Empiric Management of Acute Exacerbation of COPD (AECOPD)

AECOPD is defined as an **acute worsening** of a patient's respiratory symptoms beyond usual day-to-day variations and requiring a change in medications. Increased airway inflammation, mucus production and gas trapping contribute to the increased dyspnea (key symptom).

Depending on severity of the exacerbation and/or severity of underlying disease, AECOPD can be managed in either the outpatient or inpatient setting. **Optimal clinical management of COPD exacerbations includes** bronchodilators (short-acting inhaled beta$_2$-agonists +/- anticholinergics), short course systemic corticosteroids and O_2 therapy (target O_2Sat 88-92%). *Systemic corticosteroids reduce treatment failure and duration of hospitalisation, but long course of treatment increase risk of adverse events*.

AECOPD is frequently precipitated by respiratory viruses and **not all AECOPD require antibiotic therapy. In patients at high-risk of a complicated course or in those with an indication, antibiotic therapy can reduce risk of treatment failure and short-term mortality.**

HIGH RISK COPD if any of:

- FEV_1 < 50% predicted
- ≥ 4 exacerbations/year
- Chronic steroid use
- Antibiotic use in last 3 months
- Significant cardiac disease or lung cancer
- Use of home oxygen
- Requiring mechanical ventilation

LOW RISK COPD: none of the above criteria

CONSIDER STARTING ANTIBIOTIC *IF*

At least 2 of

- **Increased sputum viscosity/purulence**
- **Increased sputum production**
- **Increased dyspnea**

Potential indications for hospitalization
(GOLD 2020 Report[1])

- Severe symptoms (sudden worsening of resting dyspnea, confusion, drowsiness, high RR, decreased O_2Sat)
- Acute respiratory failure
- New physical signs (e.g. cyanosis, peripheral edema)
- Failure to respond to initial medical management
- Serious comorbidities (heart failure, new arrhythmias, etc.)
- Insufficient home support

No single laboratory value (e.g. CRP, PCT) can be recommended to initiate antibiotic therapy (methodological limitations of studies assessing their utility)

ORGANISMS COMMONLY IMPLICATED IN COPD EXACERBATION

- Respiratory viruses: 20-50% of cases
- *H. influenzae, S. pneumoniae, M. catarrhalis*
- Atypicals *(C. pneumoniae, M. pneumoniae):* < 5% of cases

**GNR (e.g. Pseudomonas sp, S. maltophilia)* may be present in patients with severe COPD and prior hospitalizations

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EMPIRIC PHARMACOLOGIC MANAGEMENT[a,b]

LOW RISK COPD **with indication** for antibiotic therapy	• Short-acting bronchodilators • **Amoxicillin** 500 mg PO q8h x 5 days *Type I hypersensitivity to penicillin:* **doxycycline** 100 mg PO q12h x 5 days
HIGH RISK COPD **No respiratory failure**	• Short-acting bronchodilators *AND* • Prednisone 40 mg PO daily x 5 days *AND* • **Amoxicillin-clavulanate** 875-125 mg PO q12h x 5 days *Type I hypersensitivity to penicillin:* **doxycycline** 100 mg PO q12h OR **Moxifloxacin** 400 mg PO/IV daily x 5 days
Respiratory failure **Non-life threatening** (no mechanical ventilation)	***Attempt to collect sputum specimen prior to starting antibiotic*** • Short-acting bronchodilators *AND* • Prednisone 40 mg PO daily or Hydrocortisone 1 mg/kg IV q6h x 5 d *AND* • **Amoxicillin-clavulanate** 875-125 mg PO q12h x 5 days *Type I hypersensitivity to penicillin:* **Moxifloxacin** 400mg po/IV die x 5 days
Respiratory failure **Life-threatening** (invasive/non-invasive mechanical ventilation)	***Collect sputum/endotracheal sample prior to starting antibiotic*** • Short-acting bronchodilators *AND* • Prednisone 40 mg PO daily or Hydrocortisone 1 mg/kg IV q6h x 5 d *AND* • **Piperacillin-tazobactam** 4.5 g IV q8h (extended infusion) x 5-7 days *Type I hypersensitivity to penicillin:* **Moxifloxacin** 400 mg PO/IV daily x 5-7 days *If MRSA colonized*: Add Vancomycin[c] 15 mg/kg IV q12h to regimen above

[a]Inhaled *long*-acting bronchodilators +/- inhaled corticosteroids should be continued during exacerbation or started before hospital discharge; [b]Dosing of antibiotics assume normal renal function; [c]See Vancomycin Therapeutic Drug Monitoring guideline.

PERTINENT ANTIBIOTIC SUSCEPTIBILITY PROFILES for MUHC

Amoxicillin: Sensitivity in 95% of *S. pneumoniae; 75% H. influenzae; < 5% Moraxella catarrhalis*
Amoxicillin-clavulinic acid: Sensitivity in **> 95% *S. pneumoniae, H. influenza, M. catarrhalis***
Doxycycline: Sensitivity in 65% *S. pneumoniae*; > 85% *H. influenzae* and *M. catarrhalis*
Moxifloxacin: Sensitivity in 99% of *S. pneumoniae;* Ciprofloxacin: Sensitivity in 82% of *Pseudomonas sp*

ADDITIONAL COMMENTS

- In high-risk COPD, severe or frequent exacerbation: use sputum culture results to adjust therapy
- If PCT < 0.5 ng/mL, cultures negative, clinically improving and not in ICU: can D/C antibiotic therapy earlier. *In ICU, PCT-based algorithm to start/stop antibiotics associated with greater mortality compared with standard regimens*[2]
- After acute exacerbation, initiate **appropriate measures for prevention of further exacerbations** (associated with reduced likelihood of ED visits, hospital admissions and mortality)[3].

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Drafted by VD Nguyen (Pharmacy Department), M. Semret (ID, ASP)
Reviewed by K. Schwartzman (Resp) and J. Bourbeau (Resp)
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