

A Simple Question With a Trick Answer

Jerry W. Jones, MD FACEP FAAEM

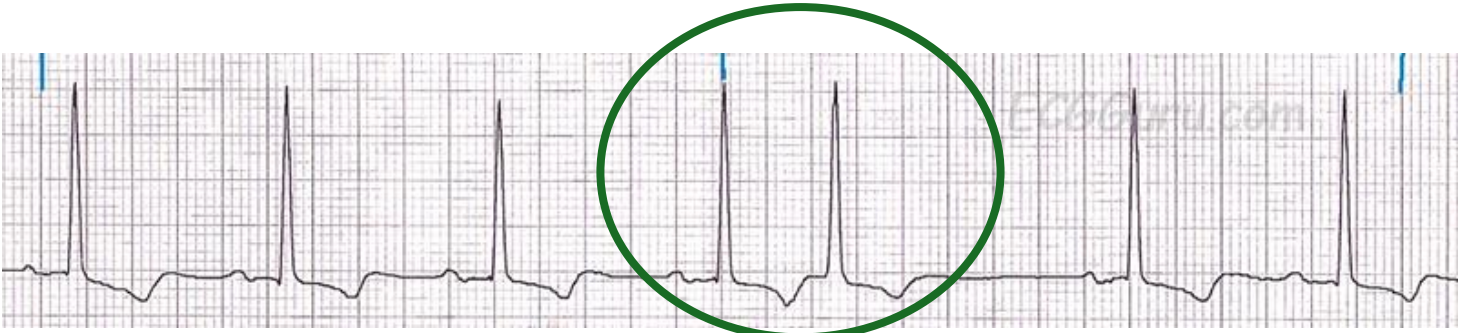


Figure 1 (Thanks to Dawn Altman of ECGGURU.com for the strip)

Do you recognize the dysrhythmia in Figure 1 (circle)? It could be one of two phenomena:

1. A low atrial premature complex, or
2. An atrial echo (reciprocal) beat.

We see a normal P wave followed by a normal QRS complex at the prevailing PR interval. But when we get to the T wave, it looks very different than the others. Its nadir comes to a more obvious point. OK... so what is the cause of an isolated, abnormal-appearing T wave? Answer: A P wave that is hidden in (superimposed on) the T wave. (That's not the "simple question.") Often, atrial echoes stop at this point but in this case, the echo returned to the ventricles and produced a second normal QRS complex. So, what happened here? (That's *still* not the "simple question.")

The P wave entered the AV node and travelled down the fast pathway and on to the His bundle and both bundle branches resulting in the normal QRS complex. And – normally – after reaching the bottom of the fast pathway, the impulse turns around and travels back up the slow pathway. This is NORMAL! However, under normal circumstances it runs into the impulse traveling down the slow pathway and they extinguish each other. This is normal and it happens with every beat of your heart.

But, what if there is a one-way, antegrade block in the slow pathway that prevented the impulse from traveling down it at the same time the impulse travelled down the fast pathway? (Nope, that's not the "simple question" either.) That would allow the impulse that travelled down the fast pathway to return to the atria via the slow pathway and produce a retrograde, inverted P wave. Look at the rhythm strip and you will see that, while the PR interval is "short" (i.e., the same duration as all the other beats), the R-P interval is longer. This would suggest that the impulse travelled back up to the atrial via the slow pathway.

OK... now for THE “simple question...”

Can a sinus P wave ever be inverted (retrograde)?

We say that only an impulse that arises in the SA node can be called a P wave. An atrial impulse with its origin outside the SA node is called a P' (“P-prime”) wave.

So, that retrograde, inverted deflection hidden in the T wave between the two QRS complexes – is it a P wave... or a P' wave?

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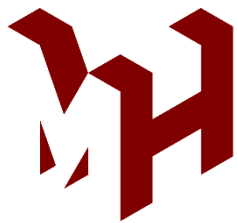


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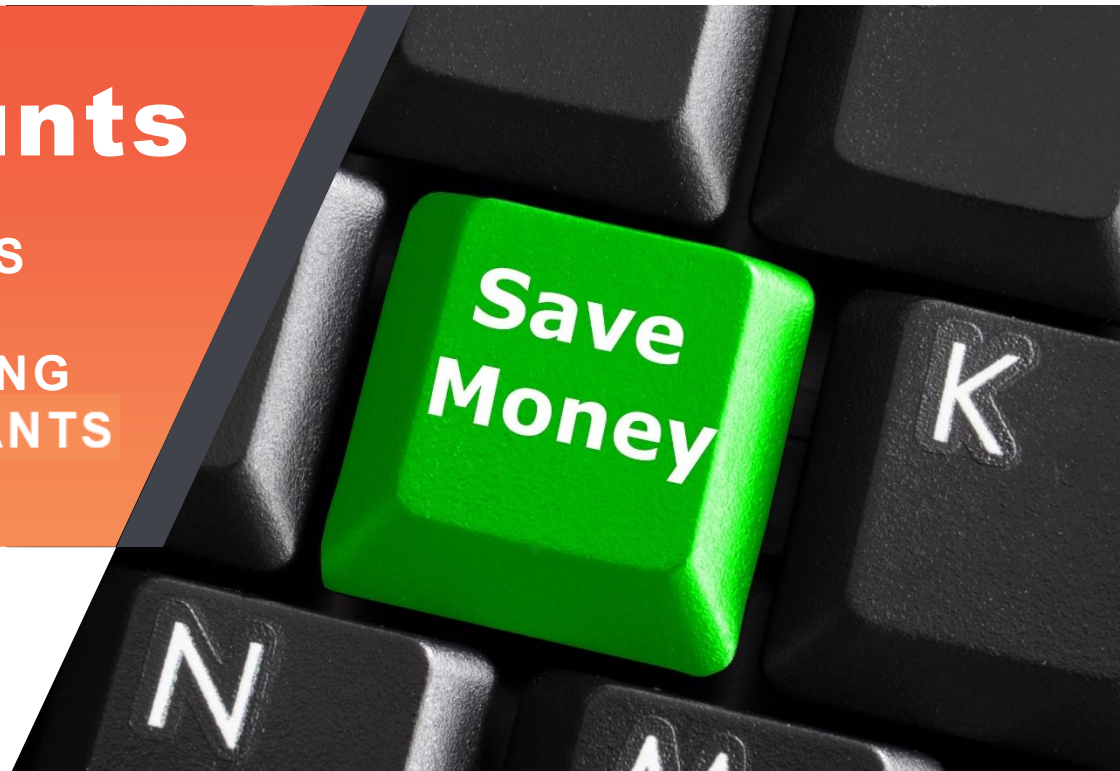
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