B05: Chronic Obstructive Pulmonary Disease

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Introduction

Chronic obstructive pulmonary disease (COPD) is a progressive, degenerative structural lung disorder that results in impaired ventilation. It is the result of persistent lung irritation from any of a number causes, including but not limited to, smoking, chemical exposure, and repeated infections. It includes progressive lung diseases such as emphysema. Although COPD cannot be cured, it can be managed. Patients with COPD often live with some degree of respiratory distress and frequently seek help during exacerbations of their disease, which are often prompted by respiratory tract infections.

Essentials

- COPD is primarily a disease of ventilation. Treatment should be directed towards improving overall airflow with bronchodilators and steroids.
- Critical hypercarbia can develop in patients with COPD despite high respiratory rates and apparently effective tidal volumes due to changes in the alveoli and pulmonary circulation. Monitor patients closely for signs of impending respiratory failure (a falling level of consciousness, a decreasing respiratory rate, decreasing tidal volumes) and intervene early if necessary.
- Oxygen therapy should be titrated based on what is typical for the patient, where this information is readily available. Although oxygen should never be withheld from patients who are acutely short of breath, its administration should be a considered act with due care and attention. Patients living with COPD are often very aware of their oxygen saturation when not in crisis; they, or their caregivers, can be used as a resource to guide oxygen therapy.
- When patients report a history suggestive of respiratory infections, paramedics and EMRs/FRs must use appropriate personal protective equipment and should avoid all aerosol generating procedures until protective measures are in place.
- Recognize that treatment options for COPD exacerbations in the out-of-hospital environment are limited. Extrication and conveyance should be accomplished as soon as practical and safe. Do not exert patients during movement.

Referral Information

Patients with COPD are at significant risk for recurrent hospital admissions due to exacerbation of their disease.

Community paramedics should refer to the CP COPD guidelines for additional management information.

General Information

- Patients with COPD often have comprehensive management plans prescribed by their care team. These plans reflect an individual's condition and describe a series of actions to be taken based on symptoms. Compliance with the action plan, and response to treatment, should form part of any investigation into an exacerbation of COPD.
- Complete relief of symptoms, including audible wheezes, is frequently not possible. Although paramedics and EMRs/FRs should be aggressive in attempting to relieve dyspnea, therapeutic end points should be set with reference to the patient's normal condition.
- In the absence of patient-specific information, paramedics and EMRs/FRs should consider observable signs that describe the degree of distress. The ratio of inspiratory time to expiratory time is an important clinical clue to the effectiveness of therapy, as is the tidal volume with each breath.
- Paramedics and EMRs/FRs should consider the possibility of concurrent disease processes and seek evidence to include or exclude other diagnoses.
- If a patient continues to deteriorate despite aggressive therapy, consider the possibility of barotrauma and pneumothorax.

Interventions

First Responder

- Minimize patient activity and do not exert patients during movement
- Provide supplemental oxygen as required
  - → A07: Oxygen Administration
- Place patient in position of greatest comfort and easiest breathing (generally sitting up)
- Assist patient with retrieval of own inhalers if prescribed
- Begin positive pressure ventilation using bag-valve masks if respiratory failure develops

Emergency Medical Responder – All FR interventions, plus:

- Titrate supplemental oxygen to SpO_2 88-92%
  - → A07: Oxygen Administration
- □□ **Requires completion of EMR scope expansion education:**
  - Salbutamol
    - MDI and spacer use is strongly recommended for patients with signs of influenza-like illness, or other infectious respiratory conditions
- Convey early
- Consider intercept with additional resources

Primary Care Paramedic – All FR and EMR interventions, plus:

- Salbutamol
- □□ **Requires completion of PCP scope expansion education:**
  - Salbutamol and ipratropium
    - MDI and spacer use is strongly recommended for patients with signs of influenza-like illness, or other infectious respiratory conditions
  - Consider dexamethasone (CliniCall consultation required prior to administration of dexamethasone)
- Consider CPAP
  - → PR09: Continuous Positive Airway Pressure

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Salbutamol and ipratropium
- Apply a staged approach to airway and breathing interventions as required
- CliniCall consultation required prior to attempting intubation for patients with perfusing rhythms who are breathing spontaneously.

Community Paramedic (CP) Interventions

- → CP 4.9: Chronic Obstructive Pulmonary Disease

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Consider use of mechanical ventilation
  - → PR29: Mechanical ventilation
- Consider use of non-invasive ventilation
- Consider invasive ventilation
- Consider dynamic hyperinflation
  - set PEEP 50-80% of the auto-PEEP
  - Consider decreasing breath rate to avoid breath stacking
- Consider I:E 1:3, 1:4
- Consider reduced driving pressure < 15 cmH_2O
- Consider permissive hypercapnia
- Consider ABG/VBG sampling for guidance of therapy.

- Consider radial arterial line placement.
- Consider femoral arterial line placement
- Anesthesia planning
  - Avoid morphine if possible (histamine release)
  - Consider Ketamine
  - Consider Propofol
  - Avoid Etomidate (increased airway resistance and adrenal dysfunction)
  - Consider paralytics
    - Succinylcholine
    - Rocuronium
    - Cisatracurium
- Glucocorticoids
  - Prednisone 40 mg
  - Methylprednisolone 60 mg
- Antimicrobial
  - antibiotic
  - antiviral
- Magnesium 2-4g
- Call ETP prior to anesthetic gas administration.
- Consider anesthetic gas if unable to transport due to severe refractory bronchospasm. This is a temporizing measure until safe transport is possible. Must have an anesthetist capable of using the equipment and medication.
  - Consider Sevoflurane
  - Avoid Desflurane

Evidence Based Practice

COPD

Supportive

- Beta Agonist-Nebulized
- Beta Agonist-Parenteral
- NiPPV
- Oxygen-titrated
- Beta Agonist-MDI
- Oxymetry Monitoring

Neutral

- Anticholinergic
- High flow nasal canula
- Humidified oxygen
- Intubation

Against

- Oxygen-high flow

References

1. Abdo WF, et al. Oxygen-induced hypercapnia in COPD: Myths and facts. 2012. [Link]
2. Austin MA, et al. Effect of high flow oxygen on mortality in chronic obstructive pulmonary disease patients in prehospital setting: randomised controlled trial. 2010. [Link]
3. Beasley R, et al. Thoracic Society of Australia and New Zealand oxygen guidelines for acute oxygen use in adults: "Swimming between the flags." 2015. [Link]
4. COMBIVENT Inhalation Aerosol Study Group. In chronic obstructive pulmonary disease, a combination of ipratropium and albuterol is more effective than either agent alone. 1994. [Link]
5. New A. Oxygen: kill or cure? Prehospital hyperoxia in the COPD patient. 2006. [Link]
6. Budithi R, et al. Anesthesia for patients with chronic obstructive pulmonary disease. UpToDate. 2021.
7. Ferguson GT, et al. Management of refractory chronic obstructive pulmonary disease. UpToDate. 2021

Practice Updates

- 2023-09-29: added salbutamol to EMR interventions; added ipratropium, dexamethasone to PCP interventions
- 2023-12-19: removed COVID-related restrictions