

# Making Use of Lead V4R

You've just done a 12-lead ECG on a patient with chest pain compatible with an acute coronary syndrome. It shows ST elevation in leads II, III and aVF. There's a bit of baseline wander so you aren't really sure if the ST elevation in III is greater than II or not. There is ST depression in V1 through V3 but - again due to the baseline wander - you really aren't sure if there is ST depression in V1 that is commensurate with the depression in V2 and V3.

OK, you've noted STE in the inferior leads so there are two questions you should be asking yourself at this point: Are there any areas that are infarcting other than the inferior wall of the left ventricle and which artery is the culprit artery - the right coronary artery (RCA) or the left circumflex artery (LCx)? (We aren't considering a wrap-around LAD in this example.)

Every - wait a moment, let me repeat that - *every* ECG showing an acute inferior epicardial ischemia (i.e., STE in the inferior leads) should have a right-sided ECG done immediately upon noting the STE in the inferior leads. We especially want to focus on Lead V4R. A famous bank robber in the US was once asked by the agents arresting him why he chose to rob banks. His answer was "Because that's where all the money is!" Well, when there is STE in the inferior leads, your money is going to be in the V4R lead.

In the presence of an acute inferior wall epicardial ischemia, ST elevation in V4R indicates a proximal occlusion of the right coronary artery (RCA) and a resultant right ventricular infarction. But if there is no STE present in V4R, look closely at the T wave. If the T wave is upright, the ischemia is being caused by the RCA whereas if the T wave is inverted it is being caused by the LCx.

Here's an extra ECG pearl for you. Let's say the ECG shows STE in leads I, aVL and V2 through V6. So there is an acute anterolateral epicardial ischemia. But, for whatever reason, the tech also happened to do a right-sided ECG and - surprisingly! - there is STE in V3R and V4R! The expected reciprocal changes are noted in the inferior leads but certainly no STE! What's going on here? What this represents is an acute epicardial ischemia of the anterior wall of the right ventricle: the STE in V3R and V4R didn't lie!

It is often overlooked that the LAD is also a major supplier of circulation to the anterior wall of the right ventricle\*, and some left ventricular anterior wall infarctions are also accompanied by smaller right ventricular anterior wall infarctions. These tend to be very localized and small and generally of no hemodynamic consequence, but they can be seen from time to time.

\*The posterior descending artery and the acute marginals mostly provide circulation to the posterior and lateral walls of the right ventricle, respectively. Collaterals and small direct branches from the LAD perfuse the anterior wall of the right ventricle.