Precordial ST-segments elevation. Which vessel is occluded and where?

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Answer to the rhythm puzzle

ST-segment elevation in the precordial leads is almost always interpreted as anterior wall myocardial infarction due to occlusion of the left anterior descending artery (LAD). However, isolated right ventricular infarction can present with precordial ST-segment elevation (Fig. 1, *patient A*) mimicking anterior wall myocardial infarction [1]. Isolated right ventricular infarction is a rare event; it occurs in cases of occlusion of a non-dominant right coronary artery (RCA), isolated right ventricular branch occlusion or in cases of RCA occlusion where the left ventricle inferior wall is protected by left to right collaterals or a bypass graft [1]. The inferior ST segments are usually elevated due to right ventricular inferior wall involvement. In anterior wall myocardial infarction, the inferior ST segments are usually isoelectric or depressed. On the other hand, occlusion of a distal LAD, especially when wrapping around the apex (Fig. 1, *patient B*), can also present with concomitant anterior as well as inferior ST-segment elevation, giving an electrocardiographic pattern almost similar to isolated right ventricular infarction [1].

The accurate electrocardiographic differentiation between distal LAD occlusion and isolated right ventricular

infarction in the setting of acute myocardial infarction is clinically important both for choosing the correct management, such as adequate preload preservation and avoidance of vasodilators in case of right ventricular infarction, and for supporting the interventional cardiologist in choosing the correct culprit vessel, especially in cases of complex multivessel disease [1].

Few electrocardiographic criteria have been proposed in the differentiation between these two conditions. The dome-like appearance of the elevated precordial ST segments, ST elevation >1 mm in lead V1, ST-segment depression in lead V6, the decrease in the magnitude of the ST-segment elevation for V1 towards V6 and the higher ST elevations in lead III compared with lead II are suggestive of isolated right ventricular infarction [1]. The regression of the precordial ST-segment elevation without the appearance of Q waves or loss of R-wave amplitude are also indicative of isolated right ventricular infarction. Whereas ST-segment elevations in V4-6 more than in V1-3 (not in the presented case), ST-segment elevation >1 mm in lead V6, the presence of hyperacute Q waves over the precordial leads and ST-segment elevation in lead II more than in lead III are suggestive of distal LAD occlusion [1].

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Fig. 1 12-lead electrocardiogram of two different patients, showing ST-segment elevation in both anterior and inferior leads

Reference

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