



HyperTensia 2025



Use of ECG in Hypertension

An **Electrocardiogram (ECG or EKG)** is a valuable tool in evaluating hypertension and its effects on the heart. While ECG does not directly measure blood pressure, it helps detect complications caused by **long-term high blood pressure**.

1. Why is ECG Important in Hypertension?

Hypertension puts extra strain on the **heart and blood vessels**, leading to structural and electrical changes. ECG helps:

- ✓ **Detect heart damage** due to prolonged high BP.
 - ✓ **Identify complications** like arrhythmias, heart enlargement, and ischemia.
 - ✓ **Monitor the effectiveness of hypertension treatment** over time.
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2. ECG Findings in Hypertensive Patients

a) Left Ventricular Hypertrophy (LVH)

- **Most common ECG abnormality in hypertension.**
- Hypertension forces the heart to work harder, causing **thickening of the left ventricle**.
- **ECG signs:**
 - Tall R waves in **leads V5 & V6**.
 - Deep S waves in **V1 & V2**.
 - Increased **Sokolow-Lyon Index** (S wave in V1 + R wave in V5/V6 > 35 mm).

b) Left Atrial Enlargement

- Due to **pressure overload in the heart**.
- **ECG signs:**
 - **Wide, notched P wave** in lead II.
 - **Negative P wave** in V1.

c) Ischemic Changes (Silent Coronary Artery Disease)

- Long-term hypertension can cause **reduced blood flow** to the heart.
- **ECG signs:**
 - **ST depression, T-wave inversions** (signs of ischemia).
 - **Pathological Q waves** (suggest prior heart attack).

d) Arrhythmias (Irregular Heartbeat)

- Hypertension can cause **atrial fibrillation (AFib)**, increasing stroke risk.



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- ECG signs:
 - Irregular RR intervals with no distinct P waves (AFib).
 - Extrasystoles or ventricular ectopy due to heart strain.

e) Left Axis Deviation (LAD) & Strain Pattern

- Due to **hypertensive heart disease**.
- ECG signs:
 - **LAD** – QRS axis shifting leftward ($< -30^\circ$).
 - **Strain pattern** – ST depression and T-wave inversion in **V5-V6, I, aVL**.

3. When is ECG Recommended for Hypertension?

- ✓ **At diagnosis** – To check for early heart involvement.
- ✓ **In resistant hypertension** – To identify secondary causes.
- ✓ **In long-term hypertension** – To monitor heart function over time.
- ✓ **If symptoms occur** – Chest pain, palpitations, dizziness, or breathlessness.

4. Limitations of ECG in Hypertension

- ✗ ECG may **miss early heart damage** (Echocardiography is more sensitive for LVH).
- ✗ Some hypertensive patients may have a **normal ECG despite underlying disease**.

Conclusion:

ECG is a **quick, cost-effective** tool to assess hypertension-related heart damage, detect complications, and guide treatment. However, **echocardiography and advanced imaging** may be needed for a more detailed assessment.