

Preconference Form

Student Name: Olivia Creamer

Medical Diagnosis/Disease: Respiratory System/ COPD

NCLEX IV (8): Physiological Integrity/Physiological Adaptation

NCLEX IV (7): Reduction of Risk

Anatomy and Physiology Normal

Structures

Upper respiratory Tract: nose, mouth, pharynx (nasopharynx, larynx), epiglottis, & larynx

Nose: divided into 2 nares by the nasal septum. The nose protects the lower airway by warming & humidifying air and filtering small particles before it enters the lungs

Epiglottis: small flap behind the tongue that closes over the larynx during swallowing, preventing solids & liquids from entering the lungs.

Lower Respiratory Tract: trachea, bronchi, bronchioles, alveolar ducts, & alveoli

Trachea: divides into the R & L mainstem bronchi at the carina.

- The carina is highly sensitive and if stimulated, causes vigorous coughing.

Bronchi: the R mainstem bronchus is shorter, wider, and straighter than the L- explaining why aspiration is more likely to occur in the R lung than the L

Bronchioles: encircled by smooth muscles that constrict & dilate in response to stimuli

Alveoli: primary site of gas exchange. They are interconnected by pores of Kohn, which allow movement of air from alveolus to alveolus.

- Deep breathing promotes movement through the pores & helps move mucus out of the respiratory bronchioles
- Alveoli are unstable, so alveolar cells secrete **surfactant:** a lipoprotein that lowers the surface tension in the alveoli. Surfactant reduces the amt of pressure needed to inflate the alveoli & make them less likely to collapse.

Ventilation: inspiration, expiration

- Air moves in & out of the lung's b/c of intrathoracic pressure changes in relation to the pressure at the airway opening
- Expiration: passive; elastic recoil is the tendency for the lungs to return to their original size after being stretched. Elasticity of lung tissue is due to the elastin fibers found in the alveolar walls & surrounding the bronchioles and capillaries.

Pulmonary Circulation: provides the lungs w/ blood that takes part in gas exchange

Bronchial Circulation: starts w/ bronchial arteries, which arise from the thoracic aorta. Does not take part in gas exchange, but provides O₂ to the bronchi & other lung tissue

Cough Reflex: protective reflex that clear the airway by a high-pressure, high-velocity flow of air. Is a "backup" for mucociliary clearance

Reflex Bronchoconstriction: when we inhale large amounts of irritating substances, the bronchi constrict to prevent the entry of irritants

Normal Tidal Volume: approx. 500 mL

Pathophysiology of Disease

Chronic inflammation of the airways, lung parenchyma (bronchioles & alveoli), and pulmonary blood vessels.

- Inflammatory process starts w/ inhalation of noxious particles/ gases. With repeated exposure, chronic inflammation causes tissue destruction & disrupts the normal defense mechanisms
- Predominant Inflammatory Cells: neutrophils, macrophages, & lymphocytes

Key feature: Airflow limitation caused by loss of elastic recoil & airflow obstruction (mucus hypersecretion, mucosal edema, & bronchospasm)

COPD & Expiration: As peripheral airways become obstructed, air is progressively trapped during expiration. **As air is trapped in the lungs, the chest hyper-expands and becomes barrel shaped.**

- As a result, functional residual capacity (FRC) increases → **making passive exhalation difficult ("overinflated state")**

Ventilation/ Perfusion (V/Q): As air trapping increases, walls of alveoli are destroyed. Bullae & blebs (air spaces) can form on the lungs and cause a significant V/Q mismatch; leading **to CO₂ retention.**

COPD & the CV System: The small pulmonary arteries vasoconstrict due to hypoxia. As COPD advances, the structure of the pulmonary arteries changes (thicken) → increasing the pressure in the pulmonary arteries (aka pulmonary HTN)

- Can lead to HF

Classifications of COPD:

Mild: FEV₁ >80% predicted

Moderate: FEV₁ 50-80% predicted

Severe: FEV₁ 30-50% predicted

Very severe: FEV₁ <30% predicted

- FEV₁/FVC ratio of <70 establishes the diagnosis of COPD
- FEV₁ determines stage of COPD (severity of obstruction)

COPD Prognosis:

- Severity: Those w/ stage 3 or 4 COPD have a life expectancy that is 6-9 years shorter than average (early-stage COPD can live a normal lifespan)
- Treatment adherence: Can improve prognosis by 20-25%

Anticipated Diagnostics Labs

ABG's (Arterial Blood Gases): identify the severity of the exacerbation

Serum a1- antitrypsin levels: assesses liver & lung function

C-reactive protein (CRP): identifies degree of pulmonary inflammation

- Erythrocyte sedimentation rate (ESR)

CBC: assesses overall health of the patient

pH
BUN

Additional Diagnostics

Spirometry: confirms the presence of airflow obstruction & determines the severity of COPD

CXR: may show a flat diaphragm due to hyperinflated lungs

Walk Test w/ O₂ Saturation

ECG: may be normal or show signs of RHF

Pulmonary Function Tests (PFTs)
CT scan

Global Initiative for Chronic Obstructive Lung Disease (GOLD)

NCLEX II (3): Health Promotion and Maintenance

Contributing Risk Factors
Cigarette Smoking: Causes hyperplasia of the cells, reducing airway diameter
Infection: Severe, recurring respiratory infections
Asthma: Many patients with COPD also have asthma (asthma-COPD overlap syndrome)
Air Pollution: high levels of urban air pollution
Occupational chemicals & dusts: various dusts, irritants, vapors, or fumes
Aging: Research is unclear
Weight: Underweight clients are at a higher risk
Genetics: “Z” allele of the AAT protein; family Hx
Alpha-1 Antitrypsin Deficiency: Protein made by the liver that is found in the lungs

Signs and Symptoms
Chronic, intermittent cough or sputum production, dyspnea, & a Hx of exposure to risk factors for the disease
 - Typically dyspnea with exertion
 Chest heaviness, not being able to “take a deep breath”, gasping, increased effort to breathe, and air hunger
 - **Can impair ability to perform ADLs**
 In late stages: dyspnea at rest, “chest breathing” (use of accessory muscles), wheezing & chest tightness, fatigue, wt. loss, anorexia, decreased breath sounds
 Tripod positioning & pursed lip breathing
 Hypoxemia with cyanosis: bluish-red skin color
 - Increased production of WBC’s as body tries to compensate

NCLEX IV (7): Reduction of Risk

Possible Therapeutic Procedures
Non-surgical
Oxygen Therapy: linked to improved survival
Drug Therapy: Bronchodilators, Short-Acting B2 Adrenergic Agonists (SABA), LABAs, Anticholinergics, Mucolytics
Breathing Exercises
Incentive Spirometry
Airway Clearance Techniques
Pulmonary Rehabilitation
Nutrition: fresh fruits, proteins, vegetables, & whole grains
Surgical
Lung Volume Reduction Surgery (LVRS): Goal is to reduce the size of the lung so the remaining healthy tissue can perform better
Bronchoscopic Lung Volume Reduction (BLVR): placing multiple 1-way valves by bronchoscopy
Bullectomy: 1 or more very large bullae are removed

Prevention of Complications
 (What are some potential complications associated with this disease process)
Pulmonary HTN & Cor Pulmonale: pressure on the R side of the heart must increase to push blood into the lungs
 - **Cor Pulmonale**: Results from pulmonary HTN.
Acute Exacerbations: acute event characterized by a worsening of the patient’s respiratory Sx’s.
Acute Respiratory Failure (ARF): May require mechanical ventilation and ICU admission
Respiratory Infections
Mental Health Challenges
Polycythemia
Pneumothorax
Avoid Lung Irritants: Smoking cessation, avoiding triggers
 Stay Active & Moving
 Stay UTD on Vaccinations
 Eat a healthy, balanced diet
 Take maintenance medications as Rx’d
 F/U with medical personal PRN/ report to ER for sudden changes in Sx’s.

NCLEX IV (6): Pharmacological and Parenteral Therapies

Anticipated Medication Management
 Bronchodilators: Salbutamol
SABA: albuterol/ LABA: salmeterol & formoterol
 Anticholinergics: ipratropium
 ICSs: Fluticasone
 Methylxanthines: theophylline
 Roflumilast (daliresp)
 Mucolytic: acetylcysteine

NCLEX IV (5): Basic Care and Comfort

Non-Pharmacologic Care Measures
Smoking cessation, Pulmonary Rehabilitation, Exercise, Breathing Exercises (Deep breathing, coughing, splinting), Patient Education Programs, Hydration (Thin Secretions), Health/ Balanced Diet, Vaccinations
 - Oxygen Therapy (Consider long-term)

NCLEX III (4): Psychosocial/Holistic Care Needs

What stressors might a patient with this diagnosis be experiencing?
 Fear/ Anxiety/ Depression r/t not being able to breathe
 Difficulty sleeping
 Inability to perform ADLs/ enjoyable activities
 - Isolation
 Self-blaming/ Guit (partaking in ↑ risk behavior)
 Relationship changes/ Sexual dysfunction
 Stress r/t socioeconomic status: ability to afford healthcare or missed time at work

Client/Family Education

List 3 potential teaching topics/areas
Importance of avoiding irritants: Smoking cessation/ second-hand smoke exposure. Workplace pollution exposure.
When to report to HCP or ER: Severe difficulty breathing, COP, circumoral cyanosis, confusion/ disorientation/ difficulty speaking, heart palpitations, and high fever.
Importance of maintaining a healthy lifestyle: Can significantly improve oxygenation and endurance. Frequent exercise & healthy eating can reduce inflammation and fight off infections.

NCLEX I (1): Safe and Effective Care Environment

Multidisciplinary Team Involvement
 (Which other disciplines do you expect to share in the care of this patient)
 Pulmonologist, Pulmonary Rehabilitation Specialist, **Respiratory Therapy**, Nutritionist/ Dietitian, PT/OT, Pharmacists, Physiotherapist, Social worker/ Case Manager, Smoking Cessation Counselor, and Mental Health Specialists (Possibly group counseling)