Nursing Management of Patients with Cardiovascular Disease

Part II: Acute Myocardial Infarction

Barbara Moloney DNPC, RN, CCRN
Second Patient

- 52-year-old woman came to the hospital complaining of fatigue, nausea, and chest discomfort
Assessment

- BP 156/80
- HR: 100
- Rhythm: regular
- R-28
- T-37°C
- SA₂ 96% room air

Respiratory
- tachypnea

Neurological
- Anxious, restless, oriented

Skin
- Diaphoretic

Complains of
- Epigastric discomfort 6/10
- Nausea
- Short of breath

WHAT ARE YOUR CONCERNS?

Is there anything that you want to do now?
Focused history

- Precipitation factor: preparing a meal
- Quality of pain: pressure in chest and back
- Radiating – "no"
- Associated symptoms: Nausea, short of breath, diaphoretic
- Onset of pain: 6 hours ago
- Allergies: unknown
- PMHx: hypertension
- Meds at home: hydrochlorothiazide
ECG
Review: Coronary Arteries

- Supply oxygen to the myocardium
Formation of Plaque

- Fatty streak
- Fibrous plaque
- Complicated lesion: Hemorrhage, Ulceration, Calcification, Thrombosis
- Thrombus
- Range of clinical symptoms: Myocardial Infarction, Stroke, Gangrene
Development of Atherosclerotic Plaque (Conventional)
Coronary Artery Disease

- **Non-modifiable Risk Factors**
  - Age
  - Gender
  - Genetics

- **Modifiable Risk Factors**
  - Smoking
  - Hypertension
  - Hyperlipidemia
  - Physical Inactivity
  - Obesity

- **Contributing factors**
  - Diabetes
  - Stress
Blocked Coronary Artery

- Myocardial ischemia
- Anaerobic metabolism
  - Lactic acid irritates cardiac nerves
- Angina
- Ischemia > 20 min. = acute myocardial infarction
How it looks on ECG
Different leads show different views of the heart.
What does this look like on the ECG?

Blue circles = ischemia, Red circles = injury
STEMI: ECG changes = injury through the myocardium

Area of necrosis penetrates full myocardium = ST elevation usually followed by Q wave as MI evolves
NSTEMI: no permanent ECG changes = injury does not go all the way through the myocardium

Small area of necrosis not penetrating full myocardium; may have some non-specific ST-T wave changes, but will not have ST elevation.
## Blood tests

<table>
<thead>
<tr>
<th>Marker</th>
<th>Normal level</th>
<th>Time for Onset of increase</th>
<th>Peak concentration</th>
<th>Return to normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPK (total)</td>
<td>15-105 U/l&lt;sub&gt;men&lt;/sub&gt; 10-80 U/l &lt;sub&gt;women&lt;/sub&gt;</td>
<td>4-6 hours</td>
<td>12-14 hours</td>
<td>2-3 days</td>
</tr>
<tr>
<td>CK-MB</td>
<td>0-9 U/L</td>
<td>4-6 hours</td>
<td>12-24 hours</td>
<td>2-3 days</td>
</tr>
<tr>
<td>CK index</td>
<td>&lt;2.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Troponins T &amp; I</td>
<td>0.0-0.4 ng/mL (tropI) Check lab</td>
<td>2-4 hours</td>
<td>8-12</td>
<td>5-14 days</td>
</tr>
</tbody>
</table>
What happens to the heart?

- Normal heart beat: [YouTube Video](http://www.youtube.com/watch?v=A0iyjNFB0as)
- Heart during a myocardial infarction: [YouTube Video](http://www.youtube.com/watch?v=w8wXdtoW-HQ)
Analysis

☐ Your analysis
### Review: Signs and symptoms

- Pale, diaphoretic
- Chest discomfort
  - Epigastric
  - Pressure
  - Pain
  - Arm, shoulder, neck, jaw, back
- Restless, apprehensive
- Dyspnea, orthopnea
- Palpitations
- Syncope
- Confusion
- Cyanosis
- Nausea
- Fatigue
- Women, Diabetics, Elderly
  - Symptoms may be more vague
    - Fatigue
    - Short of breath
    - Indigestion, nausea
    - Anxiety
    - Silent ischemia
Vital signs

Temperature elevation
- Up to 38 °C due to tissue damage within first 24 hours
- May last for as long as a week

Pulse
- May be rapid, irregular, or slow

Respirations
- Increases with pain and anxiety
- May increase if in heart failure
- Decreases with sedation

Blood pressure
- May fall below 90 immediately following an MI, returns to pre-infarction 2-4 days
Other tests

- WBC
  - rise in early phase of infarction
- Sed rate
  - rises in early phase
- Electrolytes
- PT/PTT/INR
- Platelets
- CBC
- Chest x-ray
- Echocardiogram
Nursing Diagnoses

Problem List

- Myocardial Ischemia/Injury
  - Pain related to myocardial ischemia
  - Nausea
  - Short of Breath

- Hemodynamic Stability
  - Risk for dysrhythmias
  - Risk for decreased cardiac output

- Anxiety

- Knowledge Deficit
Guidelines for management

☐ Assess: Chest pain, Vital signs

☐ **MONITOR**
  - #1 cause of death is dysrhythmias

☐ ECG

☐ IV access/blood draw

☐ Oxygen, medications

☐ Chest x-ray

American Heart Association Guidelines, 2011
Medications

- Aspirin
- Nitroglycerine
- Oxygen
- Morphine
Aspirin

☐ Action:
  ■ Decrease platelet aggregation

☐ Dose
  ■ 162-325 mg chewed as soon as ACS is suspected

☐ Nursing considerations
  ■ Allergy
Nitroglycerine

- Action:
  - Vasodilates
  - Dilates coronary arteries
  - Increases collateral blood flow

- Dose:
  - 0.4 mg SL
  - Give every 5 minutes for a total of 3 doses if needed

- Nursing considerations
  - Assess pain and blood pressure after each dose
Oxygen

- Rationale:
  - Reduces pain
  - Reduces risk for dysrhythmias
Morphine

- **Action:**
  - Reduces pre-load, afterload
  - Reduces anxiety, pain, dyspnea, and
  - Reduces myocardial oxygen demand

- **Dose**
  - 1-5 mg IV

- **Nursing considerations**
  - Monitor for effect, monitor BP, nausea, respiratory depression
Heparin

- **Action:**
  - Inhibits thrombus

- **Dose**
  - Monitor PTT

- **Nursing considerations:**
  - Bleeding precautions
  - Monitor PTT
  - Protamine sulfate
Clopidogrel (Plavix)

- **Action**
  - Inhibits platelet aggregation
  - May be given in place of ASA or in addition to ASA

- **Dose**
  - May be given a loading dose (300mg or 600mg) followed by 75mg daily for 3-12 months (maybe longer if client has stents)

- **Nursing considerations**
  - Allergy
  - Bleeding
  - Discontinue steroids & avoid NSAIDS
Beta Blockers

- Metoprolol
- Administered to acute MI usually within 2 hours - may be given IV
- Action:
  - Slow heart rate
  - Decrease oxygen consumption
  - Decrease pain
- Nursing considerations
  - Monitor blood pressure, pulse
ACE inhibitors  (*Lisinopril, Quinapril*)

- Decreases ventricular remodeling – helps the heart heal
- Start slowly - usually within first 24 hours
- Action
  - Reduce afterload
  - Reduce pre-load
  - Decreases ventricular remodeling
- Nursing considerations
  - Orthostatic hypotension, monitor VS
  - Dose – start low
Plan: Nursing Care

- Chest pain: Manage and alleviate
- Monitor
  - Dysrhythmias
  - ST segment
- Vital signs, including oxygen saturation
- Anxiety: assess and reduce
- Monitor labs – esp. potassium and magnesium
- Continuous assessment – lung sounds, heart sounds, head to toe

- Activity
  - Bed rest if unstable (having chest pain)
  - Once hemodynamically stable should not be in bed longer than 12 hours
  - Monitor response of heart rate – remember increased HR = increased oxygen consumption of myocardium

- Prevent constipation

- Monitor effects of medications
Now What????

- Your patient is on the monitor
- Her heart rhythm becomes irregular
- She becomes unresponsive
- Now what do you do?
Nursing management: CAB

1. Establish unresponsiveness
2. Call for help
   □ Defibrillator or DEA
3. Check for pulse
4. Start compressions – give 30
5. Open airway
6. Deliver 2 breaths with ambu bag
7. Continue CPR until defibrillator arrives

American Heart Association (2011)
New Guidelines

- [ ] http://www.youtube.com/americanheartassoc#p/c/7A68846B17049716/9/O9T25SMyz3A
- (3 minutes – in English; change to French version when available)

- **Key points:**
  - Know what to do if a patient becomes unresponsive
  - Know where the defibrillator or DEA is
  - Code cart needs to be checked regularly, Defibrillator must remain plugged in
Teaching guidelines

- Patient teaching
  - Start as soon as patient is ready
  - Diet and Activity
  - Medications
  - Smoking cessation – client and family
  - How to take nitroglycerine, when to call the MD or come to the ED
  - Risk factors – modifiable
  - Cardiac rehab
Guidelines continued

- Signs and symptoms of acute MI, angina and the reasons they occur
- Healing after MI
- Risk factors
- Rationales for treatments
- Resumption of work, physical activity, sexual activity
- Measures to take to promote recovery and health
- Importance of gradual, progressive resumption of activity
- When to seek and how to seek help
Teaching guidelines for HT

- Explain what HT means – may include numeric value
- Dietary recommendations
- Life-style recommendations
- Medications