

Otterbein University

Digital Commons @ Otterbein

Nursing Student Class Projects (Formerly MSN)

Student Research & Creative Work

Summer 8-6-2021

Chronic Obstructive Pulmonary Disease

Aaron McNeilan

mcneilan1@otterbein.edu

Follow this and additional works at: https://digitalcommons.otterbein.edu/stu_msn



Part of the [Family Practice Nursing Commons](#), [Geriatric Nursing Commons](#), [Occupational and Environmental Health Nursing Commons](#), and the [Public Health and Community Nursing Commons](#)

Recommended Citation

McNeilan, Aaron, "Chronic Obstructive Pulmonary Disease" (2021). *Nursing Student Class Projects (Formerly MSN)*. 490.

https://digitalcommons.otterbein.edu/stu_msn/490

This Project is brought to you for free and open access by the Student Research & Creative Work at Digital Commons @ Otterbein. It has been accepted for inclusion in Nursing Student Class Projects (Formerly MSN) by an authorized administrator of Digital Commons @ Otterbein. For more information, please contact digitalcommons07@otterbein.edu.

Chronic Obstructive Pulmonary Disease

Aaron McNeilan RN, BSN, CCRN
Otterbein University, Westerville, Ohio

What Topic?

Chronic Obstructive Pulmonary Disease (COPD)

- Chronic airway disease including both chronic bronchitis and emphysema, resulting in the inability to expire air normally (McCance & Heuther, 2019)

Why COPD?

- Third leading cause of death in the United States. Sixth leading cause of death globally. (McCance & Heuther, 2019)
- Increased mortality rate over the last 30 years, affecting women more than men (McCance & Heuther, 2019)
- Actions can be taken by anesthesia providers to decrease respiratory complications due to mechanical ventilation (Ji et al., 2020)

Signs & Symptoms

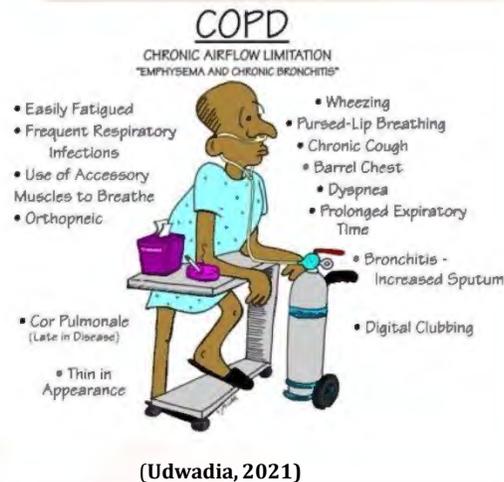
- shortness of breath (SOB), cough, sputum production, wheezing, chest tightness, dyspnea on exertion, insomnia (Buttery et al., 2021)
- Hypoxemia with exercise often requiring supplemental Oxygen (McCance & Heuther, 2019)
- Social Isolation due to difficulty performing normal daily activities (Buttery et al., 2021)

Underlying Pathophysiology

- Caused by chronic inflammation of lung epithelial cells (McCance & Heuther, 2019)
- Chronic Bronchitis:** increases mucous production by increasing goblet cells in the airway. Ciliary cells are also damaged, leading to impaired mucous clearing (McCance & Heuther, 2019)
- Emphysema:** Permanent enlargement of airways resulting in loss of elastic recoil. This prevents patient from exhaling completely, causing carbon dioxide retention and impaired uptake of oxygen with inhalation efforts. Genetic link to alpha-1 antitrypsin deficiency (McCance & Heuther, 2019)
- Pulmonary Function Tests are abnormal at baseline and worsen as the disease progresses (McCance & Heuther, 2019)

Asthma

- Is a hypersensitivity reaction to a triggering antigen
- The triggering antigen varies for each patient, but it causes constriction of the airways and air trapping which hinders carbon dioxide and oxygen exchange (McCance & Heuther, 2019)
- Individuals with asthma are asymptomatic between attacks and their pulmonary function tests are normal (McCance & Heuther, 2019)



Significance of Pathophysiology

- Disease process of chronic bronchitis and emphysema is irreversible (Cao et al., 2021)
- Caused most commonly by tobacco smoke, but also from other environmental air pollutants (McCance & Heuther, 2019)
- COPD leads to malnourishment in 1/3 of patients because they expend excessive amounts of energy trying to obtain enough oxygen for tissue requirements (McCance & Heuther, 2019)
- Inability to clear secretions increases risks of developing pneumonia (Buttery et al., 2021)
- Disease progression causes pulmonary hypertension, which strains the right side of a patient's heart → risk of cor pulmonale (right sided heart failure) (McCance & Heuther, 2019)

Diagnosis

- Pulmonary Function Tests
 - X-ray
 - CT scan
- (McCance & Heuther, 2019)

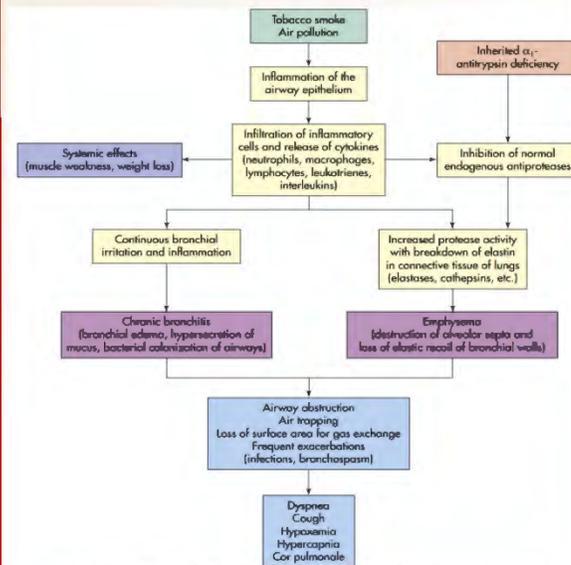


FIGURE 35-14 Pathogenesis of Chronic Bronchitis and Emphysema (Chronic Obstructive Pulmonary Disease [COPD]).

(McCance & Heuther, 2019, p. 1340)

Nursing Care Implications

- Patients may require more time to complete daily tasks (Soto-Rubio, 2020)
- Patients require supplemental oxygen as the disease progresses and may need frequent breaks. Being short of breath and fear of running out of oxygen often cause anxiety (Soto-Rubio, 2020)
- While COPD pathology cannot be reversed, symptoms can be managed with bronchodilators and pulmonary rehabilitation (McCance & Heuther, 2019)
- Encourage patients to quit smoking as it has shown to slow progression of the disease (McCance & Heuther, 2019)
- PATIENTS CANNOT SMOKE WHILE ON OXYGEN. Supplemental oxygen is highly flammable. It has caused severe burns when used while smoking (NC DOI, 2020)**
- Patients requiring intubation can be more difficult wean from mechanical ventilation (Ji et al., 2020)
- Specific anesthesia considerations for optimal airway management in surgery to prevent lung damage (Takeyama, 2021)

Conclusion

- Preventing exposure to environmental lung irritants known to cause COPD is the best way to decrease its incidence (Buttery et al., 2021)
- The only cure for COPD is undergoing lung transplantation (single or double), which on average has a life expectancy of 6.7 years following successful transplantation (Cheronis et al., 2021)
- Predictions are that COPD disability and mortality will continue to increase until the year 2030 (Cao et al., 2021)



OTTERBEIN
UNIVERSITY

References

- Buttery, S. C., Zysman, M., Vikjord, S. A., Hopkinson, N. S., Jenkins, C., & Vanfleteren, L. E. (2021). Contemporary perspectives in COPD: Patient burden, the role of gender and trajectories of multimorbidity. *Asian Pacific Society of Respiriology*. Retrieved May 26, 2021, from https://journals-ohiolink.edu.ezproxy.otterbein.edu/apexprod/rws_ejsearch/r/1507/99?entity_id=292948432
- Cao, Y., Xing, Z., Long, H., Huang, Y., Zeng, P., Janssens, J.-P., & Guo, Y. (2021). Predictors of mortality in COPD exacerbation cases presenting to the respiratory intensive care unit. *Respiratory Research*, 22(1), 77. <https://doi.org/10.1186/s12931-021-01657-4>
- Cheronis, N., Rabold, E., Singh, A., & Cheema, T. (2021). Lung Transplantation in COPD. *Critical Care Nursing Quarterly*, 44(1), 61–73
- Ji, X., Cui, W., Zhang, B., & Shan, S. (2020). Effect of lung protective ventilation on perioperative pulmonary infection in elderly patients with mild to moderate COPD under general anesthesia. *Journal of Infection and Public Health*, 13(2), 281–286. doi:10.1016/j.jiph.2019.11.021
- Levin, K., Anderson, D., & Crighton, E. (2020). Prevalence of coph by age, sex, socioeconomic position and smoking status: a cross-sectional study. *Health Education*, 120(5/6), 275–288. Retrieved July 27, 2021, from <https://doi.org/10.1108/he-06-2020-0044>
- McCance, K. L., & Huether, S. E. (eds.). (2019). *Pathophysiology: The Biologic Basis for Disease in Adults and Children* (8th ed.). St. Louis, MO: Mosby.
- North Carolina Department of Insurance. (2020, February 10). Scary burn incident reignites concern over smoking while on oxygen | nc doi. <https://www.ncdoi.gov/news/press-releases/2020/02/10/scary-burn-incident-reignites-concern-over-smoking-while-oxygen>
- Soto-Rubio, A., Valero-Moreno, S., Díaz, J. L., Andreu, Y., & Pérez-Marin, M. (2020). COPD at the end of life: Predictors of the emotional distress of patients and their family caregivers. *PLoS ONE*, <https://doi.org/10.1371/journal.pone.0240821>
- Takeyama, E., Nakajima, M., Nakanishi, Y., Amano, E., & Shibuya, H. (2021). Longer time to extubation after general anesthesia with desflurane in patients with obstructive respiratory dysfunction: A retrospective study. *JA Critical Reports*, 7(1). <https://doi.org/10.1186/s40981-021-00443-x>
- Udwadia, Z. (2021). Copd/Emphysema. Copd/Emphysema; Dr Zarir f. Udwadia. <https://www.drzarirudwadia.com/copdemphysema/>