ATI Real Life Student Packet
N201 Nursing Care of Special Populations
2025

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Inpatient Cystic Fibrosis

To Be Completed Before the Simulation

*****Blue boxes should be completed using textbook information. What do you expect to find? This information should be collected before you start the ATI simulation*

Medical Diagnosis: Cystic Fibrosis

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

Anatomy and Physiology
Normal Structures

Upper respiratory tract:

Nose: Air enters the respiratory tract through the nose. The nasal cavity is made of up pseudostratified ciliated columnar epithelial cells, also called respiratory epithelium, that make up most of the respiratory tract. It is made of bone and cartilage and is divided into 2 nares from the nasal septum. The inside of the nose has 3 turbinates, projections of a passage that increase surface area of nasal mucosa. This mucosa warms and moistens the air as it enters the nose to protect the lower airways and lungs by filtering out small particles. Nose hairs collect any dirt and dust from entering the passages, and cilia which act like hairs to further collect dust to move them outside the body. The internal nose opens directly into the 4 sinuses: frontal, ethmoid, maxillary, and sphenoid. What causes the sense of smell is from the olfactory nerve that is found in the upper mucosa of the nasal cavity.

Mouth: Also called the oral cavity, is where air enters the respiratory tract through to the oropharynx.

Pharynx (3): The pharynx is a tubular passageway that has 3 parts: naso/oro/ laryngo pharynx (superior to inferior) connecting to the epiglottis.

Epiglottis: A small flap behind the tongue that closes when one swallows to prevent anything but air from entering the larynx and further into the lungs.

Larynx: This is where the vocal cords are located and where air travels to after the epiglottis. The opening between the vocal cords is called the glottis, where air then travels though the trachea.

Trachea: This is made of up many U-shaped cartilage rings of connective tissue It is about 5 in. long and 1 in. wide and allows for opening but is flexible enough to allow for esophagus to expand. The trachea further divides into the right/left bronchi at the carina that is located at the *Angle of Louis*, 4-5th thoracic vertebrae. It is highly sensitive and if stimulated, can cause excessive coughing.

Lower respiratory tract:

Bronchi: This consists of the right and left mainstem, that divide further into the lobar, segmental and subsegmental bronchi. The trachea and bronchi transfer gases to and from the alveoli, and this volume is called the anatomic dead space that does not take part in gas exchange. In adults, the air that does take part is called the tidal volume, and the normal amount is 500mL (in a 150 lb man, and about 150mL of this is anatomic dead space; the rest of the 350mL is exchanged in the alveoli).

Bronchioles: The most proximal bronchioles are the non-respiratory while the most distant are the respiratory. They have smooth muscle that constrict and dilate. This is where the term bronchoconstriction and bronchodilation refer to.

Alveolar ducts: They are made up of smooth and connective tissue that connect the bronchioles to the alveoli.

Alveoli: They are small grape-like sacs that are the primary center for gas exchange of CO2 and O2. The normal adult lung has over 300 million alveoli, each 0.3mm wide. They are interconnected by Pores of Kohn, and deep breathing allows air to move through them to help move mucus out of the bronchioles. Alveoli produce surfactant, a lipoprotein, that lowers surface tension and reduces the amount of pressure needed to inflate them to make them less likely to collapse.

Alveoli-Capillary membrane: This is where gas is exchanged from the alveoli into the pulmonary capillaries of the lungs.

NCLEX IV *(7)*: Reduction of Risk

Pathophysiology of Disease

Characterized by exocrine (mucous-producing) gland dysfunction that produces multisystem involvement.

-autosomal recessive defective gene from both parents (25% risk w/ each pregnancy of acquiring) located on chromosome 7 coding for a protein of 1480 amino acids called the cystic fibrosis transmembrane conductance regulator (CFTR). Related to a family of membrane-bound glycoproteins that constitute a cAMP-activated chloride channel & regulate other chloride & Na channels at the surface of epithelial cells.

-1/3,500 live births, mostly whites; 1/15,000 African Americans, 1/9,200 Hispanics.

Patho

-↑ viscosity of mucous gland secretions, ↑ of sweat electrolytes, ↑ inn several organic & enzymatic constituents of saliva, abnormalities in ANS function

-↓ pancreatic secretion of bicarb & Cl and an ↑ in Na/Cl in both saliva & sweat

-sweat electrolyte abnormality present from birth, continues throughout life, & is unrelated to severity of disease or extent to which other organs are involved. The Na/Cl content in sweat is 98-99% of children w/ CF is 2-5x ↑ than children w/o it

-**primary factor:** mechanical obstruction caused by ↑ viscosity of mucous gland secretions which produce a thick, mucoprotein that accumulates & dilates them. Small passages in organs such as the pancreas & bronchioles → obstructed as secretions precipitate / coagulate to form concretions in glands/ducts

-leads to **pancreatic fibrosis** caused by cystic dilations of the acini (small lobes of the gland) that undergo degeneration & progressive diffuse fibrosis → prevents essential pancreatic enzymes from reaching duodenum → impairment in digestion & absorption of nutrients (esp. fat & proteins) → bulky stools that are frothy (steatorrhea) & foul-smelling from putrefied protein (azotorrhea)

-**Cystic fibrosis-related diabetes (CFRD)** > in CF children r/t changes in pancreatic architecture & ↓ blood supply. ≈40-50% will develop if by 30YO. Severe insulin deficiency occurs from B-islet cells dysfunction & insulin resistance may occur (esp. during acute illness). CFRD has characteristics of Type 1 & 2 DM in that adequate insulin is a key factor in maintaining nutritional status correlating w/ optimal lung function

Lungs (2): The right lung is divided into 3 lobes (upper, middle, and lower), and the left lung is divided into 2 lobes (upper and lower). Except for the right and left mainstem bronchi, all other lower respiratory structures are found within the lungs. These, pulmonary vessels, and nerves enter the lungs through the hilus, with the right mainstem bronchi being shorter, wider, and straighter than the left due to the anatomical positioning of the heart. This is also why aspiration is more likely to occur in the right lung. Defense Mechanism: 1) Air filtration: velocity and air turbulence to remove bacteria and large particles to be removed before they reach the alveoli. 2) Mucociliary Clearance System: mucociliary escalator moves mucous and debris from distal lung areas. 3) Cough reflex: high-pressure, high-velocity flow of air acting as a backup for mucociliary clearance. 4) Reflex bronchoconstriction: inhaling large irritants cause bronchi to constrict to prevent entry. 5) Alveolar Macrophages: no ciliated cells below respiratory bronchioles, so defense are the macrophages that phagocytize bacteria or other inhaled foreign particles. 2 types of circulation: pulmonary: provides lungs w/ blood, pulmonary artery receives deoxygenated blood rom right ventricle, and gets oxygenated in lungs by gas exchange in pulmonary capillaries, then the pulmonary vein returns oxygenated blood to right atrium/ventricle, then out the aorta to systemically circulate. Bronchial: from bronchial arteries that arise from thoracic aorta that does not take part in gas exchange but provides O2 to bronchi and other ling tissues. Deoxygenated blood returns through the azygos vein into the SVC.		-**liver**: focal biliary obstruction (cholelithiasis) & fibrosis become more extensive w/ time → distinctive type of multilocular biliary cirrhosis & some develop extensive liver involvement w/ fatty infiltration despite adequate nutrition. -**symptoms** produced by stagnation of mucous in airways, w/ eventual bacterial colonization → destruction of lung tissues, scattered areas of bronchiectasis, atelectasis, & hyperinflation. In severe, progressive lung involvement, compression of pulmonary blood vessels & progressive lung dysfunction frequently lead to pulm. HTN, cor pulmonale, resp. failure, & death -**most common pathogens responsible**: *P. aeruginosa, Burkholderia cepacia*, MRSA, *Burkholderia dolosa, S. aereus, H. influenzae, E. coli, Klebsiella pneumoniae* Children w/ CF who are chronically colonized have worse survival rates than those who aren't -**reproductive**: glands in uterin cervix are often filled w/ mucous & copious amounts of mucous may block the cervical canal & prevent sperm entry. >95% M are sterile r/t obliteration or atresia of epididymis, vas deferens, & seminal vesicles → ↓/absent spermatogenesis -G&D: physical growth may be restricted from ↓ absorption of nutrients (vitamins & fat), ↑ O2 demands, delayed bone growth. ↑ weight loss despite ↑ appetite & gradual deterioration of resp. system.

To Be Completed Before the Simulation

Anticipated Patient Problem: **Ineffective airway clearance**

Goal 1: Pt will have vesicular breath sounds, RR b/t 16-20, unlabored and regular depth of breathing, without coughing during my time of care.

Relevant Assessments (Prework) What assessments pertain to your patient's problem? Include timeframes	**Multidisciplinary Team Intervention** (Prework) What will you do if your assessment is abnormal?
Assess VS (esp. O2 & RR) q4hr & prn	Apply O2 supplementation as ordered w/ appropriate delivery device
Assess lung sounds & work of breathing q4hr & prn	Collaborate w/ RT to administer nebulizer &/or inhaler as ordered
Assess characteristics of sputum prn	Administer IV fluids as ordered
Assess skin coloration q4hr & prn	Encourage IS 10x/hr qhour
Assess cough characteristics q4hr & prn	Collaborate w/ RT to perform chest PT & CF vest
Assess LOC & mental status q4hr & prn	Elevate HOB & utilize humidifier in room

Goal 2: Pt will maintain an O2 saturation b/t 95-100% on RA during my time of care.

To Be Completed Before the Simulation

Anticipated Patient Problem: **Risk for infection**

Goal 1: Pt will be free some s/sx of infection such as T between 36.0-38.0, HR between 60-100bpm, & RR between XXX

Relevant Assessments (Prework) What assessments pertain to your patient's problem? Include timeframes	**Multidisciplinary Team Intervention** (Prework) What will you do if your assessment is abnormal?
Assess sputum characteristics q4hr & prn	Obtain sputum C&S 1st thing in the morning upon waking
Assess for hygiene habits q8hr & prn	Encourage effective & frequent hand washing of pt & everyone going in & out of the room
Assess VS (esp. RR, HR, T) q4hr & prn	Administer antipyretic as ordered
Assess IgE, CBC, ESR, & CRP levels as ordered	Administer ABx as ordered
Assess rooming status upon floor admission	Advocate for pt to receive a private room
Assess vaccination status upon admission	Administer any required vaccines, such as influenza as ordered

Goal 2: Pt will not show s/sx of purulent secretions or elevated lab values showing infection, such as WBC between 5-10.

To Be Completed During the Simulation:

Actual Patient Problem #1:
Goal: Met: ☐ Unmet:☐
Goal: Met: ☐ Unmet:☐

Actual Patient Problem #2:
Goal: Met: ☐ Unmet:☐
Goal: Met: ☐ Unmet:☐

Additional Patient Problems:
#3
#4
#5
#6

Below will be your notes, add more lines as needed. **Relevant Assessments:** Indicate pertinent assessment findings. **Multidisciplinary Team Intervention:** What interventions were done in response to your abnormal assessments? **Reassessment/Evaluation:** What was your patient's response to the intervention?

Patient Problem (#)	Time	Relevant Assessments	Time	Multidisciplinary Team Intervention	Time	Reassessment/ Evaluation

To Be Completed After the Simulation

The orange boxes should be filled out with your simulation patient's actual results, assessments, medications, and recommendations

NCLEX IV *(7)*: Reduction of Risk

Actual Labs/ Diagnostics

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

Signs and Symptoms

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

Contributing Risk Factors

Therapeutic Procedures

Non-surgical

Surgical

NCLEX IV *(7)*: Reduction of Risk

Prevention of Complications

(Any complications associated with the client's disease process? If not what are some complications you anticipate)

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

Medication Management

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

Non-Pharmacologic Care Measures

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

Stressors the client experienced?

Client/Family Education

Document 3 teaching topics specific for this client.

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

Multidisciplinary Team Involvement

(Which other disciplines were involved in caring for this client?)

Patient Resources

Reflection Questions

Directions: Write reflection including the following:

1. What was your biggest “take away” from participating in the care of this client?
    a.

2. What was something that surprised you in the care of this patient?
    a.

3. What is something you would do differently with the care of this client?
    a.

4. How will this simulation experience impact your nursing practice?
    a.

5. Discuss norms or deviations of growth and development that was experienced during the simulation, including developmental stage.
    a.