

Acute Exacerbation of Chronic Obstructive Pulmonary Disease (AECOPD): Adult

Respiratory

Clinical Decision Tools for RNs with Additional Authorized Practice [RN(AAP)s]

Effective Date: February 1, 2022

Background

Acute exacerbation of chronic obstructive pulmonary disease (AECOPD) is the acute sustained worsening of baseline symptoms (cough, sputum production, and dyspnea) in those with chronic cough and sputum production (chronic bronchitis) or chronic airflow obstruction in those with diagnosed chronic obstructive pulmonary disease (COPD) (Global Initiative for Chronic Obstructive Lung Disease, 2017; Winland-Brown, Beausejour, & Porter, 2019). There are several factors that precipitate AECOPD, with respiratory tract infections (bacterial or viral infection of the tracheobronchial tree) being the most common (Anti-infective Review Panel, 2019; Global Initiative for Chronic Obstructive Lung Disease, 2017). The most common pathogens are viruses and the following bacteria: *Haemophilus influenzae*, *Moraxella catarrhalis*, *Streptococcus pneumoniae*, and *Pseudomonas aeruginosa* (Anti-infective Review Panel, 2019).

Winland-Brown et al., 2019). Additional triggers for AECOPD include environmental pollution, heart failure, pulmonary embolism, pneumothorax, or non-pulmonary infection (Winland-Brown et al., 2019).

Classification

Acute Exacerbation of COPD		
Symptoms: 1) increased dyspnea, 2) increased sputum volume, 3) increased sputum purulence.		
Mild <ul style="list-style-type: none"> Only 1 of the 3 symptoms 	Moderate or Severe Uncomplicated COPD <ul style="list-style-type: none"> At least 2 of the 3 symptoms Less than 65 years of age No cardiac disease Less than 3 exacerbations per year 	Moderate or Severe Complicated COPD <ul style="list-style-type: none"> At least 2 of the 3 symptoms Over 65 years of age Cardiac disease More than 3 exacerbations per year

Immediate Consultation Requirements

The RN(AAP) should seek immediate consultation from a physician/NP when any of the following circumstances exist:

- paradoxical chest wall movement;
- new or worsening central cyanosis;
- change in mental status;
- moderate or severe complicated COPD;
- inability to adequately differentiate AECOPD from another potentially serious etiology such as acute coronary syndrome, congestive heart failure, pneumonia, pneumothorax, or pulmonary embolus (Interprofessional Advisory Group [IPAG], personal communication, October 14, 2019).

Predisposing and Risk Factors

Predisposing and risk factors for AECOPD in adult clients include:

- advanced age,
- productive cough,
- duration of COPD,
- history of prior exacerbations of COPD,
- history of antibiotic therapy,
- tapering of corticosteroids,
- COPD-related hospitalizations within the past year,
- chronic mucous hypersecretion,
- comorbidities (e.g., cardiac ischemia, heart failure, pneumonia, diabetes mellitus, renal, asthma, or hepatic failure),
- gastroesophageal reflux disease, and
- improper use of medication and oxygen (Stoller, 2019).

Health History and Physical Exam

Subjective Findings

Clients presenting with AECOPD may experience symptoms ranging from a mild increase in dyspnea or productive cough to respiratory failure (Stoller, 2019). Subjective findings should be compared to the client's baseline. Health history assessment should include:

- onset of symptoms;
- changes in respiratory symptoms (e.g., increased dyspnea [at rest or with exertion], cough, and/or sputum production);
- sputum characteristics (e.g., amount, color, blood);
- development of or increase in wheezing;
- altered mental status;
- fever, chills, or night sweats;
- chest pain or peripheral edema;
- loss of energy;
- anorexia;
- malaise;
- risk factors for thromboembolic disease or coronary disease;
- smoker or exposure to smoke;
- previous exacerbations; and
- immunization status (e.g., influenzae and pneumococcal) (Stoller, 2019; Winland-Brown et al., 2019).

Objective Findings

The signs and symptoms of AECOPD may include:

- thin or emaciated appearance;
- changes in vital signs (e.g., tachycardia, tachypnea);
- wheezing;
- difficulty speaking due to increased respiratory effort;
- increased use of accessory respiratory muscles;
- paradoxical chest wall/abdominal movements;
- altered mental status;
- prolonged expiratory phase;
- decrease in SpO₂ from baseline;
- cyanosis may occur;
- decreased tactile fremitus;
- hyperresonance on percussion; and
- fever, hypotension, fine crackles, and peripheral edema may suggest a comorbidity or alternate diagnosis (e.g., heart failure, pneumonia) (Stoller, 2019; Winland-Brown et al., 2019).

Differential Diagnosis

Acute exacerbation of chronic obstructive pulmonary disease can be life threatening and these clients often have multiple comorbidities. Consideration should be given to the complexity of this diagnosis. Several serious conditions must be considered as differential diagnosis including:

- cardiac heart failure,
- cardiac arrhythmia (e.g., [atrial fibrillation](#)),
- acute coronary syndrome,
- pulmonary embolism,
- pneumonia,
- asthma exacerbation,
- tension pneumothorax,
- spontaneous pneumothorax,
- severe [bronchiectasis](#),
- pleural effusion,
- lung cancer,
- hyperventilation, or
- non-adherence with medication regimen (Stoller, 2019; Winland-Brown et al., 2019).

Making the Diagnosis

Acute exacerbation of chronic obstructive pulmonary disease is an acute, sustained worsening of baseline symptoms of dyspnea, sputum volume, sputum purulence, and cough in clients with COPD and the diagnosis is usually made based on health history and physical exam (Anti-infective Review Panel, 2019).

Investigations and Diagnostic Tests

Moderate to severe AECOPD may require a chest x-ray and electrocardiogram to assist in ruling out other causes (e.g., pneumonia, pulmonary edema, and pneumothorax) (Government of Quebec, 2017).

Management and Interventions

Goals of Treatment

The primary goals of immediate treatment are to:

- prevent disease progression,
- decrease or abolish breathlessness and other respiratory symptoms,
- improve exercise tolerance,
- reduce the frequency and severity of exacerbations,
- improve quality of life,
- reduce impairment and disability, and

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- reduce mortality (Winland-Brown et al., 2019).

Non-Pharmacological Interventions

The RN(AAP) should recommend, as appropriate, the following non-pharmacological options:

- smoking cessation,
- avoidance of second and/or thirdhand smoke, and
- adequate hydration (Anti-infective Review Panel, 2019).

Pharmacological Interventions

The pharmacological interventions recommended for the treatment of AECOPD are in accordance with the *RxFiles Drug Comparison Charts* (RxFiles Academic Detailing Program, 2021), the *Anti-infective Guidelines for Community-acquired Infections* (Anti-infective Review Panel, 2019), and the *Pocket Guide to COPD Diagnosis, Management, and Prevention: A Guide for Health Care Professionals* (Global Initiative for Chronic Obstructive Lung Disease, 2017).

Medications may include bronchodilators, corticosteroids, and oral antibiotics. Treatment will depend on the client's current drug regimen and adherence to it, as well as the severity of the exacerbation, particularly the degree of respiratory distress.

Bronchodilators

Appropriate use of metered-dose inhaler (MDI) with a spacer device provides optimal drug delivery and should be encouraged over nebulizers.

	Drug	Dose	Route	Frequency	Duration
Adult					
	Salbutamol 100 mcg/puff (maximum 800 mcg/day)	3-4 inhalations	inhaled	q.i.d.	3-5 days and then prn
AND/OR	Ipratropium 20 mcg/puff (max 240 mcg/day)	2-4 inhalations	inhaled	q.i.d.	3-5 days and then prn

Oral Steroids

Corticosteroids should be considered in combination with antibiotics in moderate to severe exacerbations as it decreases the risk of treatment failure and the number of hospitalizations. Consultation with a physician/NP must occur prior to administration of steroids.

Antibiotic Therapy

Mild exacerbations may not require antibiotic therapy. An increase of current bronchodilator therapy may be all that is required.

	Drug	Dose	Route	Frequency	Duration
Adult (First line without penicillin allergy)					
	Amoxicillin	500 mg	p.o.	q8h	7-10 days
Adult (First line with penicillin allergy)					
	Doxycycline	100 mg	p.o.	b.i.d. on day 1 and then once daily	7 days
OR	Sulfamethoxazole /Trimethoprim (SMX/TMP)	800/160 mg	p.o.	q12h	7-10 days
OR	Tetracycline	250-500 mg	p.o.	q.i.d.	7-days
	Drug	Dose	Route	Frequency	Duration
Adult (Second line without penicillin allergy)					
	Cefuroxime	500 mg	p.o.	q12h	5 days
OR	Cefprozil	500 mg	p.o.	q12h	5 days
Adult (Second line with penicillin allergy)					
	Azithromycin	250 mg	p.o.	500 mg once on day 1 and then 250 mg once daily on days 2-5.	5 days
OR	Clarithromycin	500 mg	p.o.	q12h	5 days
OR	Clarithromycin XL	1000 mg	p.o.	once daily	5 days

Client and Caregiver Education

The RN(AAP) provides client and caregiver education as follows:

- Counsel about appropriate use of medications, such as purpose, dose, frequency, and side effects.
- Counsel about proper use of inhaler.
- Counsel about smoking cessation, if applicable.
- Recommend appropriate immunizations including annual influenza vaccination and pneumonia vaccination.
- Recommend adequate hydration, which is six to eight glasses of fluid per day; there is no evidence that drinking more than this quantity is of any benefit.
- Recommend adequate nutrition: frequent, smaller meals high in protein and calories.
- Recommend an exercise program for example, walking to improve general fitness and sense of well-being.
- Discuss natural history, expected course, and prognosis of disease.
- Implement and/or review COPD action plan.
- Teach about symptoms and signs of exacerbation and acute infection to encourage self-monitoring and early presentation when condition deteriorates (e.g., COPD action plan).
- Counsel to avoid travel at high altitudes. When air travel cannot be avoided, the client should have access to oxygen, especially when travelling in an unpressurized aircraft. (Global Initiative for Chronic Obstructive Lung Disease, 2017; Government of Quebec, 2017; Stoller, 2019; Wedzicha et al., 2017).

Monitoring and Follow-up

The client should be seen daily until acute symptoms are improving. Those with worsening symptoms may require a second antibiotic which requires a referral to a physician/NP.

Complications

The following complications may be associated with AECOPD:

- acute bronchitis,
- pneumonia,
- pulmonary hypertension,
- cor pulmonale (alteration in the structure and function of the right ventricle which may lead to heart failure),
- respiratory failure,
- polycythemia (abnormally high hemoglobin), and
- negative impact on quality of life (Leong, 2017; Stoller, 2019; Wedzicha et al., 2017).

Referral

Refer to a physician/NP if client presentation is consistent with those identified in the *Immediate Consultation Requirements* section or there is no improvement after 72 hours of treatment, or sooner if symptoms worsen (IPAG, personal communication, October 14, 2019).

References

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