University of A-Ameed
College of Nursing
Adult branch
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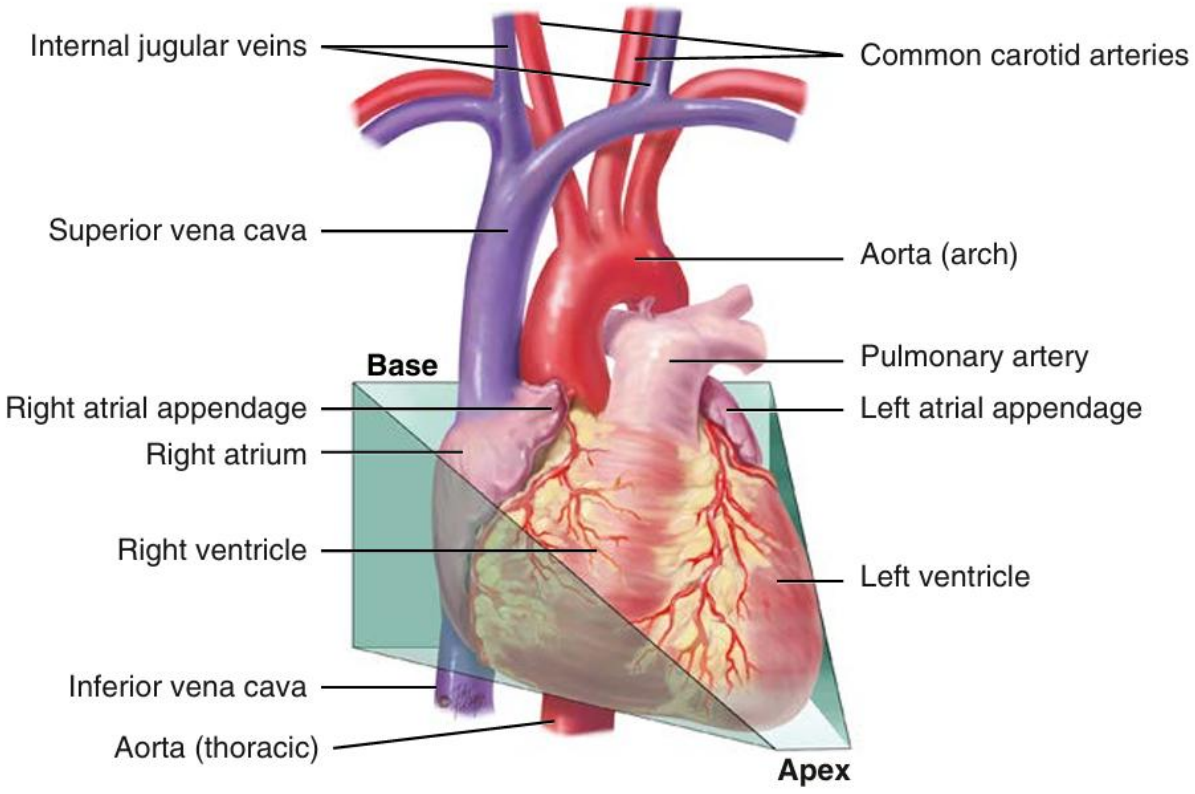
Assessment of cardiovascular system

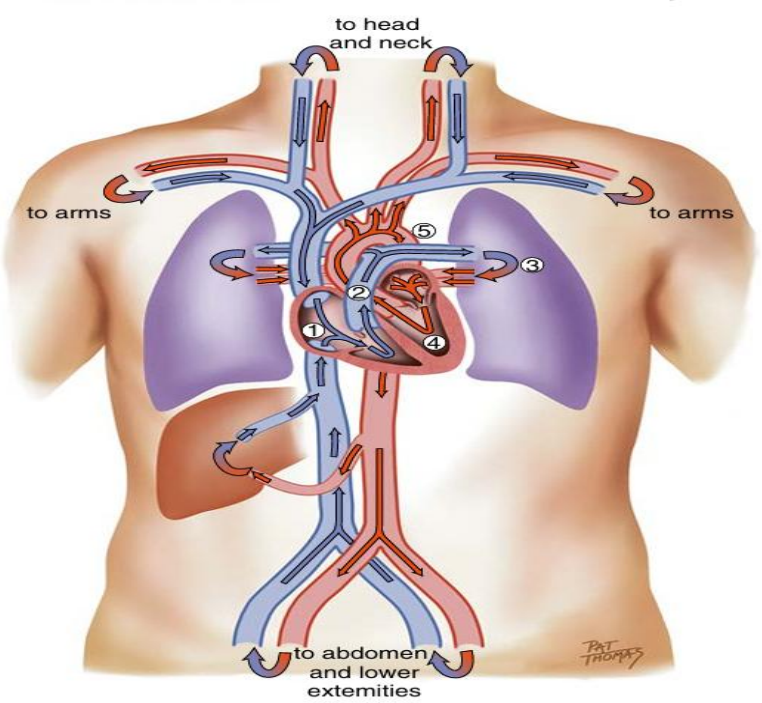
Anatomy and physiology

The cardiovascular (CV) system consists of the heart (a muscular pump) and the blood vessels. The precordium is the area on the anterior chest directly overlying the heart and great vessels. The great vessels are the major arteries and veins connected to the heart. The heart extends from the 2nd to the 5th intercostal space and from the right border of the sternum to the left midclavicular line. heart is actually two pumps; the right side of the heart pumps blood into the lungs, and the left side simultaneously pumps blood into the body. The two pumps are separated by an impermeable wall, the septum. Each side has an atrium and a ventricle.



The Direction of Blood Flow in circulatory system

1. From liver to right atrium through inferior vena cava. Superior vena cava drains venous blood from the head and upper extremities.
   From right atrium venous blood travels through tricuspid valve to right ventricle.
2. From right ventricle venous blood flows through pulmonic valve to pulmonary artery. Pulmonary artery delivers unoxygenated blood to lungs.
3. Lungs oxygenate blood.
   Pulmonary veins return fresh blood to left atrium.
4. From left atrium arterial blood travels through mitral valve to left ventricle.
   left ventricle ejects blood through aortic valve into aorta.
5. Aorta delivers oxygenated blood to body.



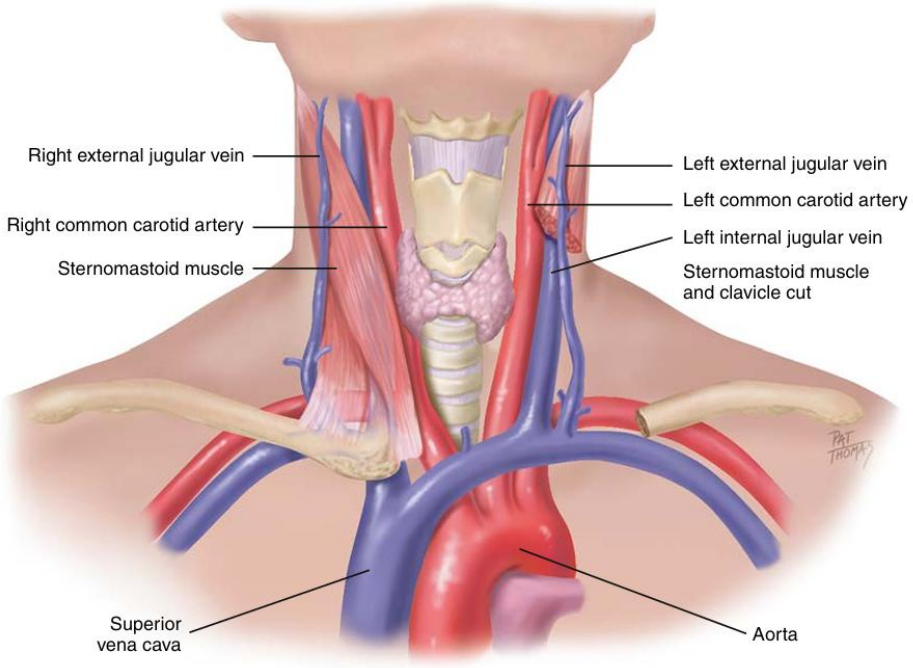
The Heart Sounds

1. The first heart sound (S1) occurs with closure of the AV valves and thus signals the beginning of systole.
2. The second heart sound (S2) occurs with closure of the semilunar valves and signals the end of systole.

3. Third Heart Sound (S3). Normally diastole is a silent event. However, in some conditions ventricular filling creates vibrations that can be heard over the chest. This occurs immediately after S2
4. Murmurs :some conditions create turbulent blood flow and collision currents. These result in a murmur, much like a pile of stones or a sharp turn in a stream creates a noisy water flow

The Neck Vessels

1. The Carotid Artery: The carotid artery is located in the groove between the trachea and the sternomastoid muscle, medial to and alongside that muscle.
2. Jugular Venous: The jugular veins empty unoxygenated blood directly into the superior vena cava. Because no cardiac valve exists to separate the superior vena cava from the right atrium, the jugular veins give information about activity on the right side of the heart.



NECK VESSELS

The Subjective Data in Cardiovascular Assessment

1. **You should ask about the allowing symptoms in in cardiovascular assessment**
   a. Chest pain
   b. Dyspnea
   c. Orthopnea
   d. Cough
   e. Fatigue
   f. Cyanosis or pallor
   g. Edema
   h. Nocturia
2. **Past Cardiac History:**
   - Any history of: hypertension, elevated cholesterol or triglycerides, heart murmur, congenital heart disease, rheumatic fever or unexplained joint pains as child or youth, recurrent tonsillitis, anemia?
   - Ever had heart disease? When was this? Treated by medication or a heart procedure or surgery?
   - Last ECG, stress ECG, serum cholesterol measurement, other heart tests?
3. **Family cardiac history**. Any family history of hypertension, high cholesterol, obesity, diabetes, sudden cardiac death, CAD, or stroke at a younger age.
4. **patient-centered care** (cardiac risk factors):
   - Nutrition: Please describe your usual daily diet.
   - Smoking: amount, type, time.
   - Exercise: What is your usual amount of exercise each day or week.
   - Drugs: Do you take any antihypertensives, beta-blockers, calcium channel blockers, digoxin, diuretics, aspirin/anticoagulants, over-the-counter or street drugs?

Physical examination in Cardiovascular Assessment:

Preparation

To evaluate the carotid arteries, the person can be sitting up. To assess the jugular veins and the precordium, the person should be supine with the head and chest elevated between 30 and 45 degrees.

Equipment Needed

Stethoscope with diaphragm and bell endpieces Alcohol wipe (to clean endpiece) Small centimeter ruler

1. Assessment of neck vessels

A. Palpate the Carotid Artery:

Procedure: Palpate each carotid artery Feel the contour and amplitude of the pulse the carotid artery located medial to the sternomastoid muscle in the neck. Avoid excessive pressure on the carotid sinus area. Palpate only one carotid artery at a time to avoid compromising arterial blood to the brain.

Normal finding: Normally the contour is smooth with a brisk upstroke and slower downstroke, and the normal strength is moderate. Your findings should be the same bilaterally.

B. **Auscultate the Carotid Artery:** auscultate each carotid artery for the presence of a bruit. This is a blowing, swishing sound indicating blood flow turbulence; normally none is present. Keep the neck in a neutral position. Lightly apply the bell of the stethoscope over the carotid artery at three levels: (1) the angle of the jaw, (2) the midcervical area, and (3) the base of the neck.

C. Inspect the Jugular Venous Pulse:

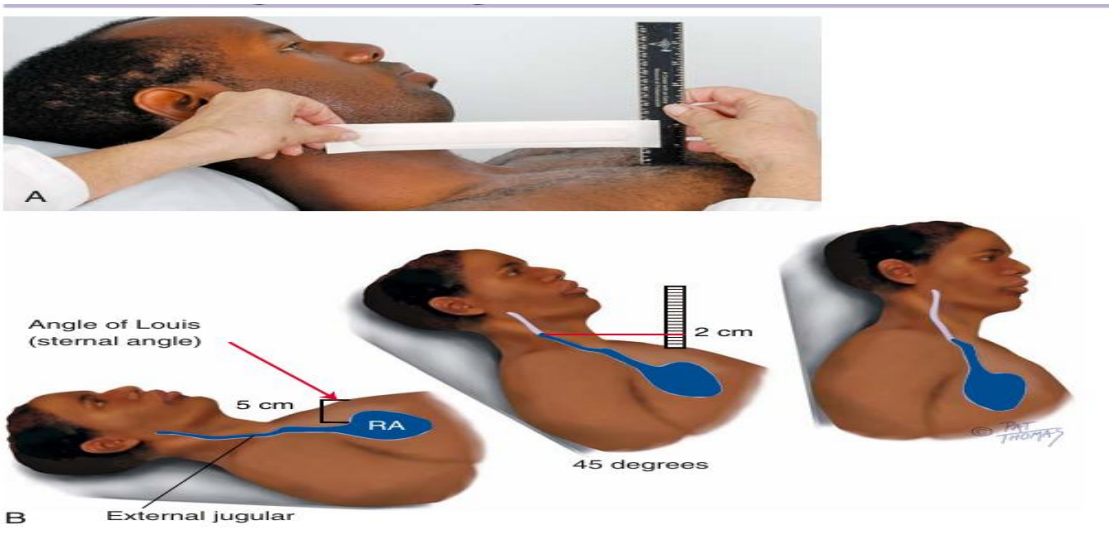
From the jugular veins you can assess the central venous pressure (CVP) and thus judge the heart's efficiency as a pump and the intravascular volume status. Stand on the person's right side because the veins there have a direct route to the heart.

Procedure:

Position the person supine anywhere from a 30- to a 45-degree angle, wherever you can best see the top of the vein or pulsations. In general, the higher the venous pressure is, the higher the position you need. Remove the pillow to avoid flexing the neck; the head should be in the same plane as the trunk. Turn the person's head slightly away from the examined side and direct a strong light tangentially onto the neck to highlight pulsations and shadows.

D. Estimate the Jugular Venous Pressure:

You can "read" the CVP at the highest level of pulsations. Use the angle of Louis (sternal angle) as an arbitrary reference point, and compare it with the highest level of the distended vein or venous pulsation. Hold a vertical ruler on the sternal angle. Align a straightedge on the ruler like a T-square and adjust the level of the horizontal straightedge to the level of pulsation. Read the level of intersection on the vertical ruler, during expiration if possible as this is more accurate normal jugular venous pulsation is less than 3 cm above the sternal angle.



2. Assessment of the Precordium:

A. Inspect the Anterior Chest:

Pulsations. You may or may not see the apical impulse, the pulsation created as the left ventricle rotates against the chest wall during systole. When visible, it occupies the 4th or 5th intercostal space, at or inside the midclavicular line. It is easier to see in children and in those with thinner chest walls.

B. Palpate the Apical Impulse:

The apical located in , the 4th or 5th, and be at or medial to the midclavicular line. Localize the apical impulse precisely by using one finger pad. Asking the person to "exhale and then hold it" helps the examiner locate the pulsation. You may need to roll the person midway to the left to find it; note that this also displaces the apical impulse farther to the left.You feel it best at the end of expiration when the heart is closest to the chest wall; then it moves quickly away from your finger.

C. Palpate Across the Precordium

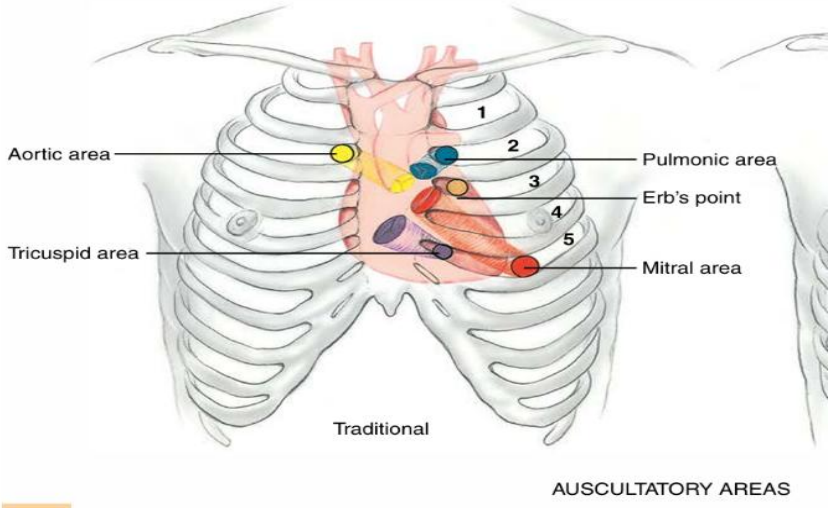
Using the palmar aspects of your four fingers, gently palpate the apex, the left sternal border, and the base, searching for any other pulsations. Normally none occur. If any are present, note the timing. Use the carotid artery pulsation as a guide, or auscultate as you palpate.

You may feel A thrill which is palpable vibration. It feels like the throat of a purring cat. The thrill signifies turbulent blood flow and directs you to locate the origin of loud murmurs.

D. Auscultation

Identify the auscultatory areas where you will listen. These include the four traditional valve areas

- Aortic valve area located in the second right interspace
- Pulmonic valve area located in the second left interspace
- Tricuspid valve area located in the left lower sternal border
- Mitral valve area located in the fifth interspace at around left midclavicular line.



AUSCULTATORY AREAS

Procedure

Before you begin, alert the person: "I always listen to the heart in a number of places on the chest. Just because I'm listening for a long time, it does not necessarily mean that something is wrong.

In auscultation assess the following:

1. **The Rate and Rhythm**. The rate ranges normally from 50 to 95 beats/min. The rhythm should be regular, although sinus arrhythmia occurs normally in young adults and children. When you notice any irregularity, check for a pulse deficit by auscultating the apical beat while simultaneously palpating the radial pulse.
2. **Identify S1 and S2**: Listen to S1 and S2 Separately. Note whether each heart sound is normal, accentuated, diminished, or split. Inch your diaphragm across the chest as you do this.
    - First Heart Sound (S1). Caused by closure of the AV valves, S1 signals the beginning of systole. You can hear it over the entire precordium, although it is loudest at the apex.
    - Second Heart Sound (S2). The S2 is associated with closure of the semilunar valves. You can hear it with the diaphragm over the entire precordium, although S2 is loudest at the base.

3. **Listen for Any Extra Heart Sounds**: Listen with the diaphragm; then switch to the bell, covering all auscultatory areas. When you do detect an extra heart sound, listen carefully to note its timing and characteristics. During systole the mid-systolic click (which is associated with mitral valve prolapse) is the most common extra sound. The third and fourth heart sounds occur in diastole; either may be normal or abnormal.
4. **Listen for Murmurs**: A murmur is a blowing, swooshing sound that occurs with turbulent blood flow in the heart or great vessels. Except for the innocent murmurs described, murmurs are abnormal