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| **Maryland Next Gen NCLEX Test Bank Project**  **September 1, 2022** | | | |
| **Case Study Topic**:  (standalone bowtie) | Chest pain (MI) | **Author:** | **Kadriyya Clark DNP, RN, CNE**  **Community College of Baltimore County** |

**Case Summary**

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| A 60- year- old male is admitted to the emergency department with midsternal chest pain, radiating down his left arm, and shortness of breath. EKG reveals ST elevation in 2 leads. The nurse reviews EMR values to develop a plan of care and evaluate outcomes. |

**Objectives**

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| 1. Identify signs and symptoms of ST elevation myocardial infarction  2. Interpret lab findings  3. Implement appropriate interventions ST elevation myocardial infarction  4. Evaluate outcomes of care |

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| **Case Study Link** | **Case Study QR Code** |
| <https://umaryland.az1.qualtrics.com/jfe/form/SV_0BrMPXvR3wzARsW> |  |
| **Bow-tie QR Code** | **Bow-tie Link** |
|  | https://umaryland.az1.qualtrics.com/jfe/form/SV\_2f0MVo4MekhIHQO |

**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 60- year- old male admitted to the Emergency Department with chest pain.

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| **Nurses’ Notes** |
| 1000. 60-year-old male client is admitted to the Emergency Department with crushing sternal pain radiating down left arm that is worse with walking. Pain began 2 hours ago while walking outside. Client also reports shortness of breath with activity. Reports taking a regular aspirin on the way to the hospital. Vital signs: T- 99 F(37.2C); HR- 110; RR- 22 bpm; B/P- 160/90; Pulse oximeter- 93% on room air; chest pain 8/10. Weight reported at 280lbs/127kg (BMI 35). Started on unit chest pain protocol. Oxygen applied, and nitroglycerin given. A peripheral intravenous line has been placed in the client’s left arm. Morphine given. Labs drawn. | | | |
| **Diagnostics Report** |
| ECG- Sinus tachycardia rate 110 bpm. ST segment elevation in leads V3 and V4 (anterior leads) | | | |
| **Laboratory Report** |
| Lab | | Results | Reference range |
| Cholesterol (Total) | | 250 mg/dl | <200 mg/dl normal;  200-239 borderline; >240 high |
| WBC | | 10 x 103 cells/mm3 | 4.5 – 10.5 x 103 cells/mm3 |
| Platelets | | 400,000/ mm3 | 140,000 to 450,000/ mm3 |
| Potassium(serum) | | 3.9 mEq/L | 3.5 to 5 mEq/L |
| Sodium (serum) | | 140 mEq/L | 135 to 145 mEq/L |
| Magnesium (serum) | | 1.5 mEq/L | 1.5 to 2.1 mEq/L |
| Troponin T | | 0.5 ng/ml | 0 to 0.04 ng/ml |
| Creatine Kinase MB (CKMB) | | 170 IU/L | 5 to 25 IU/L |

The nurse reviews the diagnostic and laboratory findings.

* Which 2 findings are **most** significant?
* ECG\*
* Cholesterol
* Platelets
* White blood cell count
* Troponin T\*
* Creatine kinase

**Scoring Rule: 0/1**

**Rationale:** An ECG of sinus tachycardia with ST segment elevation indicates there is damage to the cardiac muscle and should be addressed immediately. Elevated troponin T is specific for myocardial injury. Creatine kinase-MB can be used as a test for myocardial cell death but is also commonly found in other sites, so it is not specific to the myocardium. The cholesterol is elevated but not diagnostic for a myocardial infarction. Platelets and white blood cell counts are normal.

**Case Study Question 2 of 6**

The nurse cares for a 60- year- old male admitted to the Emergency Department with chest pain.

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| Magnesium (serum) | | 1.5 mEq/L | 1.5 to 2.1 mEq/L |
| Troponin T | | 0.5 ng/ml | 0 to 0.04 ng/ml |
| Creatine Kinase MB (CKMB) | | 170 IU/L | 5 to 25 IU/L |

* For each client finding , click to specify whether the finding is consistent with ST elevation myocardial infarction (STEMI), Non ST elevation myocardial infarction (NSTEMI), or unstable angina. Each finding may be consistent with more than one condition.

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| **Client Finding** | ST elevation myocardial infarction (STEMI) | Non ST elevation myocardial infarction (NSTEMI) | Unstable angina |
| Creatine kinase MB | * \* | * \* |  |
| Crushing chest pain | * \* | * \* | * \* |
| ECG changes | * \* |  |  |
| Elevated cholesterol | * \* | * \* | * \* |
| Obesity | * \* | * \* | * \* |
| Troponin T | * \* | * \* |  |

Note: Each column must have at least one option selected.

**Scoring Rule: +/-**

**Rationale**: Obesity, elevated cholesterol, and crushing chest pain are associated with all three acute coronary syndromes. Cardiac biomarkers are not elevated with unstable angina. The EKG findings show ST elevation which indicates significant cardiac damage associated with an ST elevation myocardial infarction (STEMI).

**Case Study Question 3 of 6**

The nurse cares for a 60- year- old male admitted to the Emergency Department with chest pain.

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| **Nurses’ Notes** |
| 1000. 60-year-old male client is admitted to the Emergency Department with crushing sternal pain radiating down left arm that is worse with walking. Pain began 2 hours ago while walking outside. Client also reports shortness of breath with activity. Reports taking a regular aspirin on the way to the hospital. Vital signs: T- 99 F(37.2C); HR- 110; RR- 22 bpm; B/P- 160/90; Pulse oximeter- 93% on room air; chest pain 8/10. Weight reported at 280lbs/127kg (BMI 35). Started on unit chest pain protocol. Oxygen applied, and nitroglycerin given. A peripheral intravenous line has been placed in the client’s left arm. Morphine given. Labs drawn. | | | |
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| Troponin T | | 0.5 ng/ml | 0 to 0.04 ng/ml |
| Creatine Kinase MB (CKMB) | | 170 IU/L | 5 to 25 IU/L |

* Complete the following sentence by selecting from the list of drop downs.

|  |  |
| --- | --- |
| The nurse should recognize that the client is most likely experiencing a/an | non ST elevation myocardial infarction  ST elevation myocardial infarction  unstable angina |
| caused by coronary artery | blockage  rupture  spasm |

**Scoring Rule: Rationale**

**Rationale**: The clients labs and symptoms are congruent with STEMI. STEMI occurs when there is sudden rupture of an unstable part of the wall in a heart artery followed by the build- up of a clot in an attempt to heal it. This clot formation results in total blockage of the artery and loss of blood supply to the heart.

**Case Study Question 4 of 6**

The nurse cares for a 60- year- old male admitted to the Emergency Department with chest pain.

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| **Nurses’ Notes** |
| 1000. 60-year-old male client is admitted to the Emergency Department with crushing sternal pain radiating down left arm that is worse with walking. Pain began 2 hours ago while walking outside. Client also reports shortness of breath with activity. Reports taking a regular aspirin on the way to the hospital. Vital signs: T- 99 F(37.2C); HR- 110; RR- 22 bpm; B/P- 160/90; Pulse oximeter- 93% on room air; chest pain 8/10. Weight reported at 280lbs/127kg (BMI 35). Started on unit chest pain protocol. Oxygen applied, and nitroglycerin given. A peripheral intravenous line has been placed in the client’s left arm. Morphine given. Labs drawn. | | | |
| **Diagnostics Report** |
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| **Laboratory Report** |
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| Magnesium (serum) | | 1.5 mEq/L | 1.5 to 2.1 mEq/L |
| Troponin T | | 0.5 ng/ml | 0 to 0.04 ng/ml |
| Creatine Kinase MB (CKMB) | | 170 IU/L | 5 to 25 IU/L |

The client receives a diagnosis of ST elevation myocardial infarction.

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

|  |  |  |
| --- | --- | --- |
| Blockage | Indicated | Not Indicated |
| Analgesics | * \* |  |
| Antibiotics |  | * \* |
| Anticoagulants | * \* |  |
| Betablockers | * \* |  |
| Fluid bolus |  | * \* |
| Fibrinolytics | * \* |  |

**Scoring Rule: 0/1**

**Rationale**: Acute care for STEMI includes pain management, establishing perfusion, and limiting ischemic damage. Analgesics, typically morphine, are given for pain. Ischemia is limited by decreasing perfusion needs. Beta blockers can be given to control lower heart rate and blood pressure. Reperfusion therapy can be medical or manual. Medical therapy includes giving a fibrinolytic to dissolve any blood clots that may be present blocking blood vessels. Anti- coagulants prevent worsening obstruction. Fluid boluses would increase cardiac load. There is no evidence of infection to need antibiotics.

**Case Study Question 5 of 6**

The nurse cares for a 60- year- old male admitted to the Emergency Department with chest pain.

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| **Nurses’ Notes** |
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| **Diagnostics Report** |
| ECG- Sinus tachycardia rate 110 bpm. ST segment elevation in leads V3 and V4 (anterior leads) | | | |
| **Laboratory Report** |
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| Troponin T | | 0.5 ng/ml | 0 to 0.04 ng/ml |
| Creatine Kinase MB (CKMB) | | 170 IU/L | 5 to 25 IU/L |
| **Orders** |
| **Category** | **Orders** | | |
| Medications | Enoxaparin100mg SC  Metoprolol 25mg PO  Tenecteplase 50 mg IV  Morphine sulfate 2mg IV as Q 15 minutes as needed for pain | | |

The nurse receives orders.

* Complete the sentence from the list of drop down options

|  |  |
| --- | --- |
| The nurse should next give the | enoxaparin100mg SC  metoprolol 25mg PO  tenecteplase 50 mg IV\* |
| which should be given | immediately upon admission  within 30 minutes of admission\*  within 90 minutes of admission |

**Scoring Rule: Rationale**

**Rationale**: Tenecteplase is a tissue plasma activator that works to dissolve any blood clots that block blood vessels. The standard of care is to give the medication within 30 minutes of arrival if a STEMI is diagnosed.

**Case Study Question 6 of 6**

The nurse cares for a 60- year- old male admitted to the Emergency Department with chest pain.

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| **Nurses’ Notes** |
| 1000. 60-year-old male client is admitted to the Emergency Department with crushing sternal pain radiating down left arm that is worse with walking. Pain began 2 hours ago while walking outside. Client also reports shortness of breath with activity. Reports taking a regular aspirin on the way to the hospital. Vital signs: T- 99 F(37.2C); HR- 110; RR- 22 bpm; B/P- 160/90; Pulse oximeter- 93% on room air; chest pain 8/10. Weight reported at 280lbs/127kg (BMI 35). Started on unit chest pain protocol. Oxygen applied, and nitroglycerin given. A peripheral intravenous line has been placed in the client’s left arm. Morphine given. Labs drawn.  1025. Orders received. Tenecteplase given.  1030. Vital signs: T- 99F(37.2C); HR- 120; RR- 22; B/P- 150/85; Pulse oximeter- 95% on 2L per nasal cannula; pain 6/10. | | | |
| **Diagnostics Report** |
| ECG- Sinus tachycardia rate 110 bpm. ST segment elevation in leads V3 and V4 (anterior leads) | | | |
| **Laboratory Report** |
| Lab | | Results | Reference range |
| Cholesterol (Total) | | 250 mg/dl | <200 mg/dl normal;  200-239 borderline; >240 high |
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| Troponin T | | 0.5 ng/ml | 0 to 0.04 ng/ml |
| Creatine Kinase MB (CKMB) | | 170 IU/L | 5 to 25 IU/L |
| **Orders** |
| **Category** | **Orders** | | |
| Medications | Enoxaparin100mg SC  Metoprolol 25mg PO  Tenecteplase 50 mg IV  Morphine sulfate 2mg IV as Q 15 minutes as needed for pain | | |

The nurse reassesses the client after initiating the chest-pain protocol and giving tenecteplase.

* 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 |
| Pulse |  | * x |  |
| Blood pressure | * x |  |  |
| Pulse oximeter | * x |  |  |
| Respiratory rate |  |  | * x |
| Pain | * x |  |  |

**Scoring Rule: 0/1**

**Rationale:** The blood pressure, pulse oximeter, and pain level have all improved after the client received oxygen per nasal cannula, nitroglycerin, morphine, and tenecteplase. The client’s heart rate has increased, this could be an indicator of the heart muscle attempting to pump more oxygenated blood to the tissues. The client’s respiratory rate is unchanged.

**Bowtie**

60- year- old male is admitted to the Emergency Department with chest pain.

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| **Nurses’ Notes** |
| 1000. 60-year-old male client is admitted to the Emergency Department with crushing sternal pain radiating down left arm that is worse with walking. Pain began 2 hours ago while walking outside. Client also reports shortness of breath with activity. Vital signs: T- 99 F(37.2C); HR- 110; RR- 22 bpm; B/P- 160/90; Pulse oximeter- 93% on room air; chest pain 8/10. Weight reported at 280lbs/127kg (BMI 35). | |

* 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 sublingual nitroglycerin \* | Atrial Fibrillation | Pain\* |
| Administer low-dose aspirin | Cardiogenic shock | Neuro checks |
| Administer a normal saline fluid bolus | Ischemic stroke | Urinary output |
| Administer oxygen\* | Myocardial Infarction \* | Pulse oximeter\* |
| Administer tenecteplase |  | Peripheral pulses |

**Scoring Rule: 0/1**

**Rationale:** The actions and monitoring for a client with acute coronary syndrome help determine next steps in treatment. Administering oxygen and nitroglycerin help to improve the oxygenation of the blood cells and vasodilate the vessels to improve blood flow to the heart muscle. Improving ischemic pain indicates improved perfusion. The pulse oximeter should be equal or more than 95% to have adequate oxygenation. Low-dose aspirin is not indicated for a myocardial infarction client however aspirin should be given in higher doses. Tenecteplase may be given to a client with ST elevation EMI, however it is done after confirmation of the diagnosis.