**Maryland Next Gen NCLEX Test Bank Project**

**January 25, 2023**

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| **Case Study Topic and Bowtie** | COPD II | **Author:** | Mary DiBartolo, PhD, RN-BC, CNE, FGSA, FAAN  Salisbury University |

**Case Summary**

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| A 63-year-old male presents to the emergency department with pneumonia and COPD exacerbation. He has a history of chronic bronchitis, hypertension, hypercholesterolemia and GERD. The learner should recognize symptoms of pneumonia and COPD exacerbation, identify interventions to improve his condition, and identify an appropriate teaching plan in preparation for discharge. |

**Objectives**

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| 1. Identify assessment findings indicative of COPD exacerbation.  2. Note pertinent risk factors for COPD exacerbation and chronic bronchitis.  3. Recognize appropriate collaborative interventions for the client with COPD exacerbation.  4. Determine elements of a teaching plan to address health promotion measures for this client.  5. Evaluate outcomes of an effective teaching plan in the client recovering from pneumonia/COPD exacerbation. |

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| **Case Study Link** | **Case Study QR Code** |
| <https://umaryland.az1.qualtrics.com/jfe/form/SV_3EiFiTD4fv7FnIG> |  |
| **Bow tie QR Code** | **Bow-tie Link** |
|  | <https://umaryland.az1.qualtrics.com/jfe/form/SV_e5SmnKyxw7yu4T4> |

**Case References**

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| 1. Ignatavicius et al. (2021). *Medical-Surgical Nursing: Concepts for Interprofessional Collaborative Care* |

**Case Study Question 1 of 6**

A 63-year-old male with history of chronic obstructive pulmonary disease (COPD) is admitted to the medical-surgical unit with respiratory distress.

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| --- | --- |
| **Phase Sheet** | |
| **Name** | Roy Blue | | | | | **Gender** | Male |
| **Age** | 63 | Weight (lbs/kg) | | 144 lbs (65 kg) | | **Allergies** | Penicillien, aspirin, milk products |
| **Nurses’ Notes** | |
| **Day 1 1300:** Admitted to the medical surgical unit from ED with moderate shortnes of breath and a productive cough of purulent rust-colored sputum. History of emphysema and chronic bronchitis since age 42 and is former 2 pack-per-day smoker for 25 years (50 pack-years) but started smoking again approximately six months ago. Takes salmeterol/fluticasone 250/25 dry powder inhaler 1 inhalation every 12 hrs and ipratropium metered dose inhaler 2 puffs 4 times/day, as well as a “pill for my high blood pressure, cholesterol and reflux”. States that up to recently, he has minimized the effects of his disease with his inhalers and proper rest/exercise. He states about a week ago, he “caught a cold” which worsened in past three days. He started coughing up rust-colored sputum and running a low-grade fever. Appears weak and cachexic, noting poor appetite and feeling too tired to eat. Some mild clubbing noted in fingers. States he has been unable to work at his job at the chemical factory for the past few months and is confined to home. Wants to start the pneumococcal vaccine series but has not felt up to leaving the house to get it. VS T101.4 F (38.5 C), P98, RR 28, B/P 140/72. Pulse oximetry 85% on 2 L min oxygen. Temp: 101.4 F (38.5 C). Labs obtained. Chest X ray and sputum cultures pending. | | | | | | | |
| **Laboratory Report** | |
| **Lab** | | | **Reference Range** | | **Admission** | | |
| Potassium (serum) | | | 3.5 to 5 mEq/L | | 4.2 mEq/L | | |
| Sodium (serum) | | | 135 to 145 mEq/L | | 144 mEq/L | | |
| Glucose (fasting) | | | Normal < 99 mg/dL | | 78 mg/dL | | |
| WBC | | | 4.5 – 10.5 x 103 cells/mm3 | | 14.2 103 cells/mm3 | | |
| ABG pH | | | 7.35 – 7.45 | | 7.31 | | |
| ABG pO2 | | | 75 – 100 mm Hg | | 72 mm Hg | | |
| ABG pCO2 | | | 35 – 45 mm Hg | | 51 mm Hg | | |
| ABG HCO3 | | | 22-26 mEq/L | | 28 mEq/L | | |

Which 3 assessment findings that are **most** significant?

* Temperature 101.4 F (38.5 C)\*
* Pulse 98
* BP 140/72
* Pulse oximetry 85%\*
* Poor appetite
* ABG pCO2 51
* Productive cough of purulent sputum\*
* ABG HCO3 28

**Scoring rule: 0/1**

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| **Rationale:** Oxygenation is compromised due to COPD exacerbation as evidenced by pulse oximetry at 85%. Productive cough of purulent rust-colored sputum is indicative of bacterial pneumonia, interfering with effective gas exchange. BP and pulse WNL and ABG CO2 expected to be slightly elevated due to chronic respiratory acidosis from COPD along with slightly elevated HCO3 as compensatory response to acidosis. Poor appetite is not an urgent issue as it will likely improve/addressed once infection resolves. |

**Case Study Question 2 of 6**

A 63-year-old male with history of chronic obstructive pulmonary disease (COPD) is admitted to the medical-surgical unit with respiratory distress.

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| --- | --- |
| **Phase Sheet** | |
| **Name** | Roy Blue | | | | | **Gender** | Male |
| **Age** | 63 | Weight (lbs/kg) | | 144 lbs (65 kg) | | **Allergies** | Penicillien, aspirin, milk products |
| **Nurses’ Notes** | |
| **Day 1 1300:** Admitted to the medical surgical unit from ED with moderate shortnes of breath and a productive cough of purulent rust-colored sputum. History of emphysema and chronic bronchitis since age 42 and is former 2 pack-per-day smoker for 25 years (50 pack-years) but started smoking again approximately six months ago. Takes salmeterol/fluticasone 250/25 dry powder inhaler 1 inhalation every 12 hrs and ipratropium metered dose inhaler 2 puffs 4 times/day, as well as a “pill for my high blood pressure, cholesterol and reflux”. States that up to recently, he has minimized the effects of his disease with his inhalers and proper rest/exercise. He states about a week ago, he “caught a cold” which worsened in past three days. He started coughing up rust-colored sputum and running a low-grade fever. Appears weak and cachexic, noting poor appetite and feeling too tired to eat. Some mild clubbing noted in fingers. States he has been unable to work at his job at the chemical factory for the past few months and is confined to home. Wants to start the pneumococcal vaccine series but has not felt up to leaving the house to get it. VS T101.4 F (38.5 C), P98, RR 28, B/P 140/72. Pulse oximetry 85% on 2 L min oxygen. Temp: 101.4 F (38.5 C). Labs obtained. Chest X ray and sputum pending. | | | | | | | |
| **Laboratory Report** | |
| **Lab** | | | **Reference Range** | | **Admission** | | |
| Potassium (serum) | | | 3.5 to 5 mEq/L | | 4.2 mEq/L | | |
| Sodium (serum) | | | 135 to 145 mEq/L | | 144 mEq/L | | |
| Glucose (fasting) | | | Normal < 99 mg/dL | | 78 mg/dL | | |
| WBC | | | 4.5 – 10.5 x 103 cells/mm3 | | 14.2 103 cells/mm3 | | |
| ABG pH | | | 7.35 – 7.45 | | 7.31 | | |
| ABG pO2 | | | 75 – 100 mm Hg | | 72 mm Hg | | |
| ABG pCO2 | | | 35 – 45 mm Hg | | 51 mm Hg | | |
| ABG HCO3 | | | 22-26 mEq/L | | 28 mEq/L | | |

* For each finding, click to specify if the finding is associated OR not associated with COPD.

|  |  |  |
| --- | --- | --- |
| **Assessment finding** | **Associated with COPD** | **Not Associated with COPD** |
| Occupation | * X |  |
| Hypertension |  | * X |
| Pulse oximeter 87% | * X |  |
| 50 pack-year smoking history | * X |  |
| Productive cough | * X |  |
| Clubbing in fingers | * X |  |
| ABG CO2 51 | * X |  |
| Vaccine status |  | * X |

**Scoring rule: 0/1**

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| **Rationale:** His job at the chemical plant (possible inhalation issues impacting lung function/vulnerability), smoking history and dyslipidemia are risk factors for COPD. Productive cough and pulse oximeter are symptoms of his pneumonia/COPD exacerbation. Clubbing of fingers is a sign of long-term hypoxia associated with his COPD and ABG CO2 is elevated due to chronic respiratory acidosis associated with COPD. Vaccine status is related to his pneumonia. Hypertension is not a risk factor for COPD. |

**Case Study Question 3 of 6**

A 63-year-old male with history of chronic obstructive pulmonary disease (COPD) is admitted to the medical-surgical unit with respiratory distress.

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| --- | --- |
| **Phase Sheet** | |
| **Name** | Roy Blue | | | | | **Gender** | Male |
| **Age** | 63 | Weight (lbs/kg) | | 144 lbs (65 kg) | | **Allergies** | Penicillien, aspirin, milk products |
| **Nurses’ Notes** | |
| **Day 1 1300:** Admitted to the medical surgical unit from ED with moderate shortnes of breath and a productive cough of purulent rust-colored sputum. History of emphysema and chronic bronchitis since age 42 and is former 2 pack-per-day smoker for 25 years (50 pack-years) but started smoking again approximately six months ago. Takes salmeterol/fluticasone 250/25 dry powder inhaler 1 inhalation every 12 hrs and ipratropium metered dose inhaler 2 puffs 4 times/day, as well as a “pill for my high blood pressure, cholesterol and reflux”. States that up to recently, he has minimized the effects of his disease with his inhalers and proper rest/exercise. He states about a week ago, he “caught a cold” which worsened in past three days. He started coughing up rust-colored sputum and running a low-grade fever. Appears weak and cachexic, noting poor appetite and feeling too tired to eat. Some mild clubbing noted in fingers. States he has been unable to work at his job at the chemical factory for the past few months and is confined to home. Wants to start the pneumococcal vaccine series but has not felt up to leaving the house to get it. VS T101.4 F (38.5 C), P98, RR 28, B/P 140/72. Pulse oximetry 85% on 2 L min oxygen. Temp: 101.4 F (38.5 C). Labs obtained. Chest X ray and sputum cultures pending.  **1315:** Chest Xray back**.** Provider notified of client status. increased to 35% via Venturi mask. | | | | | | | |
| **Laboratory Report** | |
| **Lab** | | | **Reference Range** | | **Admission** | | |
| Potassium (serum) | | | 3.5 to 5 mEq/L | | 4.2 mEq/L | | |
| Sodium (serum) | | | 135 to 145 mEq/L | | 144 mEq/L | | |
| Glucose (fasting) | | | Normal < 99 mg/dL | | 78 mg/dL | | |
| WBC | | | 4.5 – 10.5 x 103 cells/mm3 | | 14.2 103 cells/mm3 | | |
| ABG pH | | | 7.35 – 7.45 | | 7.31 | | |
| ABG pO2 | | | 75 – 100 mm Hg | | 72 mm Hg | | |
| ABG pCO2 | | | 35 – 45 mm Hg | | 51 mm Hg | | |
| ABG HCO3 | | | 22-26 mEq/L | | 28 mEq/L | | |
| **Diagnostic Report** | |
| Chest x-ray reveals left lower lobe pneumonia. | | | | | | | |

The chest X-ray results return and the provider is notified of the client’s status.

* Drag the most appropriate word from the choices to fill in the blank of the following sentence.

The top priority for this client is

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| **Word Choices** |
| Reduce temperature |
| Improve pCO2 |
| Evaluate nutritional status/food intake |
| Treat the pneumonia\* |
| Assess readiness to stop smoking |
| Address vaccination status |

**Scoring rule: 0/1**

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| **Rationale:** The priority is to treat the pneumonia as source of infection which will, in turn, address the hyperthermia and improve breathing status and pulse oximeter due to COPD. Nutritional evaluation, smoking, and vaccination status can be addressed later once stable. Although elevated, the temperature is not life-threatening. |

**Case Study Question 4 of 6**

A 63-year-old male with history of chronic obstructive pulmonary disease (COPD) is admitted to the medical-surgical unit with respiratory distress.

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| --- | --- |
| **Phase Sheet** | |
| **Name** | Roy Blue | | | | | **Gender** | Male |
| **Age** | 63 | Weight (lbs/kg) | | 144 lbs (65 kg) | | **Allergies** | Penicillien, aspirin, milk products |
| **Nurses’s Notes** | |
| **Day 1 1300:** Admitted to the medical surgical unit from ED with moderate shortnes of breath and a productive cough of purulent rust-colored sputum. History of emphysema and chronic bronchitis since age 42 and is former 2 pack-per-day smoker for 25 years (50 pack-years) but started smoking again approximately six months ago. Takes salmeterol/fluticasone 250/25 dry powder inhaler 1 inhalation every 12 hrs and ipratropium metered dose inhaler 2 puffs 4 times/day, as well as a “pill for my high blood pressure, cholesterol and reflux”. States that up to recently, he has minimized the effects of his disease with his inhalers and proper rest/exercise. He states about a week ago, he “caught a cold” which worsened in past three days. He started coughing up rust-colored sputum and running a low-grade fever. Appears weak and cachexic, noting poor appetite and feeling too tired to eat. Some mild clubbing noted in fingers. States he has been unable to work at his job at the chemical factory for the past few months and is confined to home. Wants to start the pneumococcal vaccine series but has not felt up to leaving the house to get it.  VS T101.4 F (38.5 C), P98, RR 28, B/P 140/72. Pulse oximetry 85% on 2 L min oxygen. Temp: 101.4 F (38.5 C). Labs obtained. Chest X ray and sputum cultures pending.  **1315:** Chest Xray back**.** Provider notified of client status. increased to 35% via Venturi mask. Sputum cultures obtained. | | | | | | | |
| **Laboratory Report** | |
| **Lab** | | | **Reference Range** | | **Admission** | | |
| Potassium (serum) | | | 3.5 to 5 mEq/L | | 4.2 mEq/L | | |
| Sodium (serum) | | | 135 to 145 mEq/L | | 144 mEq/L | | |
| Glucose (fasting) | | | Normal < 99 mg/dL | | 78 mg/dL | | |
| WBC | | | 4.5 – 10.5 x 103 cells/mm3 | | 14.2 103 cells/mm3 | | |
| ABG pH | | | 7.35 – 7.45 | | 7.31 | | |
| ABG pO2 | | | 75 – 100 mm Hg | | 72 mm Hg | | |
| ABG pCO2 | | | 35 – 45 mm Hg | | 51 mm Hg | | |
| ABG HCO3 | | | 22-26 mEq/L | | 28 mEq/L | | |
| **Diagnostic Report** | |
| Chest x-ray reveals left lower lobe pneumonia. | | | | | | | |

* For each potential nursing or collaborative intervention, click to specify whether the intervention is appropriate or not appropriate to include in the plan of care.

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| --- | --- | --- |
| **Potential Intervention** | **Appropriate** | **Not Appropriate** |
| Administer IV methylprednisolone | * X |  |
| Administer PO acetaminophen prn for fever | * X |  |
| Administer oxygen to achieve pulse oximeter readings of at least 95% |  | * X |
| Encourage flutter valve or acapella use every 2 hours | * X |  |
| Administer PO cough suppressant |  | * X |
| Administer IV ampicillin/sulbactam |  | * X |
| Restrict PO fluids |  | * X |
| Encourage pursed-lip breathing | * X |  |
| Monitor WBC | * X |  |
| Encourage milk, ice cream and cheese as source of protein |  | * X |

**Scoring rule: 0/1**

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| **Rationale:** IV steroids are indicated to reduce inflammation, as is acetaminophen to reduce fever as a result of the pneumonia; the nurse should encourage pursed lip breathing and flutter valve/acapella use to increase PEP and help mobilize secretions with vibration. Monitoring the WBC to determine the efficacy of antibiotic treatment is indicated. The usual range for pulse oximeter for the client with COPD is 88-92%. The antibiotic contains a penicillin and therefore is contraindicated in this client due to his allergy. A cough suppressant is contraindicated (want to encourage loosening/coughing up of purulent secretions) as is restricting fluids as fluids will help loosen secretions. Milk products are contraindicated due to his allergy and generally they can lead to thickened mucous discomfort in persons with COPD/chronic bronchitis. |

**Case Study Question 5 of 6**

A 63-year-old male with history of chronic obstructive pulmonary disease (COPD) is admitted to the medical-surgical unit with respiratory distress.

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| --- | --- |
| **Phase Sheet** | |
| **Name** | Roy Blue | | | | | **Gender** | Male | |
| **Age** | 63 | Weight (lbs/kg) | | 144 lbs (65 kg) | | **Allergies** | Penicillien, aspirin, milk products | |
| **Nurses’ Notes** | |
| **Day 1 1300:** Admitted to the medical surgical unit from ED with moderate shortnes of breath (SOB) and a productive cough of purulent rust-colored sputum. History of emphysema and chronic bronchitis since age 42 and is former 2 pack-per-day smoker for 25 years (50 pack-years) but started smoking again approximately six months ago. Takes salmeterol/fluticasone 250/25 dry powder inhaler 1 inhalation every 12 hrs and ipratropium metered dose inhaler 2 puffs 4 times/day, as well as a “pill for my high blood pressure, cholesterol and reflux”. States that up to recently, he has minimized the effects of his disease with his inhalers and proper rest/exercise. He states about a week ago, he “caught a cold” which worsened in past three days. He started coughing up rust-colored sputum and running a low-grade fever. Appears weak and cachexic, noting poor appetite and feeling too tired to eat. Some mild clubbing noted in fingers. States he has been unable to work at his job at the chemical factory for the past few months and is confined to home. Wants to start the pneumococcal vaccine series but has not felt up to leaving the house to get it. VS T101.4 F (38.5 C), P98, RR 28, B/P 140/72. Pulse oximetry 85% on 2 L min oxygen. Temp: 101.4 F (38.5 C). Labs obtained. Chest X ray pending and sputum cultures pending.  **1315:** Chest Xray back**.** Provider notified of client status. Increased to 35% via Venturi mask.  **1400**: RR: 21; pulse oximetry now 87%; reports mild SOB with exertion; resting comfortably in bed.  **DAY 2 0900**: T: 98.8 F (37.1 C) after dose of acetaminophen and two doses of IV antibiotic and IV methylprednisolone. RR 18, and pulse oximeter 92% on 2 L oxygen per nasal cannula. ABGs checked this am. No reports of SOB; up in chair for breakfast. Ate 75% of breakfast. Orders to disharge in afternoon. | | | | | | | | |
| **Laboratory Report** | |
| **Lab** | | | **Reference Range** | | **Admission** | | | **Day 2** |
| Potassium (serum) | | | 3.5 to 5 mEq/L | | 4.2 mEq/L | | |  |
| Sodium (serum) | | | 135 to 145 mEq/L | | 144 mEq/L | | |  |
| Glucose (fasting) | | | Normal < 99 mg/dL | | 78 mg/dL | | |  |
| WBC | | | 4.5 – 10.5 x 103 cells/mm3 | | 14.2 103 cells/mm3 | | |  |
| ABG pH | | | 7.35 – 7.45 | | 7.31 | | | 7.32 |
| ABG pO2 | | | 75 – 100 mm Hg | | 72 mm Hg | | | 88 mm Hg |
| ABG pCO2 | | | 35 – 45 mm Hg | | 51 mm Hg | | | 50 mm Hg |
| ABG HCO3 | | | 22-26 mEq/L | | 28 mEq/L | | | 26 mEq/L |
| **Diagnostic Report** | |
| Chest x-ray reveals left lower lobe pneumonia. | | | | | | | | |
| **Discharge Orders** | |
| Discharge in PM on Home oxygen 2 L/min  Levofloxacin 500 mg PO daily  Prednisone 40 mg PO daily X 5 days  Roflumilast 500 mcg tablet PO daily | | | | | | | | |

The nurse reviews Day 2 notes and is preparing client for possible discharge.

* What should the nurse teach the client before discharge about the treatment plan? **Select all that apply.**
* Continue to increase fluid intake.\*
* If feeling better (no SOB or fever), can stop taking the prednisone.
* Can continue flutter valve or acapella at least 3-4 times daily.\*
* Increase oxygen level to 5-6 L/minute whenever short of breath.
* Obtain pneumococcal and flu vaccine at next provider visit.\*
* Eat smaller, more frequent high-calorie, high-protein meals.\*
* Avoid all exercise for at least 3 months.
* Consider strategies to stop smoking.\*

**Scoring rule: +/-**

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| **Rationale:** Increased fluids helpful in reducing viscosity and retention of secretions. Use of flutter valve or acapella will continue to optimize lung expansion/gas exchange and mobilize secretions. Client should receive the pneumovax and flu vaccine to prevent future infections/exacerbations. Smaller/more frequent meals are recommended to optimize nutrition/intake. Client should take entire dose of PO steroid as prescribed to reduce inflammation. Oxygen should be maintained at lowest flow with goal of maintaining pulse oximetry at 88-92%. Some mild exercise as tolerated is important. |

**Case Study Question 6 of 6**

A 63-year-old male with history of chronic obstructive pulmonary disease (COPD) is admitted to the medical-surgical unit with respiratory distress.

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| **Laboratory Report** | |
| **Lab** | | | **Reference Range** | | **Admission** | | | **Day 2** |
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| ABG pO2 | | | 75 – 100 mm Hg | | 72 mm Hg | | | 88 mm Hg |
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| ABG HCO3 | | | 22-26 mEq/L | | 28 mEq/L | | | 26 mEq/L |
| **Diagnostic Report** | |
| Chest x-ray reveals left lower lobe pneumonia. | | | | | | | | |
| **Discharge Orders** | |
| Discharge in PM on Home oxygen 2 L/min  Levofloxacin 500 mg PO daily  Prednisone 40 mg PO daily X 5 days  Roflumilast 500 mcg tablet PO daily | | | | | | | | |

The nurse completes the discharge teaching.

* For each potential client statement, click to specify whether the statement indicates an understanding or no understanding of discharge teaching provided.

|  |  |  |
| --- | --- | --- |
| **Potential Statement** | **Understanding** | **No understanding** |
| “I should take the prednisone in the morning with food.” | * X |  |
| “I can get back to my previous level of activity as I recover.” | * X |  |
| “I can stop taking the antibiotic now that I am feeling better.” |  | * X |
| “I should use a spacer with my metered dose inhalers.” | * X |  |
| “I can continue to smoke as the damage is already done.” |  | * X |
| “I should do pursed lip breathing several times daily.” | * X |  |
| “I should avoid crowds during cold and flu season.” | * X |  |

**Scoring rule: 0/1**

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| --- |
| **Rationale:** Glucocorticoids are best taken in morning to mimic diurnal variation and with food to decrease GI upset. Client should continue activity as tolerated, use a spacer with MDI to optimize dose of medication obtained, and continue with pursed lip breathing techniques to prolong expiratory phase/elimination of CO2. The client should take all doses of prescribed antibiotic to make sure infection is cleared and prevent the development of multi-drug resistant pathogens. Client should still attempt smoking cessation as it is never too late to quit and experience benefits. |

**Bow-Tie**

A 63-year-old male is admitted to the medical-surgical unit with respiratory distress.

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| --- | --- |
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| **Nurses’ Notes** | |
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| ABG pO2 | | | 75 – 100 mm Hg | | 72 mm Hg | | |
| ABG pCO2 | | | 35 – 45 mm Hg | | 51 mm Hg | | |
| ABG HCO3 | | | 22-26 mEq/L | | 28 mEq/L | | |

* Complete the diagram by dragging from the choices below to specify what condition the client is most likely experiencing, 2 actions the nurse should take to address that condition, and 2 parameters the nurse should monitor to assess the client’s progress.

|  |  |  |
| --- | --- | --- |
| Action to take |  | Parameter to monitor |
|  | Condition most likely experiencing |  |
| Action to take |  | Parameter to monitor |
|  |  |  |
| **Actions to take** | **Potential conditions** | **Parameters to monitor** |
| Administer cough suppressant | Pulmonary edema | Blood pressure |
| Administer IV glucocorticoid\* | Tension pneumothorax | Arterial blood gases\* |
| Maintain client in supine position | Exacerbation of COPD\* | WBC\* |
| Administer IV antibiotic\* | Pulmonary embolism | Hematocrit |
| Assist with chest tube placement |  | Daily chest xrays |

**Scoring rule: 0/1**

|  |
| --- |
| Rationale: Client is experiencing COPD exacerbation due to pneumonia as evidenced by SOB, productive cough of rust-colored sputum and fever. Pharmacologic treatment includes IV glucocorticoid to reduce lung/airway inflammation and antibiotic. One would not lower head of bed in client who is SOB; cough suppressant is contraindicated as it is important to expel respiratory secretions. |