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ATI Scenario: 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

NCLEX IV (7): Reduction of Risk

Anatomy and Physiology
Normal Structures

Respiratory system consists of the transport of O₂ and the elimination of CO₂ which is the waste product.

The respiratory system consists of an upper and lower tract. In the upper tract, includes the nasal cavity which moistens the air that we breathe in. It also consists of the pharynx which is known as the throat. In this area, air and food is common and is differentiated by the epiglottis which closes over to prevent food or liquids from entering the trachea. The trachea is made of cartilage that branches into 2 parts which will lead to the bronchi. In the lower respiratory system, includes the right lung which has 3 lobes known as the upper, middle, and lower, whereas the left lung has 2 lobes known as the upper, and lower. The bronchi branches into bronchioles that constrict and dilate to allow air to enter the alveolar ducts. Within the alveolar ducts, includes the "Pores of Kohn" which is the exchange site for oxygen and carbon dioxide. Alveoli also produces surfactant which allows the alveoli to stay inflated.

Lungs gave 2 different circulation types, pulmonary and bronchial. Pulmonary circulation allows the lungs to take part in gas exchange. The pulmonary artery takes deoxygenated blood from the right ventricle and delivers to the pulmonary capillaries that are beside the alveoli. This is where O₂ and CO₂ exchange occurs. The pulmonary veins return oxygenated blood to the left atrium which delivers to the left ventricle into the systemic circulation.

Bronchial circulation is when the bronchial arteries which come from the thoracic aorta. Bronchial circulation is not apart of gas exchange but provides oxygen to bronchi and lung tissues.

Chest cavity is lined with parietal pleura, whereas the lungs are lined with a membrane known as visceral pleura. These pleurae prevent friction between the thoracic cage and the lungs. Intrapleural space contains 10-20 mL of fluid, to provide lubrication, and to allow pleural layers to slide against each other during breathing. Fluid from this pleural space drains into the lymphatic system.

Diaphragm is the muscle that contracts as inspiration occurs, it moves downward and increases thoracic volume. The intercostals relax during this and external intercostal muscles contract.

The process of oxygenation is when oxygen is obtained from atmospheric air and made available to organs and tissues¹ of body. When the lung can oxygenate arterial blood, this is known as partial pressure O₂. Oxygen is carried in blood by either dissolving or hemoglobin- bound oxygen. SaO₂ is the amount of O₂ bound to hemoglobin compared to how much hemoglobin can carry. O₂ and CO₂ move back and forth across the alveoli capillaries through diffusion.

Ventilation is inspiration and expiration. Air moves in and out of lungs through intrathoracic pressure changes to pressure at the airway opening. Diaphragm contracts and external intercostal, scalene muscles increases the chest dimensions. Gas flows from and area of higher pressure to lower pressure.

Compliance is the lungs' ability to expand. This is because of the elasticity of lungs and elastic recoil of chest wall. Resistance is any obstacle that impedes airflow during inspiration or expiration. The factors affecting this is changes in diameter of the airway.

The medulla in the brainstem sends impulses to respiratory muscles through the spinal cord and phrenic nerves. The central chemoreceptors are found in the medulla. They respond to H⁺ ion concentrations.

Mechanical receptors are in the upper airway, chest wall, diaphragm, and alveoli capillaries. They can be stimulated by irritation, muscle stretching, etc.

Irritant receptors are found in airways and are sensitive to inhaled particles, when stimulated the cough reflex is triggered. Stretch receptor signals in the smooth muscle aid in respiration control. When the lungs inflate, the stretch receptors are activated to activate inspiration and inhibits the lung from expanding, known as the Hering- Breuer reflex

Pathophysiology of Disease

Cystic Fibrosis affects both upper and lower respiratory tracts. A disease of the small airways initially, then progresses to larger airway destruction of lung tissue. Mucus lining becomes dehydrated because of a decrease in chloride secretion and the absorption of sodium. Cilia end up becoming overwhelmed because of the build up of thick, mucus secretions. This allows mucus to impede the airways. Eventually, scarring of the airways occur, trapping air, and the hyperinflation of lungs occurs.

To Be Completed Before the Simulation

Anticipated Patient Problem: Impaired Gas Exchange

Goal 1: will maintain a SPO2 of 93% or greater on RA by the end of my care.

<p align="center">Relevant Assessments</p> <p align="center">(Prewrite) What assessments pertain to your patient's problem? Include timeframes</p>	<p align="center">Multidisciplinary Team Intervention</p> <p align="center">(Prewrite) What will you do if your assessment is abnormal?</p>
<p>Assess VS(RR, HR, SPO2) q4h and prn</p>	<p>Apply Oxygen Therapy via NC as prescribed by provider PRN(if SPO2 <90% RA)</p>
<p>Assess for restlessness & LOC q4h and prn</p>	<p>Maintain HOB 30-45 degrees continuously</p>
<p>Assess Capillary Refill q4h and prn</p>	<p>Collaborate w/ Respiratory Therapist to administer prescribed breathing treatment prn (if cap. Refill>3 seconds)</p>
<p>Assess lung sounds (crackles, rhonchi, wheezing, use of accessory muscles, labored) q4h and prn</p>	<p>Encourage the use of I/S 10x per hour q2h</p>
<p>Assess for sputum characteristics q4h and prn</p>	<p>Perform CPT prn as prescribed</p>
<p>Assess for fatigue when performing ADLs, eating, or during exertion Qshift and prn</p>	<p>Educate client on the importance of clustering activities and frequent rest periods Qshift and prn</p>

Goal 2: will participate in effective oxygenation procedures to optimize oxygenation such as incentive spirometer, deep breathing & coughing exercises by the end of my care.

To Be Completed Before the Simulation

Anticipated Patient Problem: Imbalanced Nutrition: Less than Body Requirements

Goal 1: will eat 75% or greater and drink 60 mL of more for every meal during my time of care.

<p align="center">Relevant Assessments</p> <p align="center">(Prewrite) What assessments pertain to your patient’s problem? Include timeframes</p>	<p align="center">Multidisciplinary Team Intervention</p> <p align="center">(Prewrite) What will you do if your assessment is abnormal?</p>
<p>Assess I &O Q4h and prn after urination</p>	<p>Collaborate w/ nutritionist to educate client on importance of eating a well-balanced diet such as low fats, low carbs, and high protein Qshift</p>
<p>Assess nutritional status q4h</p>	<p>Collaborate w/ Dietitian to provide Ensure protein supplement with each meal q4h</p>
<p>Assess current dietary preferences Qshift and prn</p>	<p>Encourage family to bring in outside food Qshift and prn</p>
<p>Monitor pre-Albumin lab level qday</p>	<p>Encourage to consume protein in meals (such as sausage, chicken breast, salmon, or meatloaf) q4h</p>
<p>Assess skin integrity (for possible pressure injuries) Qshift and prn</p>	<p>Apply wedges and reposition q2h</p>
<p>Assess bowel sounds (for distention, rigidity, constipation, passing flatus,) q4h</p>	<p>Collaborate w/ Gastroenterologist to insert Nasogastric tube prn</p>

Goal 2: will maintain appropriate caloric requirements according to gender and age during my time of care.

To Be Completed During the Simulation:

Actual Patient Problem #1: Impaired Gas Exchange
 Goal: will maintain a SPO2 of 93% or greater on RA by the end of my care. Met: Unmet:
 Goal: will participate in effective oxygenation procedures to optimize oxygenation such as incentive spirometer, deep breathing & coughing exercises by the end of my care. Met: Unmet:

Actual Patient Problem #2: Imbalanced Nutrition: Less than Body Requirements
 Goal: will eat 75% or greater and drink 60 mL of more for every meal during my time of care. Unmet:
 Goal: will maintain appropriate caloric requirements according to gender and age during my time of care. Met: Unmet:

Additional Patient Problems:
 #3: Interrupted Family Processes
 #4: Risk for Allergy Reaction
 #5: Readiness for enhanced family coping
 #6: Ineffective health management

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
1	SBAR report: 1210	Temp: 38.3C Hx of CF Recurrent episodes of fever	SBAR report:1210	RN admin. Acetaminophen 650 mg PO @1150	1235	admitted to general pediatric unit
1	1235	WBC- 19 CXR Lateral- RLL PNA & bilateral peri bronchial thickening, coughing	1246	Maintained contact precautions, wore gloves, gown, and mask upon entry	1245	Productive cough
3	1240	Mother stated, "it's been quite rough at home" and father stated "if Gary did what the provider asked of him, things might be a little better"	At admission	Utilized therapeutic communication and redirected client and parents	At admission	Admission process initiated
1	1245	WBC- 19 Positive for B. Cepacia Coughing upon admission	At Admission	Maintained & educated on the importance of isolation precautions	At Admission	Verbalized understanding
1	1250	Productive cough Wheezing in all lung fields posterior and anterior bilaterally IV Tobramycin ordered WBC-19	0100	Collaborated w/ Respiratory Therapist to admin. Albuterol 0.83% unit dose nebulizer & reviewed radiology report	0110	PICC line- no pain, pallor, edema, or drainage CXR- PICC line in place Not a lot of wheezing post-tx Ineffective cough
2	0100	Dx of FTT PEG tube placement Mother stated "Gary hasn't been eating well, with his infection he needs the extra calories" K- 3.5 Cl-103	0145	Admin. IV D5 1/2 NSS & 20 mEq KCL IV @80mL. hr	0230	PICC line- no pain, pallor, edema, or drainage Intake: 100 mL
		Previous note continued		Previous note continued	0300	Urine output- 320mL
1	0130	Productive cough Wheezing in all lung fields posterior and anterior bilaterally IV Tobramycin ordered WBC-19 Temp- 37.9C RR-26 SPO2-94% RA	0150	Admin. IV bolus 90mg Tobramycin & IV bolus 130 mg Gentamycin	0150	Pending AM WBC lab draw
4	0200	Allergy for cephalosporin IV bolus Piperacillin Tazobactam ordered	0230	Collaborated w/ MD to hold Piperacillin Tazobactam order	0232	Piperacillin Tazobactam withheld
6	RRT Breathing tx admin	Productive cough Ineffective cough Stated "I skip a lot of my treatments at home"	RRT Breathing tx admin.	Collaborated w/ RT to educate on importance of adhering to breathing treatments regularly	RRT post-admin	Verbalized understanding. Green sputum cx SPO2- 95% on RA Temp- 37.9C RR-24
2	Post CPT	Dx of FTT PEG tube placement Mother stated "Gary hasn't been eating well, with his infection he needs the extra calories" BMI >10 th percentile Weight:43.11 kg Height: 155.2 cm	At dinner	Admin. Pancrealipase 3 capsules PO w/ enteral feeding	Post dinner	Intake- 110 mL
2	Dinner time	PEG tube placement Dx of FTT Stated "I want some real food"	Dinner time	Collaborated w/ dietary to give hamburger bun, tator tots, skim milk, fruit- flavored yogurt	Dinner time	Ate 100% of meal, intake- 120 mL
5		Mother stated, "My husband and I		Educated that both parents need		Verbalized understanding

		are trying for another baby, what are the chances of the baby having cystic fibrosis”?		to have an abnormal gene for the child to have the disease		
--	=====	=====	=====	=====	=====	SPO2 maintained at 94% RA, participated in CPT w/ Respiratory Therapy, still productive ineffective cough, w/ green sputum, ate 100% of meal during my time of care, & drank 120 mL of skim milk. END OF SCENARIO

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

NCLEX II (3): Health Promotion and Maintenance

Actual Labs/Diagnostics
 WBC-19.0/ mm3
 Cr- 1.1
 K- 3.5
 Cl- 103
 CXR AP/ Lateral- consistent w/ chronic inflammatory lung disease and RLL PNA. PICC line in place

Signs and Symptoms
 Productive cough
 Ineffective cough
 Fever

NCLEX II (3): Health Promotion and Maintenance

NCLEX IV (7): Reduction of Risk

Contributing Risk Factors
 Caucasian
 Male
 FTT
 IUGR

Therapeutic Procedures
Non-surgical
 CPT

Surgical
 N/A

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

 Atelectasis
 PNA
 Respiratory Compromise
 Respiratory Distress

 Prevent with CPT, IV Abx

NCLEX IV (6): Pharmacological and

NCLEX IV (5): Basic Care and Comfort

NCLEX III (4): Psychosocial/Holistic Parenteral Therapies

Care Needs

Medication Management

- IV Tobramycin
- IV Gentamycin
- Albuterol nebulizer
- D5 ½ NSS w/ 20 MEq KCL
- Pancrealipase 3 Tablets PO (3x)

Non-Pharmacologic Care Measures

- Turn, cough, and deep breathing
- Reposition q2h

Stressors the client experienced?
 Familial stressors
 School stressors
 Missing friends
 Recurrent Hospitalizations
 Dysfunctional family process(stepfather)

Client/Family Education

Document 3 teaching topics specific for this client.
 • Educate client on importance of medication adherence.
 • Educated mother on probability of inheritance of future children with Cystic Fibrosis diagnosis.
 • Educated on importance of isolation precautions.

NCLEX I (1): Safe and Effective Care Environment

Multidisciplinary Team Involvement
 (Which other disciplines were involved in caring for this client?)
 Respiratory Therapist
 Dietary/ Nutritionist
 Laboratory
 Radiology
 Registered Nurse
 MD

Patient Resources
 Cystic Fibrosis education pamphlets

Reflection Questions

Directions: Write reflection including the following:

- 1. What was your biggest “take away” from participating in the care of this client? My biggest take away from participating in the care of this client is that I must be mindful of their pediatric age. Gary was still an adolescent trying to cope with recurrent hospitalizations.

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

Something that surprised me in the care of the client is that as I was caring for this client, the family was affected in the diagnosis of Cystic Fibrosis as well; therefore I had to not only educate the client but educate his family as well.

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

Something I would do differently is address his nutritional status more and provide additional resources.

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

This simulation experience will impact my nursing practice by allowing me to be more empathetic with the pediatric population and try to take in account that they are not adults yet and will have emotional stressors from being hospitalized.

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

Adolescent: strong need for self- identity, emotional/ physical separation need from parents, risk for falls