers (MDIs) with spacer devices
 - Nebulizers
2. Systemic corticosteroids (e.g., oral prednisone)
3. Antibiotics
4. Supportive care
 - Acute oxygen therapy
 - Non-invasive positive pressure ventilation (NIPPV) (bilevel positive airway pressure [BiPAP] or continuous positive airway pressure [CPAP])
5. Preventative care
 - Smoking cessation interventions
 - Vaccination
 - Deep vein thrombosis (DVT) prophylaxis
6. Approach to hospital discharge

Major Outcomes Considered

- Sensitivity of diagnostic tests
- Cure rate
- Hospitalization and readmission rates
- Time to improvement
- Length-of-stay
- Mortality
- Quality of life
- Adverse effects of medications

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Strategy for Literature Search

Within the Medline (Ovid) database, the following search strategy was used.

1. exp *Pulmonary Disease, Chronic Obstructive/ or (COPD or chronic obstructive pulmonary).ti
2. Inpatients/ or exp Hospitalization/ or exp Hospital Units/ or (acute or exacerbat* or hospitali* or inpatient*).ti,ab.
3. patient care/ or critical care/ or life support care/ or nursing care/ or perioperative care/ or preoperative care/ or terminal care/ or exp

medical staff/ or nursing staff, hospital/ or exp personnel, hospital/ or physicians/ or hospitalists/

4. 2 or 3

5. 1 and 4

Results were limited to English language and January 1, 2013 to November 6, 2014 directly, and literature reviewed through the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guideline (updated 2015), which included literature beginning in 2001.

Six-hundred twenty-three articles were retrieved through structured search of databases. Forty-eight additional articles were identified by searching references in retrieved documents, and from recent article known to expert members on panel.

Exclusion Criteria

Articles were excluded because they failed to meet a threshold of relevance in the following domains:

- Study population
- Medical condition
- Time frame
- Setting
- Study type/design: meta-analyses, controlled trials, cohort studies, guidelines
- Language: English
- Specific research question addressed
- Specific factors related to outcomes
- Specific measures/outcomes, e.g., screening result, diagnosis accuracy, treatment outcome, costs
- Relative quality of evidence available for a specific question/topic (i.e., better evidence available)

Consideration of Previous and More Recent Publications

Additional sources considered were:

Results of a systematic review of literature published from January 2005 to February 2014 prepared for the Veterans Health Administration, U.S. Department of Veterans Affairs, and the U.S. Department of Defense clinical practice guideline Management of Chronic Obstructive Pulmonary Disease, Dec. 2014: The Lewin Group & ECRI Institute. Management of Chronic Obstructive Pulmonary Disease: Evidence Synthesis Report, Clinical Practice Guideline. Falls Church, Virginia: The Lewin Group, April 10, 2014.

References cited in articles identified by the literature search from January 2013 through November 2014 (described above).

Publications since the literature search – from December 2015 to December 2016 (meta-analyses, controlled trials, cohort studies, and guidelines) – known to members of the guideline team.

Number of Source Documents

Fifty-eight articles were identified as best evidence.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Levels of Evidence

- A. Randomized controlled trials
- B. Controlled trials, no randomization
- C. Observational trials
- D. Opinion of expert panel

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Not stated

Rating Scheme for the Strength of the Recommendations

Strength of Recommendation

- I. Generally should be performed
- II. May be reasonable to perform
- III. Generally should not be performed

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

Drafts of this guideline were reviewed in clinical conferences and by distribution for comment within departments and divisions of the University of Michigan Medical School to which the content is most relevant: Family Medicine, Internal Medicine, Emergency Medicine, Respiratory Therapy and Pharmacy. The final version was endorsed by the Clinical Practice Committee of the University of Michigan Medical Group and the Executive Committee for Clinical Affairs of the University of Michigan Hospitals and Health Centers.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Beneficial

Potential Benefits

- A Cochrane meta-analysis demonstrated that there are several benefits to the use of corticosteroids in the acute exacerbation of chronic obstructive pulmonary disease (AECOPD) population. Corticosteroid use typically results in a reduction of symptoms and improvement in spirometric measurements when given for AECOPD. In addition, the risk of treatment failure is reduced (number needed to treat [NNT] = 9 patients treated with corticosteroids to prevent 1 treatment failure). In non-intensive care unit (ICU) inpatients, the length-of-stay was decreased by an average of 1.2 days in patients treated with systemic corticosteroids.
- Studies suggest that antibiotics do improve outcomes in AECOPD patients, even though the majority of the underlying infections are probably viral in nature. It is likely that antibiotics are only of benefit in a subset of patients with a bacterial infection of the airways. Patients with more severe illness (including inpatients) may be more likely to benefit from the use of antibiotics.
- The benefits of using noninvasive positive pressure ventilation (NIPPV) in AECOPD are well established. A recent Cochrane review evaluated 14 randomized controlled trials (RCTs) comparing NIPPV plus usual care vs. usual care alone. The relative risk of intubation when using NIPPV was 0.41 with a number needed to treat (NNT) of 4. The relative risk of mortality was 0.52 with a NNT of 10.
- The influenza vaccine has been shown to decrease AECOPD in patients with COPD. Although the pneumococcal vaccine has not been shown to reduce AECOPD, it does appear to decrease the risk of invasive pneumococcal disease in a general population.
- Patient education can improve adherence and technique, and decrease hospitalizations for AECOPD.
- Studies in the 1980s demonstrated a survival benefit for patients with resting hypoxemia when they were treated with continuous home oxygen therapy.
- Long-term use of oxygen may have a reparative effect, and lead to improvements in oxygenation over time, and these may reverse if the oxygen therapy is removed.
- Enrollment in pulmonary rehabilitation after AECOPD has been linked to decreased mortality and hospitalization rates, and improvements in quality-of-life.

Potential Harms

- Although most hospitalized patients will benefit from corticosteroid treatment for acute exacerbation of chronic obstructive pulmonary disease (AECOPD), it should be noted that some patients will suffer side-effects from these agents, and may not tolerate them. The adverse effects of systemic corticosteroids include hyperglycemia, insomnia, psychiatric disturbances (including psychosis), muscle wasting, osteoporosis, and increased appetite/weight gain. Of these, hyperglycemia is the most common. Hyperglycemia can usually, but not always, be actively managed to allow the continued use of the corticosteroids. Insulin may be required to control blood glucose levels when using corticosteroids in the hospital setting. Problems such as severe hyperglycemia, severe insomnia, or psychiatric disturbances may require discontinuation of the corticosteroids.
- Since most of the adverse effects of corticosteroids are directly related to the extent of exposure to the medication, there is good reason to use the lowest dose and shortest duration that is effective.
- Potential adverse events associated with azithromycin therapy include QT prolongation and hearing loss.
- Although there is some evidence that levalbuterol may provide bronchodilation with less beta-adrenergic side effects than albuterol, there is only limited clinical data supporting its use, and no data directly supporting its use in AECOPD.

Refer to Tables 3A, 3B, and 4 for additional side effects of specific treatments.

Contraindications

Contraindications

Contraindications for non-invasive positive pressure ventilation (NIPPV) include:

- Cardiac or respiratory arrest
- Nonrespiratory organ failure
- Severe encephalopathy (i.e., Glasgow Coma Scale [GCS] <10)
- Severe upper gastrointestinal bleeding
- Hemodynamic instability or unstable cardiac arrhythmia
- Facial or neurological surgery, trauma, or deformity
- Upper airway obstruction

- Inability to cooperate/protect airway
- Inability to clear secretions
- High risk for aspiration (e.g., edentulous patient or presence of nasogastric tube)

Refer to Tables 3A, 3B, and 4 for additional information.

Qualifying Statements

Qualifying Statements

These guidelines should not be construed as including all proper methods of care or excluding other acceptable methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding any specific clinical procedure or treatment must be made by the physician in light of the circumstances presented by the patient.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Clinical Algorithm

Patient Resources

Resources

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

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Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2016 May

Guideline Developer(s)

University of Michigan Health System - Academic Institution

Source(s) of Funding

University of Michigan Health System

Guideline Committee

COPD Guideline Team

Composition of Group That Authored the Guideline

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No team members report a relevant conflict of interest.

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the [University of Michigan Health System Web site](#) .

Availability of Companion Documents

A continuing medical education self-study activity is available from the [University of Michigan Health System Web site](#) .

Appendix B in the [original guideline document](#) provides an example of an inhaled medication patient education tool.

Patient Resources

Appendix A in the [original guideline document](#) provides a patient brochure containing program details concerning the COPD Transitional Care Management Clinic.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This NGC summary was completed by ECRI Institute on April 5, 2017.

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