

Table 4 ECG leads associated with cardiac regions.

Cardiac region	Leads with STE	Reciprocal STD
Anterior	V3, V4	None
Anterolateral	I, aVL V3–V6	II, III aVF
Anteroseptal	V1–V4	None
Septal	V1, V2	None
Inferior	II, III, aVF	I, aVL
Right ventricular	Right-sided chest leads V3–6	
Posterior	Posterior leads V7–9	V1–V3
Lateral	I, aVL, V5, V6	II, III, aVF
High lateral	I, aVL (V2)	III (II, aVF)

Abbreviations: ECG, electrocardiogram; STE, ST-segment elevation; STD, ST-segment depression.

The validated Modified Sgarbossa criteria improves diagnosis of STE in people with LBBB or right ventricular pacing with a specificity of 99% and a sensitivity of 80% (Figure 4F) [86–88]. The modification entails excessively discordant STE with an amplitude >25% of the depth of the preceding S wave in any lead with no scoring required.

There are currently no validated methods to discern STE of ACOMI from STE seen with LVH or hypertrophic cardiomyopathy. However, clinical suspicion for ACOMI should be high in the presence of haemodynamic compromise and/or symptoms consistent with ACS.

In people with LVH, comparison with previous ECGs should be performed. If unavailable, continuous cardiac monitoring with close clinical observation and serial ECGs are required to monitor for development of acute coronary occlusion. Expert consultation should be sought for people with persisting ischaemic symptoms with equivocal ECG findings of ACOMI.

2.2.2. High-risk ECG findings

Acute coronary occlusion is a dynamic process which may not be evident on the initial ECG. Certain ECG patterns are associated with potential progression to ACOMI. These patterns call for prompt and continuous clinical and ECG monitoring.

Wellens T waves: characteristic T wave inversions in pre-cordial leads. In a person in whom symptoms have resolved, this pattern may represent a reperfusion syndrome associated with a critical stenosis of the left anterior descending artery, known as Wellens syndrome (Figure 5A) [89]. Avoid provocative testing (e.g. exercise stress testing) and strongly consider invasive coronary angiography. If/when ischaemic symptoms return, the ECG recorded during symptoms will pseudo-normalise with more upright T waves.

Diffuse ST-segment depression across multiple leads with STE in aVR: may represent global ischaemia of various

etiologies including a left main occlusion, triple vessel disease or oxygen supply/demand mismatch ischaemia (Figure 5B) [90]. People with persisting symptoms with no identifiable alternative causes of ischaemia or who do not respond to treatment of alternative causes (e.g. hypoxia, anaemia, hypotension) should be considered for coronary angiography [91].

Hyperacute T waves: symmetrical, broad-based T waves disproportionately large to the preceding QRS complex can be the first ECG finding of an evolving MI, although its prognostic significance has been questioned (Figure 5C) [92,93]. These people should be subject to close clinical and continuous cardiac monitoring and serial 12-lead ECGs to examine for signs of ACOMI. An important differential diagnosis is hyperkalaemia (Figure 5C).

2.2.3. Other signs of myocardial ischaemia on ECG

Other ECG findings in a person with suspected myocardial ischaemia which should prompt continuous cardiac monitoring and consideration of treatment for NSTEMI/ACS are as follows.

- **ST-segment depression:** ≥ 0.5 mm at the J-point in ≥ 2 contiguous leads which is horizontal or down sloping (Figure 5D). The deeper and more widespread the depression, the more severe the ischaemia [94,95]. ST-segment depression in contiguous leads should be first considered as reciprocal change of ACOMI and the ECG examined for corresponding STE, as ST-segment depression secondary to subendocardial ischaemia does not generally localise to a regional coronary territory (Figure 4, Figure 5 and Table 4) [96]. Although ST-segment depression occurs in other conditions (e.g. LVH, hypokalaemia, digoxin use), a systematic review found it to be highly specific (97.2%–99.3%) but poorly sensitive (16.6%–20.0%) for ischaemia [97].
- **T wave abnormalities:** including dynamic inversion or flattening (Figure 5E). New T wave inversion compared to a previous ECG or dynamic T wave changes during serial ECGs may represent ischaemia. Specificity of T wave inversion for ischaemia is higher in the context of other signs of ischaemia on the ECG [98].

Computer-assisted ECG interpretation

No international standardised system for computer interpretation of ECGs currently exists. ECG machine manufacturers use different algorithms with varying sensitivity and specificity for diagnosing cardiac conditions. Computer errors specific to ACS and ACOMI diagnosis include attribution of Q waves in LVH, LBBB, and/or dilated or hypertrophic cardiomyopathy to ACOMI. Other errors include an inability to discriminate STE of early repolarisation, pericarditis, or LBBBs from ACOMI [99]. ECG interpretation by a clinician who can incorporate the person-specific clinical context into the assessment is vital.