Abstract:

The goal of this paper is to provide a case study of chronic obstructive pulmonary disorder along with key scientific information about the disease. Throughout the paper, there is an emphasis on etiology and prognosis for the individual in the case study. The purpose was to fulfill the short paper 1 assignment for BBH 411W. Disclaimer: the purpose of the writing is to fulfill course requirements for BBH 411W and to stand as a personal writing sample, but the findings should be treated as generalizable research.
Medical Condition:

Chronic obstructive pulmonary disease (COPD) is a progressive chronic disease that affects millions of Americans. The National Institute of Health defines COPD as “a progressive disease that makes it hard to breathe.”¹ COPD is a respiratory disease. In a healthy person, the airways and the air sacs at the end of the airway, the alveoli, are elastic and stretchy. However, in people with COPD, the airways are thick and inflamed. Additionally, the alveoli are inelastic and lose their shape.² Doctors recognize when a person has COPD because the majority of cases include symptoms of both emphysema, which is lung inflammation, and chronic bronchitis, which is destroyed alveoli. Patients report a nagging cough, shortness of breath, wheezing, a tight chest, and excessive mucus.³ Eighty-three percent of people suffering from COPD report symptoms being the worst in the morning.⁴ In the later stages of COPD, symptoms include weight loss, fast heartbeat, or trouble talking.⁵ If a doctor suspects a patient has COPD, a number of tests can be used to confirm the diagnosis. The most common test is a spirometry, which tests lung functioning.⁶

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¹ "What Is COPD?", 2013
² "What Is COPD?", 2013
³ Mayo Clinic Staff. "COPD Causes," 2015
⁴ Mayo Clinic Staff. "COPD Tests and Diagnosis," 2015
⁵ “Smoking and COPD,” 2016
⁶ Mayo Clinic Staff. "COPD Tests and Diagnosis," 2015
Etiology:

The leading cause of COPD is inhaling irritants, especially tobacco. Smoking is behind 80% of all COPD cases. Smoking, especially long-term, degrades lung quality over time. The toxins in tobacco tighten lungs’ airways, cause inflammation, and destroy the lungs’ alveoli. Even if a person does not smoke, a study in China by He et al. found that cumulative exposure to secondhand smoke is causation for developing COPD. Inhaling other irritants, such as air pollution, dust, and chemicals, at home or at work can contribute to COPD development. About 1% of all COPD cases are genetic. Alpha-1 Antitrypsin (AAT) is a protein that is secreted by the liver; its purpose is to protect the lungs from inflammation. If a person inherits AAT deficiency, the protein accumulates in the liver, putting the liver and lungs at risk for disease. Patients who genetically develop COPD usually present symptoms at a younger age.

Case Study:

For the purpose of anonymity, the case study patient’s name is Kelly. Kelly is a 33-year-old woman. She has lived in downtown Pittsburgh for the past 15 years. Kelly was a social smoker in college and averaged 1 to 2 cigarettes per weekend. She has not smoked a cigarette since her early twenties. Her husband, whom she has lived with for the past 7 years, smokes a pack a day; he smokes frequently in their home and shared car. For the past few months, Kelly has experienced a nagging cough. She has increasingly noticed more mucus in her cough. Kelly reported her cough is the worst when she first wakes up, and it takes several minutes to clear her

7 “Smoking and COPD,” 2016
8 “What Causes COPD,” 2016
9 He, Y. et al., 2012
10 Mayo Clinic Staff. "COPD Causes,” 2015
11 “What is Alpha-1”, 2016
chest. Her husband reported that Kelly has much less energy than she used to, and seems more run down than her typical upbeat self. Kelly’s father was diagnosed with liver disease before passing away at age sixty-five. After a blood test, Kelly’s blood was found to have an AAT deficiency. This, along with her symptoms, confirmed her COPD diagnosis.

**Prognosis & Comorbidities:**

There is currently no cure for COPD. With the right treatment and lifestyle, the symptoms are manageable and people can still have a good quality of life. Unfortunately, with COPD comes the risk of developing many additional diseases. In a 2010 national study on residential facilities, less than 3% of COPD patients did not have a comorbidities.\(^{12}\) As mentioned above, having an AAT deficiency, as Kelly does, means there is a risk for having liver disease because the abnormal proteins are trapped in the liver.\(^{13}\) Additionally, COPD is commonly associated with: arthritis, congestive heart failure, diabetes, coronary heart disease, and asthma.\(^{14}\) COPD is also linked with higher rates of influenza and pneumonia because the lungs are more susceptible to infection.\(^{15}\)

**Modifiable Factors:**

In order to have the most positive outcome possible, Kelly should combine lifestyle changes and medicinal therapy. The biggest lifestyle change Kelly can make is removing herself from secondhand smoke exposure. Kelly should also meet with a new nutritionist to find a meal plan that will maximize her energy and maintain a healthy weight. Since Kelly’s disease has

\(^{12}\) Wheaton, AG et al, 2010  
\(^{13}\) Sandhaus, 2015  
\(^{14}\) Wheaton, AG et al, 2010  
\(^{15}\) Wesseling, 2007
underlying genetic causes, her first treatment should be weekly AAT replacement therapy. Recent updates report that AAT therapy significantly reduces mortality and slows COPD progression.\textsuperscript{16} Kelly should also use a bronchodilator to help open up her airways and steroids to help reduce lung inflammation. Compared to a placebo, bronchodilators significantly reduce COPD symptoms.\textsuperscript{17} A different study showed that quality of life was positively correlated with steroid intervention for people with COPD.\textsuperscript{18} In order to reduce her risk of comorbidities, Kelly should also stay up to date on her flu shot vaccine.

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\textsuperscript{16} Casas, F. et al., 2015
\textsuperscript{17} “Bronchodilators,” 2015
\textsuperscript{18} Daga, MK et al., 2014
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