Acute Myocardial Infarction - Objectives

1. Use the workbook and the internet sites listed on the online course to help you define the essential components of heart anatomy and physiology to include:
   - a. the chambers of the heart

   **Right atrium**—receives deoxygenated blood from body
   **Left Atrium**—receives oxygenated blood from lungs
   **Right ventricle**—pumps blood to lungs
   **Left Ventricle**—pumps blood to body

   b. pathway of blood flow

   **SVC/IVC**→**Right atrium**→**Tricuspid valve**→**Right ventricle**→**Pulmonary semilunar valve**→**Pulmonary trunk/arteries**→**Lungs**→**Pulmonary veins**→**Left atrium**→**Mitral valve**→**Left ventricle**→**Aortic semilunar valve**→**Aorta**→**Body**

   c. coronary blood supply

   **Left ventricle**→**Aorta**→**Coronary arteries**→**Coronary veins**→**Coronary sinus**→**Right atrium**

   d. conduction system of the heart

   **SA node (pacemaker)**→**AV node**→**Bundle of His**→**Right and left bundle branches**→**Purkinje fibers**

2. Differentiate between angina and myocardial infarction.

   **Angina pectoris**—chest pain caused by ischemia (reduced blood flow in the coronary arteries)
   **Myocardial infarction**—prolonged ischemia that leads to heart tissue death (complete lack of blood flow in coronary arteries)

   - **Coronary artery narrowing or blockage (clot, atherosclerosis)**→**ischemia**→**hypoxia** (lack of O2)→**necrosis** (tissue death)→**infarction**
3. Discuss the following options for failing hearts:

- a. Heart transplant
  Receiving a new heart from a recently deceased donor; risky due to chance of transplant rejection; requires lifestyle changes to work

- b. Intra-aortic balloon device
  Balloon device inserted through the femoral artery into the thoracic aorta to help increase coronary blood flow

- c. Ventricular assist device
  Mechanical pump that helps a weakened ventricle pump blood throughout the body

- d. Skeletal muscle assist device
  Procedure that involves using a piece of skeletal muscle from the patient to fashion a pouch that is inserted between the heart and the aorta

- e. Cardiomyoplasty
  Procedure that involves wrapping the patient's own skeletal muscle around the heart to improve heart function

4. Define the following terms:

- a. ischemia
  Lack of blood flow

- b. arteriosclerosis
  Hardening of arteries

- c. cholesterol and relationship to plaque formation
  Combination of calcium and cholesterol leads to plaque build-up in arteries

- d. angina
  Chest pain due to ischemia and hypoxia

- e. hypertension
  HTN; high blood pressure

5. Outline and define the physiologic/pathophysiologic sequence of events that lead to an acute myocardial infarction (AMI).

Coronary artery narrowing or blockage (clot, atherosclerosis) → ischemia → hypoxia (lack of O2) → necrosis (tissue death) → infarction

6. List the critical parameters of assessment and treatment emergency responders (a paramedic or EMT) must perform when first attending to a patient with an acute myocardial infarction.

**QUICK TREATMENT AND RESPONSE IS VITAL**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Treatment</th>
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<tbody>
<tr>
<td>Continuous vitals</td>
<td>M—morphine</td>
</tr>
<tr>
<td>12-lead EKG (continuous)</td>
<td>O—oxygen</td>
</tr>
<tr>
<td>L.V. Access</td>
<td>N—nitroglycerine</td>
</tr>
<tr>
<td>O2 saturations</td>
<td>A—aspirin</td>
</tr>
<tr>
<td>Brief history</td>
<td>transport to hospital asap</td>
</tr>
<tr>
<td>Draw blood for cardiac markers, electrolytes, and coag studies</td>
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</table>
7. List common symptoms in an acute myocardial infarction (AMI).

- Neck/arm pain
- Angina pectoris (chest pain)
- Shortness of breath (dyspnea)
- Excessive sweating (diaphoresis)
- Indigestion

8. Describe the information each of the following tests provide an ER (critical care) physician or cardiac specialist when presented with a patient with a suspected AMI.

- a. electrocardiogram
  Can detect abnormal heart rhythms; damaged areas of the heart; fibrillation; recent myocardial infarction
- b. echocardiogram
  Image of the heart created using sound waves
  Can detect:
  a. The sizes of the 4 chambers of the heart.
  b. The strength of the heart muscle.
  c. The presence of fluid around the heart.
  d. Problems with the valves of the heart.
  e. Congenital heart disease.
  f. Information about the pressures within the chambers of the heart.
  g. Information about why a person may have an erratic heartbeat.
- c. creatinine kinase (CPK-MB), LDH isoenzymes, troponin-1
  Enzymes found in the cardiac muscle

9. Define the following as to their prevention or treatment of an AMI:

- a. angiogram
  Method for visualizing the interior of the coronary arteries using radioactive dye and x-rays
- b. angioplasty
  Balloon is inserted through the femoral artery to open the lumen of an artery
- c. coronary bypass surgery
  CABG—a new vein or artery is attached to aorta and coronary artery past the blocked area
- d. beta blockers
  Slow heart rate and decrease rate of contractions which decreases the oxygen demand of the heart
- e. thrombolytics such as streptokinase
  Used to dissolve existing clots
- f. aspirin
  Acts as an anticoagulant to prevent further clot formation
- g. streptokinase
  Thrombolytic medication administered I.V. to break up existing clots

10. Describe the key roles the following health professionals provide in the care of a patient with an acute heart attack:

- a. EMT/Paramedics
  First responders
Administer medications for pain (nitroglycerin or morphine)
Prepare an intravenous line for administration of medications
Prepare electrocardiogram leads for monitoring heart activity
Obtain and stabilize vital signs
Transport patient to emergency facility (hospital)
  • b. Medical laboratory personnel
Clinical/medical laboratory specialist
  • c. Critical care (ER) physicians
Emergency care when patient first arrives in hospital; order tests, labs, meds; order consult from cardiologist
  • d. Critical care and coronary care nurses
Monitoring patient, administering medications, prioritizing patient care (which patient requires attention first)
  • e. Radiologic technologists and cardiovascular technologists
Radiology techs perform different radiologic studies
Radiology tech with echocardiograph specialty—performs echocardiograms
Cardiovascular technologist—assists physician assisting physicians with catheter insertion; monitoring vital signs during heart procedures; preparing and monitoring patients during open heart surgery; performing stress tests
  • f. Family physician (follow-up)
Follow up with patient to continue to monitor vital signs and lifestyle changes; refer patient to cardiologist if further issues develop

11. Briefly define procedures and medications that may be used to reduce the mortality from an AMI. Define factors that influence treatment decision making processes.

Immediate care and access to emergency facility (ER)
MONA
Critical care (close monitoring and medication administration)
Med administration:
  • Beta blockers (reduce oxygen demand of heart by slowing heart rate and strength of contraction)
  • Streptokinase (breaks up existing clots that may be blocking coronary arteries)
  • Aspirin (prevents further clotting)
Procedures:
  • Angioplasty
  • CABG
  • Stent

12. List the contributing factors in the patient's lifestyle that led to his first heart attack. List reasonable changes that need to be made in the future to reduce further episodes.

<table>
<thead>
<tr>
<th>Lifestyle Factors</th>
<th>Changes</th>
</tr>
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<tbody>
<tr>
<td>Smoking</td>
<td>Dietary changes</td>
</tr>
<tr>
<td>Poor diet</td>
<td>Exercise</td>
</tr>
<tr>
<td>Lack of exercise</td>
<td>Quit smoking</td>
</tr>
<tr>
<td>Eating fast food/late night eating</td>
<td>Reduce stress/stress management</td>
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