NR 23 Lecture Outline
Assessment of the Cardiovascular System
Part I: Heart and Great Vessels

The major function of the heart:

**Anatomy**
- Precordium

- The Great Vessels
  - Superior and Inferior Vena Cava
  - Pulmonary Artery
  - Pulmonary Veins
  - The Aorta

- The Heart’s location
  - Vertical location
  - Horizontal location
  - Positions with respiration
    - inspiration
    - expiration
  - Apex
  - Base
  - PMI
  - The hearts right side
  - The hearts left side
  - The right ventricle
  - The left ventricle
  - The left atrium
**Structures of the Heart**

- Pericardium
  - Visceral pericardium
  - Parietal pericardium
  - The space between the sac membranes and the heart:

- Heart Wall- has 3 layers
  1. **Endocardium**
  2. **Myocardium**
  3. **Epicardium**

- Heart Chambers, Valves and Circulation
  - 4 chambers
  - 4 valves
  - 2 septum’s

***The main function of the heart is to pump blood, but to understand it think of it as 2 separate pumps:***

**Right side** of the heart is a pump that circulates blood into the lungs

- **Right Atrium**
  - It lies:
  - It is separated:
  - It forms:
  - It received:
  - Pressure of:
  - Blood passes:

- **Right Ventricle**
  - It lies:
  - It is separated:
  - It receives:
  - Pressure:
  - It ejects the blood:
The left side of the heart is a pump to circulate blood to the body-

- **Left Atrium**
  - Forms
  - It receives
  - Blood is ejected
  - Pressure

- **Left Ventricle**
  - Forms
  - The most muscular part of the heart because
  - LVH sign of pathology (enlarged LV)
  - It ejects blood
  - Pressure

<table>
<thead>
<tr>
<th>Heart Valves</th>
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<tbody>
<tr>
<td><strong>Atrioventricular between the A and V</strong></td>
</tr>
<tr>
<td>Tricuspid (right A/V)</td>
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<tr>
<td>Mitral (left A/V)</td>
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<tr>
<td><strong>Semilunar between the V and artery/aorta</strong></td>
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<tr>
<td>Pulmonic (RV/PA)</td>
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<td>Aortic (LV/A)</td>
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Heart Sounds- are from the closing of the valves

The cardiac cycle has 2 phases
  - Systole
  - Diastole

**Diastole**: the valves between the atria and ventricle have to be open to allow filling. When they close a sound is produced. This is the “lub” or first heart sound. It is called__________

And marks:
  The __________ valve and the __________ valves close

The __________ slightly precedes the closure of the __________ but normally is heard as one sound

S1 is loudest at the _________
**Systole:** The next thing to occur is the ventricles that are now full of blood have to contract, forcing the semilunar valves to open. When they close the “dub” is heard known as the ______ or _______. It marks the close of the cardiac cycle.

The ___________ and ______________ close

The ______________ slightly precede the ______________ closure but also normally is heard as one sound

S2 is loudest at the ___________.

****The events of the left side of the heart (pumping to the body) occur a fraction of a second BEFORE the events on the right side (pumping the lungs) because the pressure is lower on the right side.

**Changes in sound quality**

Respiration-

During inspiration:

This increase in volume, prolongs ___________ and delays the closure of the_______________

The greater amount of blood is in the lungs during inspiration, decreases the amt of returned blood to the left side of the heart, shortening ventricular systole allowing ________________. It these closures are significantly earlier you hear the 2_______________ valves to close separately causing a ______________.
Extra Heart Sounds

Because there are 4 valves there are technically 4 separate sounds produced.

- **S3**
  - Many be heard:
  - Ventricular filling creates vibrations heard over the chest indicating:
    - It occurs immediately after:
    - It usually disappears as:
    - If it persists when the person sits up it is termed:
    - It may originate from either:
      - Left:
      - Right:

- **S4**
  - The atria contracts to:
  - Soft, low pitch:
  - Best heard at:
  - May be normal (physiologic) in:
  - Pathologic S4 is called:

When BOTH S3 and S4 are heard it is called a ____________________________

Pericardial friction rub:

Mechanical heart sounds:
Understanding Murmurs

Murmurs

Conditions that cause murmurs are:
1.
2.
3.

When heard:

Timing-

Location

Amplitude Loudness-

Grade 1 barely heard
Grade 2 clear but faint
Grade 3 moderate, easy to hear
Grade 4 Loud usually with a palpable thrill
Grade 5 Very loud, heard just as your stethoscope touches the pt
Grade 6 loudest heard with the stethoscope not even touching yet

Quality

Posture and radiation
NECK Vessels

Assessment of the **Carotid Artery** and **Jugular Veins**

**Carotid Artery:**

**Jugular Veins:**

- Internal jugular vein:
- External jugular vein:

**Conduction System**

**The main structures if the conduction system are:**
SA node

- Intra-atrial conduction pathways

- AV node and Bundle of HIS

- Right and Left Bundle Branches

- Perkinge Fibers
Electrical Representation of the Cardiac Cycle

Components of EKG include
P-Wave
PR Interval
QRS Interval
T Wave
QT Interval

**P-Wave** represents atrial depolarization. The SA node emits an electrical impulse that spreads to the RA and LA and cause the atria to contract

**PR Interval** represents the time needed for the electrical current to travel to the atria and arrive at the AV node

**QRS Interval** represents ventricular depolarization. The ventricles respond to the spread of the electrical current by turning positively charged

**T Wave** ventricle repolarization

**QT Interval** represents the period from the beginning of ventricular depolarization to repolarization where ventricles contract

**PHYSICAL ASSESSMENT OF THE HEART**

Equipment needed:

Assessment techniques:

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 
11. 

________________________________________________________________________
CS/06/MP/08 8
CHEST

**Inspection:** Includes inspecting the neck and precordium

**Anterior chest:**

**Palpation**

- Apical impulse
  - location
  - size
  - amplitude
  - duration

- Precordium
  - Apex
  - LSB
  - Base

- Abnormal pulsations
  - Base
  - Thrill
  - Lift (heave)
  - Apex
  - PMI

**Percussion:** Outlines the heart border to detect cardiac enlargement

**Auscultation:** assesses the function of the heart, mainly the valves by listening to the different sounds in specific places

The order of auscultation should follow:
- Aortic area: 2\textsuperscript{nd} ICS RSB
- Pulmonic area: 2\textsuperscript{nd} ICS LSB
- Erb’s point 3\textsuperscript{rd} ICS LSB
- Tricuspid area 4\textsuperscript{th} ICS LSB
- Mitral area 5\textsuperscript{th} ICS MCL

Begin at the base and move across, down the SB to the apex forming a Z

Listen with both the diaphragm (high pitched) Bell (low)
Listen for:
Rate, rhythm
S1, S2
Extra sounds and murmurs

Remember
S1 louder __________
S2 louder __________

Then have pt change position, roll to left side and repeat

NECK
Inspection involves inspecting the jugular venous pulse
internal vein pulsation
the external vein pulsation
estimate the jugular venous pressure (JVD)

Palpate:
The Carotid artery

Auscultate
Carotid artery

Apply the bell over the carotid artery in 3 positions
Angle of jaw
Midcervical area
Baser of neck
Do not compress to hard

Listen for Bruit