Preconference Form

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Medical Diagnosis/Disease: COPD

NCLEX IV *(8)*: Physiological Integrity/Physiological Adaptation

NCLEX IV *(7)*: Reduction of Risk

Anatomy and Physiology

Normal Structures

Upper respiratory tract includes nose mouth, pharynx, epiglottis, larynx, and trachea. Air passes through the structures and moves into the lower structure

The lower respiratory system includes the following: Trachea: pipelike structure that contains muscles and connective tissue and is responsible for moving inhaled air down into the lungs. The trachea divide into the left and right main bronchi at a point called the carina. Bronchi: conduct air to the lungs so that gas exchange can occur, it is lined with a mucus layer that plays a role in protecting the lungs from inhaled pathogens. It is composed of three sections the main bronchus (left & right), the right bronchus has a more vertical course and is shorter and wider (more likely to occur in the right lung than left). The main bronchi then branch out to the secondary lobar bronchi, then to the tertiary segmental bronchi. As the airways get smaller they have more branches. Bronchioles: branches that run into the lungs getting progressively smaller the deeper the go into the lungs and end into alveolar ducts. Lungs: the main respiratory organ where gas exchange occurs the right lung has 3 lobes and the left has 2 lobes. Normal tidal volume for an adult is 500 mL. Alveoli: tiny air filled sacs located at the end of the bronchioles, surrounded by capillaries where gas exchange occurs (inhaled O2 enters bloodstream and CO2 exits bloodstream and is exhaled). The lung has over 3 million alveoli (~0.3mm). They are connected by pores of Kohn, deep breathing helps with air movement

The smooth muscles allow for bronchoconstriction and bronchodilation.

Gases are exchanged over the alveolar-capillary membrane that's in contact with pulmonary capillaries and O2 and CO2 more back and forth by diffusion. Surfactant is a lipoprotein that lowers surface tension and helps reduce the amount of pressure needed to inflate the alveoli. The lungs have two types of circulation: pulmonary & bronchial. Pulmonary circulation provides the lung with blood and oxygenates it and moves through the heart to the rest of the body tissue. Blood comes from the pulmonary artery (only artery carrying deoxygenated blood) and becomes oxygenated, then returns to the heart via the pulmonary veins into the left atrium. The chest wall consists of the mediastinum which separates the right & left lungs. The cavity is lined with the pleura which is divided into 2 membranes parietal

Pathophysiology of Disease

Defined as a progressive lung disease, where they is persistent airflow limitation. COPD is an abnormal inflammatory response (neutrophils, macrophages, and lymphocytes caused by cigarette smoke, noxious particle, and gases. It results in small airway remodeling and narrowing, excess mucus production, vascular changes, pulmonary blood vessels & parenchymal (alveolar tissue with respiratory bronchioles, alveolar ducts, and terminal bronchioles) inflammation, which leads to airflow limitations & obstructions. COPD is complex and include many different mechanism. A key feature of COPD airflow limitation not fully reversable during forced exhalation, caused by loss of elastic recoil and airflow obstruction (mucus hypersecretion, mucosal edema, and bronchospasm). As COPD worsens air trapping, gas exchange, and abnormalities in airflow limitation get worse. In very severe cases pulmonary hypertension and systemic manifestations can occur. It can impair or destroy areas of lung tissue. Inability to expire is a common characteristic. The main site of airflow limitations is in the smaller airways and air becomes progressively trapped during expiration leading to a barrel shaped chest. COPD can lead to excess mucus production resulting in a productive cough. Pulmonary vascular changes can occur late in COPD. Chronic inflammation is an underlying issue, osteoporosis and diabetes have occurred.

It's the third leading cause of death worldwide (& in the US) (3.23 million deaths in 2019 worldwide & >140,000 deaths each year in the US). Around 16 million adults in the US have COPD. It is not usually diagnosed until it is moderately advanced. Slightly more common in men & they tend to have a poorer response to O2 therapy. Rates in women are increasing due to more women smoking, women who smoke are 50% more likely to develop COPD than men who smoke, and women who have COPD have lower quality of life, more exacerbations, less phlegm, and increased dyspnea.

COPD exacerbation is an acute worsening on the respiratory symptoms. Respiratory infections are common causes of these

Classifications GOLD system (FEV = forced expiratory volume)

Mild: FEV1 ≥80% predicted
Moderate: FEV1 50-80% predicted
Severe: 30-50% predicted
Very severe: <30 % predicted

Anticipated Diagnostics

Labs

Arterial blood gases
Serum α1-antitrypsin levels
Sputum culture

Additional Diagnostics

Chest X-ray
H&P
COPD assessment test or clinical COPD questionnaire
Spirometry
6 minute walk test (used to measure exercise tolerance in patients with COPD)
O2 sat

Thoracentesis (aspirate pleura fluid; needle inserted into the pleura space to remove fluid) can be done for diagnostics or therapeutic reasons (relive symptoms). Possible complications pneumothorax, intrapleural bleeding, hemoptysis, reflex bradycardia or hypotension, pulmonary edema. Post procedure: monitor vitals, apply bandage, turn pt on unaffected side for 1 hour, obtain CXR to check for pneumothorax,

(chest wall) & visceral (lungs). The intrapleural space is between the two and contains 10-20 mL of fluid to provide lubrication and increases unity. O2 and CO2 move back and forth through the alveolar-capillary membrane from high to low conc. Inspiration is the movement of air into the lungs. Expiration is the movement of air out of the lungs. Compliance: ability of lungs to expand. Resistance: any obstacle to airflow during ventilation. Breathing is controlled in the medulla.

NCLEX II *(3)*: **Health Promotion and Maintenance**

NCLEX IV *(7)*: **Reduction of Risk**

Contributing Risk Factors	Signs and Symptoms	Possible Therapeutic Procedures	Prevention of Complications
Smoking Infection Asthma Air pollution Occupational chemicals and dusts Aging Genetics (Alph)a-1 Antitrypsin Deficiency	Chronic cough Dyspnea Chest heaviness Acessory muscle use when breathing Wheezing Chest tightness Fatigue Weight loss Barrel chest Sputum production	Non-surgical Pulmonary rehab Long term O2 Immunizations (Flu, covid, pneumococcal) Exercise plan Surgical Lung volume reduction Bullectomy (removes air pockets from lungs) Lung transplant Thoracentesis (aspirate pleura fluid; needle inserted into the pleura space to remove fluid) can be done for diagnostics or therapeutic reasons (relive symptoms)	Exacerbations Pulmonary hypertension Acute respiratory failure Cor Pulmonale (right sided heart failure due to long term pressure in pulmonary arteries) Bacterial infections (including pneumonia) CAD, heart failure Anxiety and depression Weight loss Normocytic anemia

NCLEX IV *(6)*: **Pharmacological and Parenteral Therapies**

NCLEX IV *(5)*: **Basic Care and Comfort**

NCLEX III *(4)*: **Psychosocial/Holistic Care Needs**

Anticipated Medication Management	Non-Pharmacologic Care Measures	What stressors might a patient with this diagnosis be experiencing?
Bronchodilators (short-acting beta-2 agonists) (long-acting beta-2 agonists) Corticosteroids Anticholinergics Combination inhaled medicines Antibiotics Anti inflammatory	Tripoding O2 Airway clearance techniques Breathing exercises Proper hydration & nutrition	Guilt Effects on family dynamics Finical stress Being overwhelmed Nicotine withdraw/ smoking cessation Job related stress/loss of job Changes to routine Disease progression Fear of unknown

Client/Family Education

NCLEX I *(1)*: **Safe and Effective Care Environment**

List 3 potential teaching topics/areas	Multidisciplinary Team Involvement (Which other disciplines do you expect to share in the care of this patient)
□ Inform on effects of smoking & give resources on how to quit / smoking cessation □ Education on techniques such as tripoding and use of O2 to help improve symptoms □ Education on current medications (what they do, side effects, interactions, etc.)	Pulmonologist Respiratory therapist Social worker/case manager or psychologist Nutritionist Thoracic surgeon PT & OT General practician (GP)