

1  **Electrocardiography for Healthcare Professionals**

Chapter 13:  
Clinical Management of the  
Cardiac Patient

2  **Learning Outcomes**

13.1 Identify the major coronary arteries, and describe the structure of arteries.

13.2 Describe typical cardiac symptoms and unstable angina.

13.3 Summarize atypical patient types and presentation.

3  **Learning Outcomes (Cont'd)**

13.4 Compare ST Segment Elevation and Non-ST segment Elevation.

13.5 Explain Heart Failure.

13.6 Identify Assessment and Immediate Treatment for the Cardiac Patient.

13.7 Discuss Continued Treatment for the Cardiac Patient.

4  **13.1 Coronary Arteries**

■ Right coronary artery branches in to:

Posterior descending artery

Marginal artery

■ Left coronary artery branches in to:

Circumflex artery

Left anterior descending artery

5  **13.1 Coronary Arteries (Cont'd)**

■ Coronary arteries have three layers:

Tunica adventitia: outermost layer keeps vessel open

Tunica media: middle layer dilates and constricts

Tunica intima: innermost layer comes in direct contact with the blood

6  **13.1 Apply Your Knowledge**

Name the three layers of an artery:

7  **13.1 Apply Your Knowledge**

Name the three layers of an artery:

Answer: Tunica adventitia (outermost)

Tunica media (middle)

Tunica intima (innermost)

8  **13.2 Cardiac Symptoms**

- Non-cardiac causes of chest pain:
  - Inflammation of the costal cartilage or lungs
  - Gastric or esophageal irritation
  - Gallbladder or dental pain
- Consider all chest discomfort as cardiac in origin until proven otherwise

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9  **13.2 Cardiac Symptoms (Cont'd)**

- Angina: chest pain or discomfort that may radiate to other locations due to the heart muscle not receiving enough oxygen
- Ischemia: lack of blood supply to an area of the heart due to a blockage in circulation to that area

10  **13.2 Cardiac Symptoms (Cont'd)**

- Shortness of breath (SOB)
- Sweating, anxiety
- Chest pain, pressure, or fullness
- Epigastric discomfort (bad indigestion)
- Neck pain, jaw pain
- Cough, nausea

11  **13.2 Cardiac Symptoms (Cont'd)**

- Back pain (between shoulder blades)
- Squeezing sensation
- Dizziness
- Palpitations
- Sense of impending doom
- Arm pain (one or both arms)

12  **13.2 Unstable Angina**

- Unstable angina is a state between angina and myocardial infarction
  - Pain is more frequent or severe; pain increases to 3 or more times a day
  - Occurs with less exertion; occurs at rest or awakens patient from sleep

13  **13.2 Unstable Angina (Cont'd)**

- The symptoms last longer, often greater than 20 minutes
  - Pain is less responsive to nitroglycerin.
  - The patient needs to take more nitroglycerin than before for the same or less reduction of pain.

14  **13.2 Apply Your Knowledge**

Why should all chest pain initially be treated as cardiac in origin?

15  **13.2 Apply Your Knowledge**

Why should all chest pain initially be treated as cardiac in origin?

Answer: To protect the patient from an untreated myocardial infarction or other serious cardiac condition.

16  **13.3 Atypical Patient Presentation**

WOMEN: Over 40% of women having a heart attack never experienced chest pain

•Common cardiac symptoms in women:

- Shortness of breath
- Weakness, unusual fatigue, cold sweats, dizziness, indigestion

17  **13.3 Atypical Patient Presentation (Cont'd)**

■ Diabetes:

- High blood glucose levels damages blood vessels and leads to an accumulation of atherosclerotic plaque.
- Diabetics are twice as likely to have a heart attack or stroke.

18  **13.3 Atypical Patient Presentation (Cont'd)**

■ Cardiac Symptoms in Diabetic Patients:

- Chest pain or discomfort
- Shortness of breath
- Sweating, Nausea
- Pain or discomfort in arms, back, jaw, neck
- Light-headedness

19  **13.3 Atypical Patient Presentation (Cont'd)**

■ Cardiac Symptoms in the Elderly:

- Shortness of breath
- Nausea
- Profuse sweating
- Pain in the arms
- Syncope
- Weakness or fatigue

20  **13.3 Apply Your Knowledge**

What three groups of patients often present atypically?

21  **13.3 Apply Your Knowledge**

What three groups of patients often present atypically?

Answer: Women, diabetics, and the elderly

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22  **13.4 Acute Coronary Syndrome (ACS)**

■ ST segment elevation MI (STEMI):

- 75-80% of patients present with this MI
- A complete occlusion of a coronary artery has occurred.
- Ischemia delays repolarization

23  **13.4 Acute Coronary Syndrome (ACS)  
(Cont'd)**

- Changes to the ECG tracing include:
    - ST segment depression or elevation
    - T wave inversion
    - Development of a pathologic Q wave
- <insert figure 6-3 from 2ed ECG page 187 >

24  **13.4 Acute Coronary Syndrome (ACS) (Cont'd)**

- Non-ST Segment Elevation (NSTEMI):
  - 20-25% of patients present with this MI
  - Classic signs and symptoms are not present
  - Occurs due to incomplete coronary artery occlusion
  - Lab tests are needed to look for cardiac enzymes

25  **13.4 Apply Your Knowledge**

Which myocardial infarction is often referred to as the "silent" MI?

26  **13.4 Apply Your Knowledge**

Which myocardial infarction is often referred to as the "silent" MI?

Answer: Non-ST segment elevation  
(NSTEMI)

27  **13.5 Heart Failure**

- Heart muscle is unable to pump
- Can affect the right or left side of the heart
- Most common cause is myocardial infarction
- Body tissues will not be perfused well enough
- Cardiogenic shock occurs to other body systems
- Left heart failure always leads to right heart failure

28  **13.5 Heart Failure (Cont'd)**

- Symptoms of Left Ventricular Failure:
  - Shortness of breath or trouble breathing
  - Fatigue, Confusion
  - Tachycardia
  - Anorexia
  - Decreased or absent urine production
  - Pallor

29  **13.5 Heart Failure (Cont'd)**

- Symptoms of Right Ventricular Failure:
  - Hypotension
  - Jugular vein distention
  - Clear lung sounds
  - Swelling, pitting edema
  - Ascites (fluid collecting in abdominal cavity)

30  **13.5 Apply Your Knowledge**

What term means supplying nutrients and oxygen to the organs and tissues by way of blood

flow through the vessels?

31  **13.5 Apply Your Knowledge**

What term means supplying nutrients and oxygen to the organs and tissues by way of blood flow through the vessels?

Answer: Perfusion

32  **13.6 Cardiac Patient Assessment and Immediate Treatment**

■ O-P-Q-R-S-T:

O - Onset: when it started; sudden or gradual?

P - Pain: what provokes pain; better or worse?

Q - Quality: is the pain dull, sharp, aching?

R - Radiation: does the pain travel?

S - Severity: rate the pain from 0 to 10.

T - Time: How long has the pain lasted?

33  **13.6 Cardiac Patient Assessment and Immediate Treatment (Cont'd)**

■ S-A-M-P-L-E:

S - Signs and Symptoms: things you can see, feel or measure; patient complaints

A - Allergies: document any known allergies

M - Medications: document all prescription, over-the-counter, and herbal medications

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34  **13.6 Cardiac Patient Assessment and Immediate Treatment (Cont'd)**

■ S-A-M-P-L-E (Cont'd):

P - Previous history: document information related to patient's cardiac health or previous cardiac events

L - Last intake: include food or liquids, how much and when

E - Events: anything that led up to problem

35  **13.6 Immediate Care**

■ Tasks to be performed within 10 minutes of arrival:

Assess pain level: quality, duration, location, radiation

Check vital signs, including pulse oximetry

Start oxygen per local protocol

Notify physician of patient with chest pain

Obtain 12-lead ECG immediately; have physician interpret

36  **13.6 Immediate Care (Cont'd)**

■ Further treatment may include:

Determine cardiac rhythm on monitor

Start an intravenous line

Obtain a blood specimen

Order lab tests

Aspirin is administered

37  **13.6 Immediate Care (Cont'd)**

■ Further treatment may include (cont'd):

- Nitroglycerin is administered; systolic BP must be greater than 100 mmHg
- Repeat nitroglycerin x 2 more doses
- Monitor vital signs every 15 minutes
- Beta blocker medications are given per protocol
- Chest X-ray may be ordered

38  **13.6 Law & Ethics**

If the patient will be undergoing an invasive procedure, an informed consent form must be signed before any narcotic medication is administered.

39  **13.6 Additional Cardiac Tests**

- Coronary Angiography:
  - Done in cath lab
  - Radiopaque dye is injected to visualize the heart structures and coronary arteries
- Echocardiography:
  - Sound waves create an image of heart walls, chambers, and structures within

40  **13.6 Additional Cardiac Tests (Cont'd)**

- Electrocardiogram (ECG):
  - Serial or repeated ECG's are performed at regular intervals to observe subtle changes in the cardiac complexes

41  **13.6 Apply Your Knowledge**

What are the two common memory devices used in assessment of the cardiac patient?

42  **13.6 Apply Your Knowledge**

What are the two common memory devices used in assessment of the cardiac patient?

Answer: O-P-Q-R-S-T evaluates pain  
 S-A-M-P-L-E gathers more  
 information

43  **13.7 Further Treatment for the Cardiac Patient**

- Thrombolytic or Fibrinolytic Therapy:
  - Medications used to prevent or break down clots that block coronary vessels
- Angioplasty (PTCI or PCI):
  - Procedure performed to open blocked blood vessels in the heart

44  **13.7 Further Treatment for the Cardiac Patient (Cont'd)**

- Stent:
  - Small, metal mesh tube that opens up the inside of a coronary artery
  - Helps prevent reocclusion of the artery
  - Drug-eluting stent has medication within to prevent the artery from closing again

45  **13.7 Further Treatment for the Cardiac Patient (Cont'd)**

- Coronary artery bypass graft (CABG) surgery:

- Performed under anesthesia and while patient is on heart-lung machine
- The internal mammary artery or the saphenous vein in the leg is grafted in place of the occluded vessel to re-establish blood flow

46  **13.7 Further Treatment for the Cardiac Patient (Cont'd)**

■ Coumadin Clinic:

- Patients are prescribed this anticoagulant due to dysrhythmia or hypercoagulopathy
- Patients must take Coumadin at the same time each day
- Patients must have their bleeding times checked on a regular basis to ensure the Coumadin dose remains therapeutic

47  **13.7 Further Treatment for the Cardiac Patient (Cont'd)**

■ Enhanced External Counter Pulsation Therapy (ECP):

- Performed on patients with recurrent angina or patients unable to withstand major surgery
- A safe, non-invasive, well-tolerated procedure
- Inflatable pants are wrapped around the patient's calves, upper and lower thighs

48  **13.7 Further Treatment for the Cardiac Patient (Cont'd)**

■ Enhanced External Counter Pulsation Therapy (ECP) (Cont'd):

- The pants systematically inflate and deflate in coordination with the contraction and relaxation phases of the heart.
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49  **13.7 Further Treatment for the Cardiac Patient (Cont'd)**

■ Enhanced External Counter Pulsation Therapy (ECP) (Cont'd):

- Promotes the growth of new collateral blood vessels to bypass the occluded vessels.
- Each treatment lasts 1 hour/day, 5 days/week for 7 weeks.
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50  **13.7 Apply Your Knowledge**

What term refers to the occlusion of the proximal left main coronary artery and leads to carcinogenic shock and sudden death?

51  **13.7 Apply Your Knowledge**

What term refers to the occlusion of the proximal left main coronary artery and leads to carcinogenic shock and sudden death?

Answer: "Widow maker"

52  **Chapter Summary**

- The coronary arteries are responsible for supplying oxygen and nutrients to the heart muscle.
- All chest pain is considered cardiac until proven otherwise.
- Anginal symptoms indicate the heart is not receiving enough oxygen.

53  **Chapter Summary (Cont'd)**

- Unstable angina indicates the angina has changed or gotten worse and may be confused with a MI.
- Women, diabetics and the elderly may have atypical symptoms of acute coronary syndrome.

54  **Chapter Summary (Cont'd)**

- STEMI refers to the classic MI occurring 75%-80% of the time.
- NSTEMI patients may be asymptomatic.
- Heart failure occurs when the heart muscle is injured and is unable to be an effective pump.
- Heart failure is most commonly caused by MI.

55  **Chapter Summary (Cont'd)**

- Left and right heart failure have different effects on the body.
- O-P-Q-R-S-T and S-A-M-P-L-E are common memory tools used to gather information from cardiac patients so medical care can be delivered immediately.

56  **Chapter Summary (Cont'd)**

- Interventional procedures such as angioplasty, stenting, or CABG may be required in certain circumstances.
- Other treatments include fibrinolytic therapy, Coumadin therapy, or EECF depending on the patient's diagnosis and state of health.