CURRENT CONCEPTS

ST-Segment Elevation in Conditions Other Than Acute Myocardial Infarction

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Figure 1. Electrocardiograms Showing Normal ST-Segment Elevation and Normal Variants.

Tracing 1 shows normal ST-segment elevation. Approximately 90 percent of healthy young men have ST-segment elevation of 1 to 3 mm in one or more precordial leads. The ST segment is concave. Tracing 2 shows the early-repolarization pattern, with a notch at the J point in V4. The ST segment is concave, and the T waves are relatively tall. Tracing 3 shows a normal variant that is characterized by terminal T-wave inversion. The QT interval tends to be short, and the ST segment is coved.
Benign Early Repolarization Morphology

- High Voltage
- Fish Hook
- Narrow T wave (Asymmetric)
- Concaving Up ST Segment
Rule 1
\[
\frac{\text{sum of } T \text{ wave amplitudes } V1 + V2 + V3 + V4}{\text{sum of } QRS \text{ amplitudes } V1 + V2 + V3 + V4} > 0.22
\]

Rule 2
\[
\frac{T \text{ wave amplitude}}{QRS \text{ amplitude}} \text{ in any lead } V1, V2, V3, \text{ or } V4 \geq 0.36
\]

**Figure 2.** Two rules for predicting STEMI versus left ventricular aneurysm.

**Figure 3.** Measurements annotated on individual leads in millimeters. By rule 1, the ratio is equal to 0.23 (>0.22 suggests STEMI). By rule 2, the maximum ratio is equal 0.25 (≥0.36 suggests STEMI).

PEARLS

• Left ventricular aneurysm occurs commonly in nonreperfused anterior infarcts.
• Typical ECG features of left ventricular aneurysm include persistent anterior ST-segment elevations, deep Q waves, and the absence of reciprocal ST-segment depressions.
• “Proportionality” describes the concept of T-wave amplitude relative to the QRS amplitude, and suspicion of STEMI should increase as this ratio increases (see Figure 3 for rules).
• In this case, the presence of left ventricular aneurysm obscured ECG findings of acute myocardial infarction.
• Consider immediate percutaneous coronary intervention when acute coronary occlusion is likely, such as in this symptomatic patient with recent placement of a drug-eluting stent and noncompliance with antiplatelet agents, even when ST-segment elevation is absent or obscured by other conditions such as left ventricular aneurysm.

Before one ‘LEAPS’ to a diagnosis of STEMI, one should consider these other causes of ST elevation

**L** - LVH, LBBB, Left main disease

**E** - Early Repolarization, Epinephrine

**A** - Aneursym (Left ventricle and Aorta), Anemia

**P** - Potassium, Pericarditis, Pre-excitation syndromes

**S** - Shock (Defibrillation), Sepsis
META ANALYSIS (10 STUDIES)
3,007 PATIENTS

Factors Associated with Circulatory Shock and Death

The 6 SISTAS

• Sinus Tachycardia (HR >100 bpm)
• Incomplete RBBB or Complete RBBB
• ST Elevation in aVR
• T wave inversions in V1-V4
• Atrial fibrillation (new onset)
• S1Q3T3 (RV strain causes pressure on the LPF)