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| **Maryland Next Gen NCLEX Test Bank Project**  **September 1, 2022; Update May 10, 2023** | | | |
| **Case Study Topic**:  (& stand-alone bow-tie) | Postoperative Atelectasis | **Author:** | Stacy McGrath, Ed.D, MSN, RN, Salisbury University |

**Case Summary**

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| Client is a 47 year-old male who had a routine appendectomy after coming to the emergency department with abdominal pain. Client develops post-op atelectasis on day 2. The nurse takes action to improve oxygenation and teaches the client to take deep breaths and cough, use an incentive spirometer, and increase their mobility. |

**Objectives**

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| 1. Recognize signs and symptoms of postoperative atelectasis  2. Differentiate between Postoperative atelectasis and infection  3. Plan care for a client with post-op atelectasis  4. Educate patient about self-care for atelectasis  5. Identify improvement of the client’s condition |

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| **Case Study Link** | **Case Study QR Code** |
| <https://umaryland.az1.qualtrics.com/jfe/form/SV_1RAIcNZ0SmsBAlE> |  |
| **Bow-tie QR Code** | **Bow-tie Link** |
|  | <https://umaryland.az1.qualtrics.com/jfe/form/SV_cSUQwbHGbXc7Nae> |

**Case References**

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| 1. Perry & Potter (2022). Clinical Nursing Skills & Techniques 10th ed. |

**Case Study Question 1 of 6**

The nurse cares for a 47 year-old male on the post-surgical unit the second day after an appendectomy.

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| **Nurses’ Notes** | |
| **Post-Operative Day 2:**  0800 Vital signs are stable. Breath sounds clear. Incision intact. Client reports pain 4/10 at surgical site, declined pain medication.  1400 Vital signs as noted. Client is short of breath and having difficulty breathing and coughing. Requesting pain medication. Breaths sounds on the left are diminished compared to previous assessment. Client and family are requesting an update from the physician. | | | | | |
| **Vital Signs**  **Post- op day 2** | |
| Time | 0800 | | 1200 | 1400 |
| Temp | 37.5 C/ 99.5 F | | 37.5 C/ 99.5 F | 37.6 C/ 99.7 F |
| P | 80 | | 82 | 110 |
| RR | 14 | | 18 | 26 |
| B/P | 122/84 | | 124/86 | 132/84 |
| Pulse oximeter | 97 on RA | | 96 on RA | 92 on RA |
| Pain | 4/10 | | 3/10 | 5/10 |

* Which findings require **immediate** follow-up? Select all that apply.
* Heart Rate 110 \*
* Blood Pressure 132/84
* Respirations are 26 \*
* Requesting pain medication for 5/10 pain
* Breath sounds are diminished on the left \*
* Feeling short of breath \*
* Pulse oximeter reading of 92% on RA \*
* Requesting an update from the physician

**Scoring Rule: +/-**

**Rationale:** The nurse should identify signs and symptoms of post-operative complications that need to be addressed. Signs of atelectasis include increased heart rate, increased respirations, breathing difficulties and low oxygen levels. Breath sounds will be diminished due to collapsed alveoli. Blood pressure is not affected unless it becomes elevated due to the stress of breathing difficulties. Pain medication is important but first the breathing issues must be addressed.

**Case Study Question 2 of 6**

The nurse cares for a 47 year-old male on the post-surgical unit the second day after an appendectomy.

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| **Nurses’ Notes** | |
| **Post-Operative Day 2:**  0800 Vital signs are stable. Breath sounds clear. Incision intact. Client reports pain 4/10 at surgical site, declined pain medication.  1400 Vital signs as noted. Client is short of breath and having difficulty breathing and coughing. Requesting pain medication. Breaths sounds on the left are diminished compared to previous assessment. Client and family are requesting an update from the physician. | | | | | |
| **Vital Signs**  **Post- op day 2** | |
| Time | 0800 | | 1200 | 1400 |
| Temp | 37.5 C/ 99.5 F | | 37.5 C/ 99.5 F | 37.6 C/ 99.7 F |
| P | 80 | | 82 | 110 |
| RR | 14 | | 18 | 26 |
| B/P | 122/84 | | 124/86 | 132/84 |
| Pulse oximeter | 97 on RA | | 96 on RA | 92 on RA |
| Pain | 4/10 | | 3/10 | 5/10 |

The nurse considers conditions that can cause post-operative respiratory distress.

* For each client finding click to indicate if the finding is consistent with pneumonia, post-operative atelectasis, pulmonary embolism, or fluid overload. Each finding may support more than one type of condition.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Findings | Pneumonia | Post Operative Atelectasis | Pulmonary  Embolism | Fluid overload |
| Diminished breath sounds |  | * \* |  |  |
| Low grade fever | * \* | * \* |  |  |
| Repressed coughing |  | * \* |  |  |
| Decreased pulse oximeter | * \* | * \* | * \* | * \* |
| Stable blood pressure | * \* | * \* |  |  |

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

**Scoring Rule: +/-**

**Rationale:** The nurse should differentiate signs and symptoms of atelectasis, pneumonia, pulmonary embolism, and fluid overload in clients with respiratory distress following surgery. All respiratory issues include shortness of breath and increased respirations, and decreased pulse oximeter readings. Diminished breath sounds and repressed coughing are most associated with post-op atelectasis. Coughing, rhonchi, wheezing, or crackles would be expected with the other three conditions. Low-grade fever and normal and stable blood pressures would be expected with atelectasis and pneumonia. Fever could also be higher with pneumonia. Unstable blood pressures would be expected for pulmonary embolism or fluid overload. Hypotension is typically seen with pulmonary embolism. Hypertension is associated with fluid overload.

**Question 3 of 6**

The nurse cares for a 47 year-old male on the post-surgical unit the second day after an appendectomy.

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| **Nurses’ Notes** | |
| **Post-Operative Day 2:**  0800 Vital signs are stable. Breath sounds clear. Incision intact. Client reports pain 4/10 at surgical site, declined pain medication.  1400 Vital signs as noted. Client is short of breath and having difficulty breathing and coughing. Requesting pain medication. Breaths sounds on the left are diminished compared to previous assessment. Client and family are requesting an update from the physician. | | | | | |
| **Vital Signs**  **Post- op day 2** | |
| Time | 0800 | | 1200 | 1400 |
| Temp | 37.5 C/ 99.5 F | | 37.5 C/ 99.5 F | 37.6 C/ 99.7 F |
| P | 80 | | 82 | 110 |
| RR | 14 | | 18 | 26 |
| B/P | 122/84 | | 124/86 | 132/84 |
| Pulse oximeter | 97 on RA | | 96 on RA | 92 on RA |
| Pain | 4/10 | | 3/10 | 5/10 |

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

The nurse should recognize that the client is most likely experiencing

|  |
| --- |
| Word Choices |
| pneumonia |
| postoperative atelectasis\* |
| pulmonary edema |
| fluid overload |

**Scoring Rule: 0/1**

Rationale: The client’s respiratory findings along with the diminished breath sounds, repressed cough, low grade fever and stable blood pressure most suggest the client is experiencing atelectasis.

**Case Study Question 4 of 6**

The nurse cares for a 47 year-old male on the post-surgical unit the second day after an appendectomy.

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| **Nurses’ Notes** | | |
| **Post-Operative Day 2:**  0800 Vital signs are stable. Breath sounds clear. Incision intact. Client reports pain 4/10 at surgical site, declined pain medication.  1400 Vital signs as noted. Client is short of breath and having difficulty breathing and coughing. Requesting pain medication. Breaths sounds on the left are diminished compared to previous assessment. Client and family are requesting an update from the physician.  1415. Provider notified of client changes. Started on 2 Liters of oxygen by nasal canula. Portable Xray obtained | | | | | | | |
| **Vital Signs**  **Post- op day 2** | | |
| Time | 0800 | | | 1200 | 1400 | 1415 |
| Temp | 37.5 C/ 99.5 F | | | 37.5 C/ 99.5 F | 37.6 C/ 99.7 F | 37.6 C/ 99.7 F |
| P | 80 | | | 82 | 110 | 110 |
| RR | 14 | | | 18 | 26 | 26 |
| B/P | 122/84 | | | 124/86 | 132/84 | 122/82 |
| Pulse oximeter | 97 on RA | | | 96 on RA | 92 on RA | 93 on 2L O2 |
| Pain | 4/10 | | | 3/10 | 5/10 | 5/10 |
| **Diagnostic Reports** | |  | | | | | |
| Portable Chest X-ray shows mild atelectasis | | | | | | | |

The client is diagnosed with mild atelectasis.

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

|  |  |  |
| --- | --- | --- |
| Potential order | Indicated | Not Indicated |
| Administer pain medication | * \* |  |
| Administer fluid bolus |  | * \* |
| Have client use incentive spirometer | * \* |  |
| Place client in supine position |  | * \* |
| Request CBC labs STAT |  | * \* |

**Scoring Rule: 0/1**

**Rationale:** The XRAY confirms atelectasis. Proper nursing interventions include sitting the client up to aid with breathing. Supine position can make breathing more difficult. Applying oxygen via nasal cannula can also make breathing easier. Using the incentive spirometer can also make breathing easier. Controlling pain improves compliance with incentive spirometry. Extra fluid does not help a client with breathing and can put the client at risk for fluid overload. A CBC is not necessary for monitoring atelectasis as it would be for detecting and infection.

**Case Study Question 5 of 6**

The nurse cares for a 47 year-old male on the post-surgical unit the second day after an appendectomy.

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| **Nurses’ Notes** | | |
| **Post-Operative Day 2:**  0800 Vital signs are stable. Breath sounds clear. Incision intact. Client reports pain 4/10 at surgical site, declined pain medication.  1400 Vital signs as noted. Client is short of breath and having difficulty breathing and coughing. Requesting pain medication. Breaths sounds on the left are diminished compared to previous assessment. Client and family are requesting an update from the physician.  1415. Provider notified of client changes. Started on 2 Liters of oxygen by nasal canula. Portable Xray obtained | | | | | | | |
| **Vital Signs**  **Post- op day 2** | | |
| Time | 0800 | | | 1200 | 1400 | 1415 |
| Temp | 37.5 C/ 99.5 F | | | 37.5 C/ 99.5 F | 37.6 C/ 99.7 F | 37.6 C/ 99.7 F |
| P | 80 | | | 82 | 110 | 110 |
| RR | 14 | | | 18 | 26 | 26 |
| B/P | 122/84 | | | 124/86 | 132/84 | 122/82 |
| Pulse oximeter | 97 on RA | | | 96 on RA | 92 on RA | 93 on 2L O2 |
| Pain | 4/10 | | | 3/10 | 5/10 | 5/10 |
| **Diagnostic Reports** | |  | | | | | |
| Portable Chest X-ray shows mild atelectasis | | | | | | | |
| **Orders** | | |
| 1. Apply nasal cannula at 2 to 4 L as needed to maintain oxygenation level over 95% 2. Morphine Sulfate 2 mg IV PRN for pain every 4 hours 3. Use incentive spirometer q 2 hours | | | | | | | |

The nurse is developing a teaching plan with the client.

* What should the nurse teach the client about the treatment plan? Select all that apply.
* Get out of bed and ambulate in the hall \*
* Sit upright when using the incentive spirometer \*
* Importance of taking deep breaths \*
* Limiting fluid intake
* Avoid use of pain medication right before using incentive spirometer
* How to splint the incision during coughing\*

**Scoring Rule: +/-**

**Rationale:** The nurse should teach the client with atelectasis interventions that can improve their oxygenation. The nurse can instruct the client to be out of bed and ambulate, to take deep breaths in order to increase lung capacity and open up the alveoli. The incentive spirometer can also help improve lung function. The client should increase the fluids to about 3,000 ml /day to thin mucous secretions, and use pain medication so they can take deep breaths.

**Case Study Question 6 of 6**

The nurse cares for a 47 year-old male on the post-surgical unit the second day after an appendectomy.

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| **Nurses’ Notes** | | |
| **Post-Operative Day 2:**  0800 Vital signs are stable. Breath sounds clear. Incision intact. Client reports pain 4/10 at surgical site, declined pain medication.  1400 Vital signs as noted. Client is short of breath and having difficulty breathing and coughing. Requesting pain medication. Breaths sounds on the left are diminished compared to previous assessment. Client and family are requesting an update from the physician.  1415. Provider notified of client changes. Started on 2 Liters of oxygen by nasal canula. Portable Xray obtained  1430. Medicated with morphine. Teaching provide on use of spirometer. Client gave return demonstration.  1500. Breath sounds diminished on left. Coughing after incentive spirometer use. | | | | | | | |
| **Vital Signs**  **Post- op day 2** | | |
| Time | 0800 | | | 1200 | 1400 | 1415 | 1500 |
| Temp | 37.5 C/ 99.5 F | | | 37.5 C/ 99.5 F | 37.6 C/ 99.7 F | 37.6 C/ 99.7 F | 38.1C/100.6F |
| P | 80 | | | 82 | 110 | 110 | 104 |
| RR | 14 | | | 18 | 26 | 26 | 20 |
| B/P | 122/84 | | | 124/86 | 132/84 | 122/82 | 122/82 |
| Pulse oximeter | 97 on RA | | | 96 on RA | 92 on RA | 93 on 2L O2 | 97 on 2L O2 |
| Pain | 4/10 | | | 3/10 | 5/10 | 5/10 | 2/10 |
| **Diagnostic Reports** | |  | | | | | |
| Portable Chest X-ray shows mild atelectasis | | | | | | | |
| **Orders** | | |
| 1. Apply nasal cannula at 2 to 4 L as needed to maintain oxygenation level over 95% 2. Morphine Sulfate 2 mg IV PRN for pain every 4 hours 3. Use incentive spirometer q 2 hours | | | | | | | |

The nurse reassesses the client at 1500.

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

|  |  |  |  |
| --- | --- | --- | --- |
| Finding | Improved | Declined | Unchanged |
| Pulse oximeter 97% on 2 L oxygen | * \* |  |  |
| Breath sounds diminished on left |  |  | * \* |
| Temperature 100.6 F (38.1) |  | * \* |  |
| Coughing after incentive spirometer use | * \* |  |  |

**Scoring Rule: 0/1**

Rationale: The nurse should recognize that the client has improved if the oxygen saturation is within normal limits and the client is coughing after using the incentive spirometer. Breath sounds were diminished on left and make take several cycles of deep breathing and coughing to improve. The increasing fever would indicate that the client’s condition had decreased and a infection may now be present.

**Bowtie**

The nurse cares for a 47 year-old male on the post-surgical unit the second day after an appendectomy.

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| --- | --- |
| **Nurses’ Notes** | |
| **Post-Operative Day 2:**  0800 Vital signs are stable. Breath sounds clear. Incision intact. Client reports pain 4/10 at surgical site, declined pain medication.  1400 Vital signs as noted. Client is short of breath and having difficulty breathing and coughing. Requesting pain medication. Breaths sounds on the left are diminished compared to previous assessment. Client and family are requesting an update from the physician. | | | | | |
| **Vital Signs**  **Post- op day 2** | |
| Time | 0800 | | 1200 | 1400 |
| Temp | 37.5 C/ 99.5 F | | 37.5 C/ 99.5 F | 37.6 C/ 99.7 F |
| P | 80 | | 82 | 110 |
| RR | 14 | | 18 | 26 |
| B/P | 122/84 | | 124/86 | 132/84 |
| Pulse oximeter | 97 on RA | | 96 on RA | 92 on RA |
| Pain | 4/10 | | 3/10 | 5/10 |

* 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** |
| Apply oxygen per non-rebreather mask | Pneumonia | Blood gases |
| Request an order for antibiotics | Post-operative atelectasis\* | Oxygen saturation \* |
| Encourage incentive spirometer use\* | Fluid overload | Breath Sounds\* |
| Request an order for diuretics | Pulmonary embolism | Urine output |
| Obtain a chest Xray\* |  | Blood Pressure |

**Scoring Rule: 0/1**

**Rationale**: Atelectasis, pneumonia, pulmonary embolism, and fluid overload in clients can all cause respiratory distress following surgery. Diminished breath sounds and repressed coughing are most associated with post-op atelectasis. Coughing, rhonchi, wheezing, or crackles would be expected with the other three conditions. Low-grade fever and normal and stable blood pressures would be expected with atelectasis and pneumonia. Fever could also be higher with pneumonia. Unstable blood pressures would be expected for pulmonary embolism or fluid overload. Hypotension is typically seen with pulmonary embolism. Hypertension is associated with fluid overload. The nurse should apply oxygen by a nasal cannula, request a chest- Xray, and encourage the incentive spirometer. The client’s pulse oximeter readings are not low enough to need a non-rebreather and use of that device would limit the client’s ability to use an incentive spirometer. Diuretics would be needed for fluid overload and antibiotics would be needed for pneumonia. Diminished breath sounds and low pulse oximeter readings alerted the nurse to the problem; therefor it is appropriate to monitor the client to determine they have returned to baseline.