



The Direction of the Septal Vector

I seem to write a lot about the septal vector (Vector 1) and there's a good reason for that: **it is the first indication of ventricular depolarization and it indicates whether the depolarization of the ventricles is proceeding normally... or not!**

There are two manifestations of the septal vector that we examine on the 12-lead ECG: a "septal q" wave and a "septal r" wave. The septal r appears in V1 and V2, but most reliably in V1. The septal q wave appears in V5 and V6 and usually Leads I and aVL. However, depending on the orientation of the heart in the thorax, septal q's may also appear in the inferior leads (II, III and aVF). And again, depending on the orientation of the heart in the chest cavity, you may even see a mixture of septal q waves in both the left-sided limb leads and the inferior limb leads. Septal q's are most frequently found in Leads I and aVL, but if you read several ECGs per shift, you are going to see septal q's in the inferior leads - *it's not that unusual*.

If the electrodes for V5 and V6 have been placed a little too low on the chest wall (as they so frequently are) you may see septal q's in those leads when they are only present in the inferior limb leads because, in such cases, V5 and V6 are acting more like inferior leads due to the location of their electrodes.

The issue here is that we are usually taught that the septal r in V1 or a septal q in Leads I, aVL, V5 and V6 indicate that the initial septal vector is traveling from left to right. On rare occasions, you may see a mention that there is "some" anterior force present as well, but it is usually mentioned as an aside or afterthought.

When you look at the illustration at the top of the article you see two diagrams indicating

- 1) the long-held (but totally incorrect) view of the heart in the chest (on the left) and
- 2) the current (and correct!) view of the heart in the chest (on the right).

In the past, when we spoke of the initial septal vector, illustrations such as the one on the left were used to demonstrate the left-to-right direction of the vector. As I pointed out in a previous post, there are inherently two problems with that concept.

First, the interventricular septum is not arranged in a vertical orientation that is perpendicular to the frontal plane and

second, the section through the heart should not be in the frontal plane but rather in the *transverse* or *horizontal* plane. When we place the illustration of the heart in the appropriate orientation to the thoracic cage (illustration on the right), we finally see the correct position of the heart, the septum and their relative positions with respect to the precordial electrodes.

Now when we look at the initial septal vector, we see that it does indeed travel from left-to-right but even more, ***it travels from posterior-to-anterior***. So whenever you are trying to visualize the initial septal vector, view it in your mind as in the illustration on the right! That septal r in V1 is probably more indicative of a posterior-to-anterior force rather than a left-to-right force. And this is logical since the "left" ventricle is actually *posterior* and the "right" ventricle is actually *anterior*!

If you would like to learn to interpret 12-lead ECGs at a more advanced level, visit our website at <https://www.medicusofhouston.com>. The [***Advanced ECG Interpretation Boot Camp***](#) is known the world over for its advanced curriculum. This is NOT a review course that simply reiterates the information contained in most basic ECG texts and online courses. It is a live, 4-day class. Classes presented in Houston, Texas are limited to *just 10 participants per class* while those presented outside Houston are limited to *just 20 participants per class*. Each participant can *ask questions at any time* and receive *individual attention*. The boot camp also includes *14 hours of active involvement by all participants in the interpretation of complex ECGs* during the class while being guided by the instructor. Again, questions are welcomed at any time! And the *instructor is available by phone during the 4-day boot camp each evening until 10 pm* if you should think of any questions after the class is over for the day.

At Medicus of Houston, you are always a participant and never just an audience!

A Special Note from Jerry W. Jones, MD FACEP

Medicus of Houston will continue to offer classes in Canada and other locations outside the United States so that *anyone* who wishes to attend may do so.

Come join us! We've saved a place just for you. (But it won't last long!)