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| **Maryland Next Gen NCLEX Test Bank Project**  **September 1, 2022** | | | |
| **Case Study Topic**:  (& stand-alone trend) | Acute respiratory failure | **Author:** | **Kadriyya Clark DNP, RN, CNE**  **Community College of Baltimore County** |

**Case Summary**

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| The case involves a 78-year-old female who is admitted to the ICU in respiratory distress and ultimately needs mechanical ventilation. The nurse monitors the client’s vital signs, selects appropriate interventions and evaluates outcomes of care to determine if the client is improving or not. |

**Objectives**

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| 1. Recognize signs and symptoms of respiratory failure  2. Recognize trends and changes in client’s condition and intervene as needed  3. Monitor and care for clients on a ventilator  4. Implement interventions to manage recovery from an illness  5. Evaluate outcomes of care |

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| **Case Study Link** | **Case Study QR Code** |
| <https://umaryland.az1.qualtrics.com/jfe/form/SV_efwJseK51WitIIm> |  |
| **Trend QR Code** | **Trend Link**  <https://umaryland.az1.qualtrics.com/jfe/form/SV_6ruyAZEcS7fU7pI> |

**Case References**

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| Hinkle, J., & Cheever, K. (2018). *Brunner & Suddarth's textbook of medical-surgical nursing.*(14th ed.).Philadelphia, PA: Lippincott, Williams, & Wilkins. |

**Case Study Question 1 of 6**

The nurse cares for a 78-year-old female admitted to the medical intensive care unit in respiratory distress.

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| **Nurses’ Notes** | |
| 0900. Client was admitted to the ICU in respiratory distress after minimal response to high flow oxygen for a pulse oximeter reading of 83% in room air. Crackles heard bilaterally in lower lobes with diminished breath sounds in right middle lobe; S1S2 auscultated; bowel sounds positive in all 4 quadrants; skin warm dry and intact. VS T 99.8F(37.7C); HR 110; RR 30 bpm; B/P 168/90; pulse oximeter is 87% on 100% non-rebreather; pain-0/10. | | | |
| **Laboratory Report** | |
| Lab | Results | | Reference range |
| ABG pH | 7.2 | | 7.35-7.45 |
| ABG P02 | 75 mm Hg | | 75-100 mm Hg |
| ABG PC02 | 51 mm Hg | | 35-45 mmHg |
| ABG HC03 | 28 mEq/L | | 22-26 mEq/L |
| WBC | 35,000 cells/mm3 | | 4.5 – 10.5 x 103 cells/mm3 |
| Platelets | 250,000/ mm3 | | 140,000 to 450,000/ mm3 |
| Potassium(serum) | 4.0 mEq/L | | 3.5 to 5 mEq/L |
| Sodium (serum) | 140 mEq/L | | 135 to 145 mEq/L |
| Magnesium | 1.5 mEq/L | | 1.5 to 2.1 mEq/L |
| Lactate level | 4.5 mEq/L | | 0.5 to 2.2 mEq/L |
| Blood culture | Gram negative cocci | | negative |
| Urine culture | pending | | negative |
| Sputum culture | pending | | negative |

* Which 4 findings are **most** urgent?

|  |
| --- |
| * B/P 168/90 |
| * WBC 35,000 cells/mm3 |
| * Lactate 4.5 mEq/L |
| * Ph 7.2\* |
| * PCO2 50 mm Hg\* |
| * PO2 75 mm Hg |
| * Respiratory rate 30 bpm\* |
| * Gram negative cocci |
| * Pulse oximeter 87%\* |

**Scoring Rule: 0/1**

**Rationale:** The client has signs and symptoms of infection and respiratory failure. The most urgent findings are related to respiratory failure. Those include a pH of 7.2 indicating an acidic state, PCO2 > 50, tachypnea (rr 30 bpm), and a pulse oximeter reading of 87% on high flow oxygen. The blood pressure is elevated but is not yet critical.

**Case Study Question 2 of 6**

The nurse cares for a 78-year-old female admitted to the medical intensive care unit in respiratory distress.

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| **Nurses’ Notes** | |
| 0900. Client was admitted to the ICU in respiratory distress after minimal response to high flow oxygen for a pulse oximeter reading of 83% in room air. Crackles heard bilaterally in lower lobes with diminished breath sounds in right middle lobe; S1S2 auscultated; bowel sounds positive in all 4 quadrants; skin warm dry and intact. VS T 99.8F(37.7C); HR 110; RR 30 bpm; B/P 168/90; pulse oximeter is 87% on 100% non-rebreather; pain-0/10. | | | |
| **Laboratory Report** | |
| Lab | Results | | Reference range |
| ABG pH | 7.2 | | 7.35-7.45 |
| ABG P02 | 75 mm Hg | | 75-100 mm Hg |
| ABG PC02 | 51 mm Hg | | 35-45 mmHg |
| ABG HC03 | 28 mEq/L | | 22-26 mEq/L |
| WBC | 35,000 cells/mm3 | | 4.5 – 10.5 x 103 cells/mm3 |
| Platelets | 250,000/ mm3 | | 140,000 to 450,000/ mm3 |
| Potassium(serum) | 4.0 mEq/L | | 3.5 to 5 mEq/L |
| Sodium (serum) | 140 mEq/L | | 135 to 145 mEq/L |
| Magnesium | 1.5 mEq/L | | 1.5 to 2.1 mEq/L |
| Lactate level | 4.5 mEq/L | | 0.5 to 2.2 mEq/L |
| Blood culture | Gram negative cocci | | Negative |
| Urine culture | pending | | Negative |
| Sputum culture | pending | | Negative |

* For each finding click to indicate if the finding is consistent with Acute Respiratory Failure or Pneumonia. Each finding may support more than one condition.

|  |  |  |
| --- | --- | --- |
| Findings | Acute Respiratory Failure | Pneumonia |
| Crackles bilateral lower lobes | * \* | * \* |
| Pulse oximeter 87% on 100% | * \* | * \* |
| PCo2 51 mmHg | * \* |  |
| pH 7.2 | * \* |  |

Note: Each column must have at least 1 response option selected.

**Scoring Rule: +/-**

**Rationale**: Bilateral crackles can be associated with both respiratory conditions and are common in respiratory illnesses. A pulse oximeter reading of 87% indicates there is a low level of oxygen within the blood which can be caused by either condition. A PCO2 of 51 and pH of 7.2 indicates respiratory acidosis and are consistent with acute respiratory failure.

**Case Study Question 3 of 6**

The nurse cares for a 78-year-old female admitted to the medical intensive care unit in respiratory distress.

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| **Nurses’ Notes** | |
| 0900. Client was admitted to the ICU in respiratory distress after minimal response to high flow oxygen for a pulse oximeter reading of 83% in room air. Crackles heard bilaterally in lower lobes with diminished breath sounds in right middle lobe; S1S2 auscultated; bowel sounds positive in all 4 quadrants; skin warm dry and intact. VS T 99.8F(37.7C); HR 110; RR 30 bpm; B/P 168/90; pulse oximeter is 87% on 100% non-rebreather; pain-0/10. | | | |
| **Laboratory Report** | |
| Lab | Results | | Reference range |
| ABG pH | 7.2 | | 7.35-7.45 |
| ABG P02 | 75 mm Hg | | 75-100 mm Hg |
| ABG PC02 | 51 mm Hg | | 35-45 mmHg |
| ABG HC03 | 28 mEq/L | | 22-26 mEq/L |
| WBC | 35,000 cells/mm3 | | 4.5 – 10.5 x 103 cells/mm3 |
| Platelets | 250,000/ mm3 | | 140,000 to 450,000/ mm3 |
| Potassium(serum) | 4.0 mEq/L | | 3.5 to 5 mEq/L |
| Sodium (serum) | 140 mEq/L | | 135 to 145 mEq/L |
| Magnesium | 1.5 mEq/L | | 1.5 to 2.1 mEq/L |
| Lactate level | 4.5 mEq/L | | 0.5 to 2.2 mEq/L |
| Blood culture | Gram negative cocci | | Negative |
| Urine culture | pending | | Negative |
| Sputum culture | pending | | Negative |

What does the nurse determine is the priority for this client’s care?

* Administering corticosteroids to reduce inflammation
* Intubating for mechanical ventilation support\*
* Opening airways with aerosol treatments
* Treating infection with antibiotics

**Scoring Rule: 0/1**

**Rationale:** Acute respiratory failure is characterized by the lung tissue’s inability to oxygenate properly. The client has had a poor response to maximum supplemental oxygen and now needs mechanical ventilation. The respiratory failure was most likely caused by pneumonia. Treating pneumonia should take place next. Aerosols and corticosteroids may be incorporated into the treatment plan but are not as critical as intubation.

**Case Study Question 4 of 6**

The nurse cares for a 78-year-old female admitted to the medical intensive care unit in respiratory distress.

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| **Nurses’ Notes** | |
| 0900. Client was admitted to the ICU in respiratory distress after minimal response to high flow oxygen for a pulse oximeter reading of 83% in room air. Crackles heard bilaterally in lower lobes with diminished breath sounds in right middle lobe; S1S2 auscultated; bowel sounds positive in all 4 quadrants; skin warm dry and intact. VS T 99.8F(37.7C); HR 110; RR 30 bpm; B/P 168/90; pulse oximeter is 87% on 100% non-rebreather; pain-0/10.  0930. Client was intubated with #6 endotracheal tube and was placed on assist control mechanical ventilation, rate 14, Peep 5 mmHg, FIO2 60%. VS T 99.8F(37.7C); HR 110; RR 14; B/P 180/90; pulse oximeter is 96%. Client is restless. | | | |
| **Laboratory Report** | |
| Lab | Results | | Reference range |
| ABG pH | 7.2 | | 7.35-7.45 |
| ABG P02 | 75 mm Hg | | 75-100 mm Hg |
| ABG PC02 | 51 mm Hg | | 35-45 mmHg |
| ABG HC03 | 28 mEq/L | | 22-26 mEq/L |
| WBC | 35,000 cells/mm3 | | 4.5 – 10.5 x 103 cells/mm3 |
| Platelets | 250,000/ mm3 | | 140,000 to 450,000/ mm3 |
| Potassium(serum) | 4.0 mEq/L | | 3.5 to 5 mEq/L |
| Sodium (serum) | 140 mEq/L | | 135 to 145 mEq/L |
| Magnesium | 1.5 mEq/L | | 1.5 to 2.1 mEq/L |
| Lactate level | 4.5 mEq/L | | 0.5 to 2.2 mEq/L |
| Blood culture | Gram negative cocci | | Negative |
| Urine culture | pending | | Negative |
| Sputum culture | pending | | Negative |

The nurse plans care for the client after beginning mechanical ventilation.

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

|  |  |  |
| --- | --- | --- |
| **Potential Intervention** | **Indicated** | **Not Indicated** |
| Administer sedatives | * \* |  |
| Repeat chest- Xray | * \* |  |
| Schedule suctioning every 2 hours |  | * \* |
| Administer amiodarone |  | * \* |
| Administer IV antibiotics | * \* |  |
| Position supine with head midline |  | * \* |
| Obtain an electrocardiogram | * \* |  |

**Scoring Rule: 0/1**

**Rationale:** Most intubated clients require sedation to prevent them from fighting the ventilator. A chest x-ray should be done after intubation to confirm endotracheal tube placement. Suctioning can be damaging to tracheal tissue and should be done as needed and not on a schedule. Antibiotics are indicated to fight infection. Amiodarone, an antiarrhythmic, would not be indicated for this client because no arrhythmia was identified. Positioning the client supine would not be indicated. Semi fowlers or prone would be best to help with postural drainage. The client has tachycardia and elevated blood pressure which makes obtaining an electrocardiogram important.

**Case Study Question 5 of 6**

The nurse cares for a 78-year-old female admitted to the medical intensive care unit in respiratory distress.

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| --- | --- |
| **Nurses’ Notes** | |
| 0900. Client was admitted to the ICU in respiratory distress after minimal response to high flow oxygen for a pulse oximeter reading of 83% in room air. Crackles heard bilaterally in lower lobes with diminished breath sounds in right middle lobe; S1S2 auscultated; bowel sounds positive in all 4 quadrants; skin warm dry and intact. VS T 99.8F(37.7C); HR 110; RR 30 bpm; B/P 168/90; pulse oximeter is 87% on 100% non-rebreather; pain-0/10.  0930. Client was intubated with #6 endotracheal tube and was placed on assist control mechanical ventilation, rate 14, Peep 5 mmHg, FIO2 60%. VS T 99.8F(37.7C); HR 110; RR 14; B/P 180/90; pulse oximeter is 96%. Client is restless. | | | |
| **Laboratory Report** | |
| Lab | Results | | Reference range |
| ABG pH | 7.2 | | 7.35-7.45 |
| ABG P02 | 75 mm Hg | | 75-100 mm Hg |
| ABG PC02 | 51 mm Hg | | 35-45 mmHg |
| ABG SaP02 | 96% | | 95-100% |
| ABG HC03 | 28 mEq/L | | 22-26 mEq/L |
| WBC | 35,000 cells/mm3 | | 4.5 – 10.5 x 103 cells/mm3 |
| Platelets | 250,000/ mm3 | | 140,000 to 450,000/ mm3 |
| Potassium(serum) | 4.0 mEq/L | | 3.5 to 5 mEq/L |
| Sodium (serum) | 140 mEq/L | | 135 to 145 mEq/L |
| Magnesium | 1.5 mEq/L | | 1.5 to 2.1 mEq/L |
| Lactate level | 4.5 mEq/L | | 0.5 to 2.2 mEq/L |
| Blood culture | Gram negative cocci | | negative |
| Urine culture | Pending | | negative |
| Sputum culture | Pending | | negative |

The Nurse receives orders.

* Click to highlight the 3 orders the nurse should specify if the nurse should implement **first**.

|  |
| --- |
| **Orders** |
| **Category** | **Orders** |
| Nursing | Insert urinary catheter  Suction endo tracheal tube as needed  Titrate oxygen to keep pulse oximeter above or equal to 95% |
| Medications | Start IV of 0.9% normal saline at 75ml/hr  Amoxicillin 500 mg IVPB every 12 hours  Midazolam 2 - 4 mg IVP every 1hr as needed for agitation  Acetaminophen 650 mg per rectum every 8 hrs as needed for T> 100.8 F |
| Monitoring | Perform 12 lead EKG  Call for chest x-ray  Blood gas in 30 minutes |

Key

* Click to highlight the 3 orders the nurse should specify if the nurse should implement next.

|  |  |
| --- | --- |
| Nursing | Insert urinary catheter  Suction endo tracheal tube as needed  Titrate oxygen to keep pulse oximeter above or equal to 95 |
| Medications | Start IV of 0.9% normal saline at 75ml/hr  Amoxicillin 500 mg IVPB every 12 hours  Midazolam 2 - 4 mg IVP every 1hr as needed for agitation  Acetaminophen 650 mg per rectum every 8 hrs as needed for T> 100.8 F |
| Monitoring | Perform 12 lead EKG  Call for chest x-ray  Blood gas in 30 minutes |

**Scoring Rule: +/-**

**Rationale**: A chest X-ray is needed after intubation determine optimal endotracheal tube placement. The client does not yet have venous access. This should be established immediately so medications can be given. The B/P and heart rate are significantly elevated, and the client is agitated. Sedation should be given to decrease agitation and risk of self- extubation. Next an EKG can be done, and antibiotics can be given. The oxygen level is above 95% so adjustments are not needed and there is no indication suctioning is needed. The blood gas is not due. The urinary catheter can be placed after other treatments.

**Case Study Question 6 of 6**

The nurse cares for a 78-year-old female admitted to the medical intensive care unit in respiratory distress.

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| **Nurses’ Notes** | |
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| **Laboratory Report** | |
| Lab | Results | | Reference range |
| ABG pH | 7.2 | | 7.35-7.45 |
| ABG P02 | 75 mm Hg | | 75-100 mm Hg |
| ABG PC02 | 51 mm Hg | | 35-45 mmHg |
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| Magnesium | 1.5 mEq/L | | 1.5 to 2.1 mEq/L |
| Lactate level | 4.5 mEq/L | | 0.5 to 2.2 mEq/L |
| Blood culture | Gram negative cocci | | negative |
| Urine culture | Pending | | negative |
| Sputum culture | Pending | | negative |
| **Orders** | |
| **Category** | | **Orders** | |
| Nursing | | Insert urinary catheter  Suction endo tracheal tube as needed  Titrate oxygen to keep pulse oximeter above or equal to 95 | |
| Medications | | Start IV of 0.9% normal saline at 75ml/hr  Amoxicillin 500 mg IVPB every 12 hours  Midazolam 2 - 4 mg IVP every 1hr as needed for agitation  Acetaminophen 650 mg per rectum every 8 hrs as needed for T> 100.8 F | |
| Monitoring | | Perform 12 lead EKG  Call for chest x-ray  Blood gas in 30 minutes | |

The nurse reassesses the client at 1000 and compares the findings to 0930.

* For each finding, click to specify if the finding indicates that the client’s status has improved, declined, or is unchanged.

|  |  |  |  |
| --- | --- | --- | --- |
| Finding | Improved | Declined | Unchanged |
| Heart rate | * \* |  |  |
| Temperature |  |  | * \* |
| Respiratory rate |  |  | * \* |
| Blood pressure | * \* |  |  |
| Pulse oximetry |  | * \* |  |
| Agitation | * \* |  |  |

**Scoring Rule: 0/1**

**Rationale:** The heart rate decreased from 110 to 100 and blood pressure dropped from 180/90 to 150/70; both indicate improvement. The client is drowsy showing the agitation has decreased. The client’s temperature and respiratory rate remain unchanged. The client’s pulse oximeter has declined slightly. The nurse should assess the lungs sounds to determine if suctioning or ventilator increases are needed.

**Trend Template**

The nurse cares for a 78-year-old female admitted to the medical intensive care unit in respiratory distress.

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| **Nurses’ Notes** |
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The nurse reassesses the client at 1000and compares the findings to 0930.

* For each finding, click to specify if the finding indicates that the client’s status has improved, declined, or is unchanged.

|  |  |  |  |
| --- | --- | --- | --- |
| Finding | Improved | Declined | Unchanged |
| Heart rate | * \* |  |  |
| Temperature |  |  | * \* |
| Respiratory rate |  |  | * \* |
| Blood pressure | * \* |  |  |
| Pulse oximetry |  | * \* |  |
| Agitation | * \* |  |  |

**Scoring Rule: 0/1**

**Rationale:** The heart rate decreased from 110 to 100 and blood pressure dropped from 180/90 to 150/70; both indicate improvement. The client is drowsy showing the agitation has decreased. The client’s temperature and respiratory rate remain unchanged. The client’s pulse oximeter has declined slightly. The nurse should assess the lungs sounds to determine if suctioning or ventilator increases are needed.