**Oxygenation Case Study**

John, age 66, comes to the emergency department with shortness of breath and left shoulder/back pain. During the night he had gotten up and fell hitting the footboard on his bed. He has a history of occupational lung disease resulting in COPD. His wife reports that he has been ill the past 2 weeks with a productive cough and increasing shortness of breath. This am the sputum was green. His ECG, anterior view chest x-ray, CK, and troponin are within normal limits. He is admitted to a telemetry unit with the admitting diagnosis of exacerbation of COPD and pneumonia. Medications taken at home are salmeterol inhaler 2 puffs 2 times a day and triamcinolone 2 puffs 2 times a day. He does have a history of type II diabetes for which he takes metformin.

Nursing Assessment

VS: BP - 168/98; HR - 116; R - 24 shallow and labored; POX 91% on RA; T - 102.1°F

Airway: chronic coughing spells with thick yellow/green sputum

Breathing: rhonchi and wheezes throughout the lung fields, crackles in the right base, diminished in left lower lung; c/o of a sharp pain in the left base with each breath

Circulation: +2 pitting edema in lower extremities; rhythm sinus tachycardia

Disability: A&Ox3; restless; has difficulty moving; c/o left shoulder pain, rates 5/5

Skin: hot and ashen

General Appearance: well nourished man with labored respirations; answers questions with difficulty

** Sinus Tachycardia**



Looking at the ECG you'll see that:

 Rhythm - Regular

 Rate - More than 100 beats per minute

 QRS Duration - Normal

 P Wave - Visible before each QRS complex

 P-R Interval - Normal

 The impulse generating the heart beats are normal, but they are occurring at a faster pace than

 normal. Seen during exercise

Which of the following positions would be most appropriate to place John in?

Do the vital signs indicate early or late signs of respiratory distress?

The following labs are ordered with these results:

CBC:

Hgb -11.7 g/dL

Hct - 37%

PLT - 371,000 mL

WBC - 15.4x109/L

 Segs - 79% (54-62%

 Bands - 8% (3-5%)

BMP:

glucose - 187 mg/dL

K+ - 3.7 mEq/L

 Na+ - 139 mEq/L

Ca++ - 4.6 mg/dL

 BUN - 21 mg/dL

 Creatinine - 0.8 mg/dL

ABG:

pH - 7.36

CO2 – 52

HCO3 – 31

PO2 - 78

CXR: infiltrate in right base with small right pleural effusion.

What is your interpretation of the results?

The CXR shows a pleural effusion. What is a pleural effusion?

Admitting orders are as follows:

* diet as tolerated
* up with assistance
* O2 2 L/NC
* push fluids
* IV D5.0.45NaCl @ 75 ml/hr
* sputum for C&S
* ABGs in am on RA
* Solu-Medrol 65 mg IV every 8 hrs
* albuterol HHN every 4 hrs and every 2 hrs prn
* furosemide 40 mg orally daily

When is the best time to collect the sputum specimen?

An IV pump is not available. What is the rate is based on gtts/minute? The drop factor of the tubing is 15 gtts/mL.

The HCP is notified of the ABG and CXR results and orders cefuroxime 1 g IVPB every 8 hrs. Would you hold the antibiotic till after the sputum specimen is obtained or give it?

The cefuroxime comes in an IV minibag labeled: Cefuroxime 1 gm in 100 mL. Infuse over 30 minutes. An IV pump is now available. Calculate the mL/hr to set the IV pump at to infuse the cefuroxime.

The following nursing diagnoses are established for John. Which is of priority?

* Impaired gas exchange R/T thick pulmonary secretions, hypoventilation (CO2 – 52, PO2 -78%)
* Ineffective airway clearance R/T secretions, expiratory airflow obstruction, ineffective cough
* Anxiety R/T hypoxemia and disease progression
* Alteration in comfort R/T inflammatory process
* Activity intolerance R/T increased energy demands used for breathing
* Infection R/T decreased ciliary action and ineffective airway clearance
* Knowledge deficit R/T disease, treatment, and self-care needs

John’s status deteriorates throughout the day and he is in acute respiratory distress.

BP - 158/96; HR – 132; RR – 32, shallow and labored; POX 86% on oxygen

ABG - pH - 7.32; CO2 - 61; HCO3 - 29; PaO2 - 75.

Pain in left shoulder is worse.

A CT scan of the chest is ordered and shows a left pneumothorax with approximately 35% collapse. John is transferred to the MICU. The HCP intubates John and inserts a 28 Fr chest tube.

What is your responsibility with the management of the CT?

a. Ensure tubing is coiled and below the collection device

b. Use a non-occlusive dressing around the insertion site

c. Adjust suction so there is no movement in the water seal chamber

d. Assess for the presence of crepitus

What would you do initially if the CT became dislodged from the collection device?

a. Call the health care provider

b. Clamp the CT

c. Place the end of the CT in water

d. Turn off the suction

What would you do initially if the CT fell out of John’s chest?

a. Place the end of the CT in sterile water

b. Cover the site with a gauze dressing

c. Cover the insertion site with an occlusive dressing

d. Place on oxygen

The nurse is assessing John and observes the following. Which would be of concern to the nurse?

* BVM at the bedside
* Kelly’s clamp at the bedside
* POX alarm off
* Ventilator mode set to AC mode and the patient is initiating occasional breaths

While the nurse is in the room, what cares should carried out? Assume the patient was last assessed 2 hours ago.

What are nursing interventions to prevent VAP? Select all that apply.

a. Provide routine oral hygiene every 2 hours

b. Reposition the patient every 2 hours

c. Sedate the client so deep suctioning can be done

d. Allow the client to cough

e. Suction the patient every 4 to 6 hours

Two days later John is extubated and transferred to a medical/surgical unit. The next day, you deliver John’s dietary tray and he comments how hungry he is. As you leave the room he is rapidly consuming the noodles. When you pick up the tray you notice he hasn’t eaten anything else. When you question him he states, “I don’t understand it. I can be hungry enough to eat enough for 2 people, but when I start to eat, I start to have trouble breathing and then I have to stop.”

Explain this phenomenon based on your knowledge of carbohydrates.

Two days later the HCP orders the CT to be removed. What is the nursing care for removal and post-removal? Select all that apply.

a. Medicate for pain prior to removal

b. Place a non-occlusive dressing around the insertion site post-removal

c. Place on oxygen prior to removal

d. Assess breath sounds pre and post removal

e. Have suction available

John is to be discharge home the following day on salmeterol MDI ii puffs twice a day; albuterol inhaler ii puffs prn with spacer; budesonide DPI ii puffs twice a day; prednisone 40 mg by mouth daily; azithromaxin 250 mg by mouth daily; zarfirlukast 20 mg twice a day by mouth; see HCP in one week. He is also to receive the pneumovax vaccine.

In assessing John and his wife’s knowledge of home management, you determine teaching is needed in the areas of diet, meds, infection prevention, pulmonary hygiene, activity, and management of SOB.

Teaching regarding nutrition should include? Select all that apply.

a. Moderate calorie, high in protein, moderate carbohydrate diet

b. Include wife in teaching

c. Two large meals a day

d. Exercise after eating

e. Push fluids – small amounts frequently

Teaching regarding medications should include: Select all that apply.

a. The budesonide should be used before the albuterol

b. Use the zarfirlukast for exacerbation of COPD

c. Take the azithromaxin till sputum is yellow or tan

d. The salmeterol will not help in an acute attack of dyspnea

e. Rinse out the mouth after each use of the inhalers and rinse the inhaler each day

f. Wait 5 minutes between each puff of the inhalers

You know John and his wife understand teaching to prevent infection when they state: Select all that apply.

a. “We should avoid people who are sick.”

b. “I will need to get a flu shot every year.”

c. “I will need to get a pneumonia shot.”

d. “I will drink about a quart of fluids a day.”

e. “I will wash my hands frequently and after I cough.”

f. “I will use a handkerchief rather than Kleenex.”

John asks when he should call the HCP. The nurse’s best response is: Select all that apply.

a. “When you have shortness of breath with any activity.”

b. “When the sputum is yellow.”

c. “If there is an increase in swelling around the ankles.”

d. “If you develop a fever.”

e. “If I have to sleep on several pillows so I am not short of breath.”

The nurse is caring for a patient with pneumonia. Assessment VS are BP 104/66; HR 110; RR 24; POX 89%; 102.6°F; responds to questions with prompting. Oxygen at 2L per high flow cannula is applied. 30 minutes the VS are: BP 96/60; HR 118; RR 28; POX 87%; responding to questions with a groan. The nurse suspects ARDS.

What is the initial response by the nurse?

a. Notify the unit charge nurse that you need assistance

b. Notify the respiratory therapist for a breathing treatment

c. Notify the rapid response team for emergency assessment and treatment

d. Notify the HCP and suggest transfer to the ICU

The diagnosis of ARDS is made. Which of the following HCP orders would the nurse question?

a. Obtain blood cultures

b. BiPAP

c. Nitric oxide

d. IV rate at 25 mL/hour

A patient has a chest tube in after thoracic surgery. Which of the following findings would the nurse notify the HCP of?

a. Chest tube output average 55 mL/hour

b. Pain at the chest tube insertion site

c. Chest tube output 450 mL in the past hour

d. Fluctuations in the water seal chamber