A marked increase in amplitude of the PMI at the right ventricular area occurs with right ventricular volume overload in atrial septal defect.

An increase in amplitude and duration occurs with right ventricular pressure overload in pulmonic stenosis and pulmonary hypertension. A lift or heave may also be seen in these conditions (and in chronic lung disease).

A palpable thrill in this area occurs with ventricular septal defect.

- Palpate the subxiphoid area with the index and middle finger.

- Right ventricular enlargement may produce a downward pulsation against the fingertips.

- An accentuated pulsation at the pulmonary area may be present in hyperkinetic states.

- A prominent pulsation reflects increased flow or dilation of the pulmonary artery.

- A thrill may be associated with aortic or pulmonary stenosis, aortic stenosis, pulmonary HTN, or atrial septal defect.

- Increased pulsation at the aortic area may suggest aortic aneurysm.

- A palpable second heart sound \( (S_2) \) may be noted with systemic HTN.

Cardiac Rate and Rhythm Assessment with Abnormal Findings (✓)

- Auscultate heart rate.

  ✓ A heart rate exceeding 100 beats per minute (BPM) is tachycardia. A heart rate less than 60 BPM is bradycardia.

  - Simultaneously palpate the radial pulse while listening to the apical pulse.

  ✓ If the radial pulse falls behind the apical rate, the client has a pulse deficit, indicating weak, ineffective contractions of the left ventricle.

- Auscultate heart rhythm.

  ✓ Dysrhythmias (abnormal heart rate or rhythm) may be regular or irregular in rhythm; their rates may be slow or fast. Irregular rhythms may occur in a pattern (e.g., an early beat every second beat, called bigeminy), sporadically, or with frequency and disorganization (e.g., atrial fibrillation). A pattern of gradual increase and decrease in heart rate that is within normal heart rate and that correlates with inspiration and expiration is called sinus arrhythmia.

Heart Sounds Assessment with Abnormal Findings (✓)

See guidelines for cardiac auscultation in Box 28–1.

- Identify \( S_1 \) (first heart sound) and note its intensity. At each auscultatory area, listen for several cardiac cycles. See Figure 28–9 for auscultation areas.

  ✓ An accentuated \( S_1 \) occurs with tachycardia, states in which cardiac output is high (fever, anxiety, exercise, anemia, hyperthyroidism), complete heart block, and mitral stenosis.

  ✓ A diminished \( S_1 \) occurs with first-degree heart block, mitral regurgitation, CHF, coronary artery disease, and pulmonary or systemic HTN. The intensity is also decreased with obesity, emphysema, and pericardial effusion. Varying intensity of \( S_1 \) occurs with complete heart block and grossly irregular rhythms.

  - Listen for splitting of \( S_1 \).

    ✓ Abnormal splitting of \( S_1 \) may be heard with right bundle branch block and premature ventricular contractions.

    - Identify \( S_2 \) (second heart sound) and note its intensity.

      ✓ An accentuated \( S_2 \) may be heard with HTN, exercise, excitement, and conditions of pulmonary HTN such as mitral stenosis, CHF, and cor pulmonale.

      ✓ A diminished \( S_2 \) occurs with aortic stenosis, a fall in systolic blood pressure (shock), pulmonary stenosis, and increased anterioposterior chest diameter.

    - Listen for splitting of \( S_2 \).

      ✓ Wide splitting of \( S_2 \) is associated with delayed emptying of the right ventricle resulting in delayed pulmonary valve...