

Subject-Basic ECG

Unit-1-Puzzles No-2

Reasoning Adaptation - Cardiac Wave Front Conduction Block

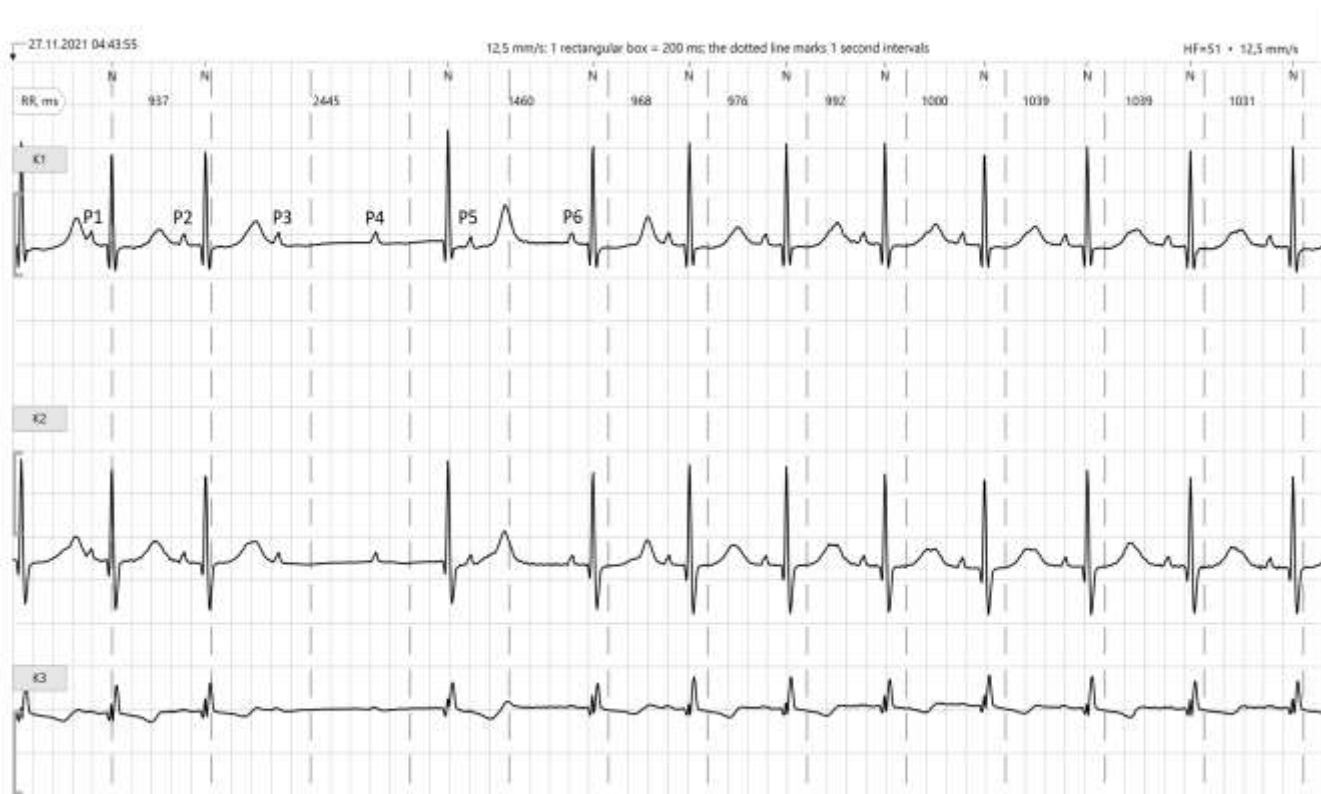
This scenario requires deduction regarding the effect of a functional change on ECG morphology, adapting the structure of the Reasoning Puzzle - Symptom Deduction.

Scenario: A patient suffers an acute blockage affecting the highly specialized conduction pathways (Purkinje fibers) responsible for rapidly distributing the cardiac wave fronts throughout the ventricles during activation.

Observation: The resulting ECG shows a wide and bizarre QRS complex, unlike the typical narrow, sharp QRS seen in a healthy heart.

Question: Why does the slowing of the wave fronts lead specifically to a wide QRS complex?

- A) It prolongs the time required for the cardiac electrical field generation during activation to complete.
- B) It increases the voltage (amplitude) of the instantaneous cardiac vector.
- C) It prevents subsequent ventricular recovery.
- D) It causes lead reversal in the Standard Limb Leads.



2. Observation-Vector Addition Challenge

Consider the heart as a set of three main vectors for ventricular depolarization:

Vector 1: 0° – 30° , small magnitude

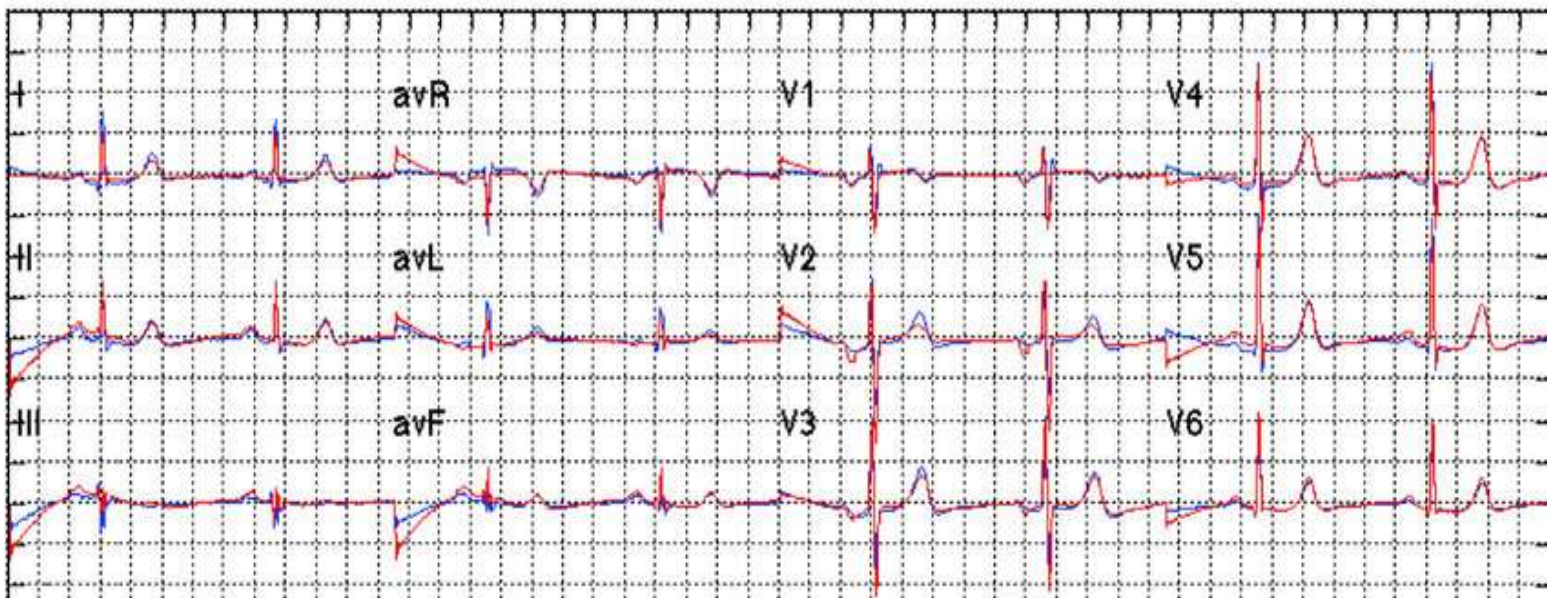
Vector 2: 60° – 90° , medium magnitude

Vector 3: 120° – 150° , large magnitude

Question:

1. If you sum these vectors geometrically, which lead would show the highest R wave amplitude?
2. Explain the reasoning behind your choice

A Healthy Control (HC) - 12 Lead ECG Signal Time Domain Plots



B Myocardial Infarction(MI) - 12 Lead ECG Signal Time Domain Plots

