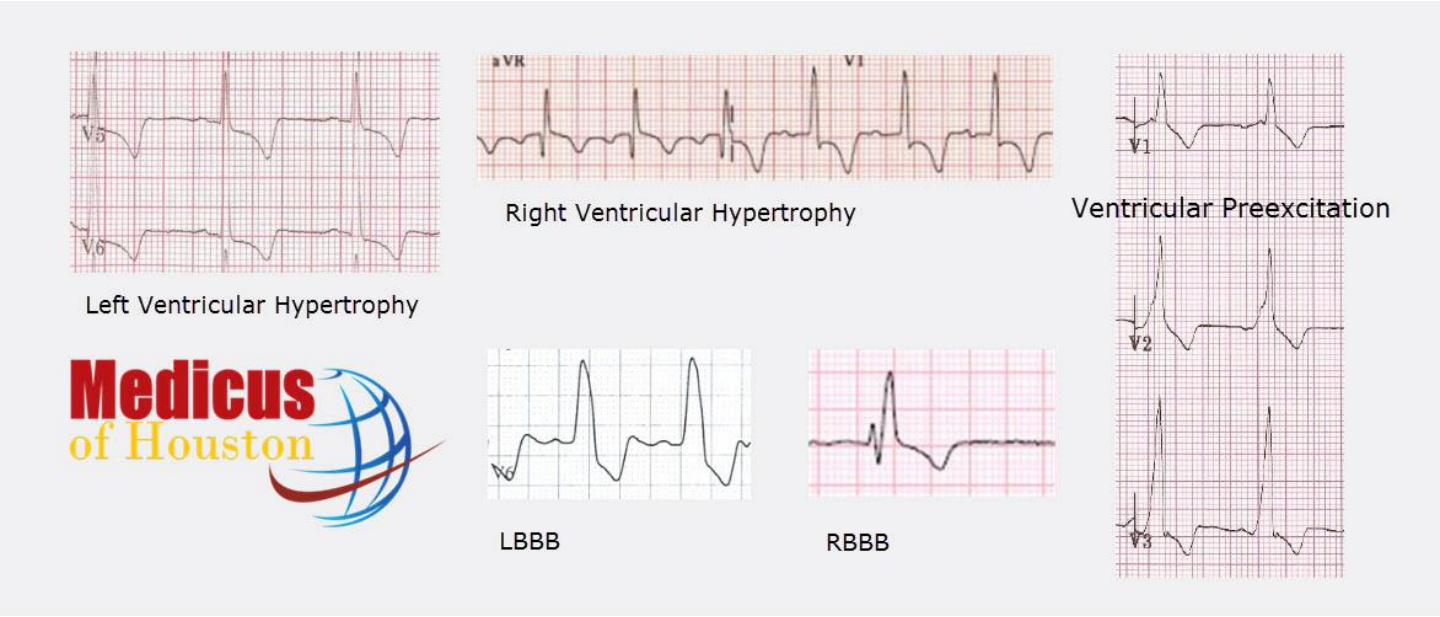

Which Direction Should the Repolarization Abnormality Point?

OK. You've got an abnormal QRS complex followed by a repolarization abnormality (RA). Which direction should the repolarization abnormality point? As a young resident, I was taught that the RA should point in the direction *opposite the terminal deflection of the QRS complex*. But years later, I see other physicians stating that the repolarization abnormality should point opposite *the main deflection of the QRS complex*. Which is correct?

The answer is *both are correct*. Why? How?

The reason is that ***the repolarization abnormality is connected to the ventricle in which the problem is located - not the QRS complex itself***. To better understand this, let's look at some of the major causes of repolarization abnormalities (you can find examples in the illustration at the top of this page):

Right Bundle Branch Block (RBBB) - When you look at the QRS complex in V1, you see an R and an R'. The R represents *left* ventricular activation while the R' represents *right* ventricular activation. So, *the problem lies in the right ventricle represented by the R'*. The repolarization abnormality reflects the problem in the RV so it should be opposite the R' which is always the last deflection in V1 in the presence of RBBB. Therefore, *in cases of RBBB, the repolarization abnormality is always opposite the* ***terminal deflection*** of the QRS.

Left Bundle Branch Block (LBBB) - When you look at the QRS complex from V6 which has a LBBB, we see a relatively tall, upright monophasic QRS complex. Part of that QRS represents right ventricular depolarization and part represents left ventricular depolarization. But how much of which? We don't know, but all we need to know is that this is a monophasic complex and it is upright. Therefore, since the repolarization abnormality reflects the problem in the left ventricle, and the LV is represented *somewhere in that monophasic R*, the repolarization abnormality should be opposite the main deflection. Therefore, *in cases of LBBB, the repolarization abnormality is always opposite the* ***main deflection*** of the QRS.

Left Ventricular Hypertrophy (LVH) - When you look at the QRS complexes from V5 and V6, we see a relatively tall, upright monophasic QRS complex. Part of that QRS represents right ventricular depolarization and part represents left ventricular depolarization. But how much of which? Again, we don't know, but all we need to know is that this is a monophasic complex and it is upright. Therefore, since the repolarization abnormality reflects the problem in the left ventricle, and the LV is represented somewhere in that monophasic R, the

repolarization abnormality should be opposite the main deflection. Therefore, *in cases of LVH, the repolarization abnormality is always opposite the* ***main deflection*** of the QRS.

Right Ventricular Hypertrophy (RVH) - The same concept discussed regarding LVH applies in cases of RVH. Therefore, *in cases of RVH, the repolarization abnormality is always opposite the* ***main deflection*** of the QRS.

Ventricular Pre-excitation - Most people reading ECGs don't realize that ventricular pre-excitation can also produce a repolarization abnormality. Just as repolarization abnormalities are not always present in cases of LVH and RVH, they are not always present in cases of ventricular pre-excitation, either. However, the repolarization abnormality IS present in some cases. The RA is connected to the ventricle containing the accessory pathway, but *don't worry: you don't have to determine which ventricle that is*. If a repolarization abnormality is present in a lead, it should be negative if the delta wave is positive and vice versa. Therefore, *the repolarization abnormality points* ***opposite to the direction of the delta wave***.

So, the question really isn't whether the repolarization abnormality should be opposite the *terminal* or the *main* deflection of the QRS. ***It should be opposite the deflection that represents the involved ventricle***.