Modified Sgarbossa and Smith's 4-variable formula

● Draft — pending owner review

MODIFIED SGARBOSSA CRITERIA (SMITH)

In left bundle branch block and ventricular paced rhythm the ST segment normally points away from the QRS and is in proportion to it. The Sgarbossa criteria, as modified by Dr. Stephen W. Smith, look for ST changes that break that rule. Any one criterion is positive for acute coronary occlusion.

1. **Concordant ST elevation.** ST elevation of 1 mm or more in any lead where the QRS is mainly positive.
2. **Concordant ST depression in V1–V3.** ST depression of 1 mm or more in V1, V2 or V3, where the QRS is mainly negative.
3. **Excessively discordant ST elevation.** In any lead with ST elevation of 1 mm or more, an ST/S ratio of −0.25 or lower: the ST elevation at the J point is at least 25% of the depth of the preceding S wave.

How to apply

- Measure at the J point against the baseline, at 10 mm/mV.
- Decide whether each lead's QRS is mainly positive or mainly negative.
- For leads with a mainly negative QRS and ST elevation, divide the ST elevation by the S-wave depth.

ST/S ratio cutoff: −0.25 or lower. Sgarbossa's original score gave points for discordant ST elevation of 5 mm or more. Smith replaced that fixed cutoff with the ST/S ratio because a proportional rule is more sensitive: a large QRS can carry 5 mm of normal discordant elevation, while a small QRS with 3 mm can already be an occlusion.

Caveat. A negative result does not exclude occlusion when the clinical picture suggests it: repeat the ECG and compare with old tracings.

SMITH'S 4-VARIABLE FORMULA

For anterior ST elevation where the question is subtle LAD occlusion or benign early repolarization. Not for use with LBBB, LVH, Q waves, T inversion or obvious STEMI.

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0.052 × QTc (Bazett, ms) − 0.151 × QRS amplitude in V2 (mm) − 0.268 × R-wave amplitude in V4 (mm) + 1.062 × ST elevation 60 ms after the J point in V3 (mm)
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Cutoff	Above 18.2 suggests LAD occlusion; below suggests early repolarization
3-variable version	Cutoff 23.4 (older formula, no QRS term)
Measure	QTc by Bazett; amplitudes in mm at 10 mm/mV

The lab's calculators apply both rules to the live tracing: ECG Lab, Measure.

SGARBOSSA AT A GLANCE

Concordant STE	≥ 1 mm, any lead
Concordant STD	≥ 1 mm in V1–V3
Excessive discordance	ST/S ratio ≤ −0.25