# Do You See the Problem?

# Discussion

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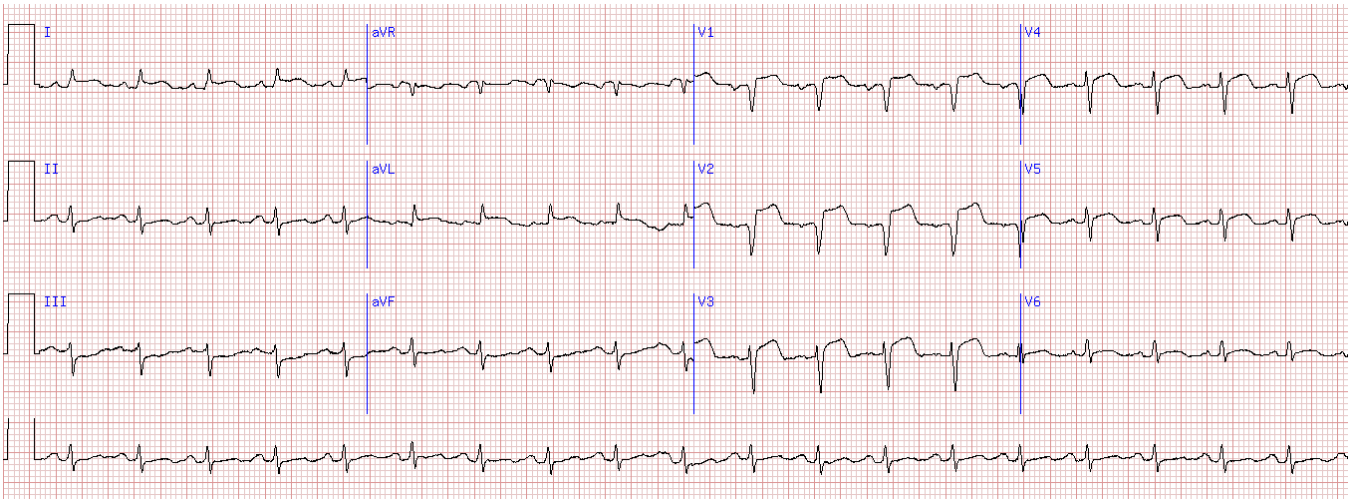


***Figure 1***

This ECG demonstrates an anterior transmural ischemia (aka, acute anterior MI). The MI is very extensive and its diagnosis is supported by the reciprocal changes in Leads III and aVF. Lead II is not showing any reciprocal change.

The problem is this: if this is an ***acute*** anterior MI, why do we see QS deflections in Leads V1 and V2. Do those large QS waves not indicate a completed infarction, although there are no signs of any reperfusion having occurred? Why are they there?

**ANSWER |** Those "QS" waves in Leads V1 and V2 most likely are *not* QS waves but actually simply S waves. Why? If you look closely, you will see that the P waves in BOTH Leads V1 and V2 are *completely inverted!* That is *not* normal. The most common cause of completely inverted P waves in those leads is placement of the adhesive electrodes for those two leads one or even two interspaces too high. Those electrodes should be placed in the 4$^{th}$ intercostal space, but they are very often placed higher, in the 3$^{rd}$ or even 2$^{nd}$ intercostal space.

What does this do?

First, it reduces or completely eliminates the small septal r wave that is normally present in those leads.

Second, it can elevate the J point to the extent that a small r' wave appears or the lead may manifest an artifactual elevation of the ST segment.

In this ECG, the ST elevations *are* authentic – but we really don't know for certain how high the ST elevations really are in Leads V1 and V2. In this case, it doesn't matter because we know that a serious acute anterior MI is occurring! What DOES matter is that there is now uncertainty as to the *evolution* of this acute transmural ischemia.

Had the electrodes for Leads V1 and V2 been placed correctly, I think the QRS morphology in both those leads would be an rS pattern followed by some degree of ST elevation.

How common is the misplacement of the Leads V1 and V2 electrodes?

I have a collection of around 3,000 ECGs that I acquired before my retirement from Emergency Medicine. When trying to find a NORMAL P wave in Lead V1 for one of my Masterclasses, I will sometimes have to look through 30 or 35 ECGs before I find a *normal* P wave in Lead V1 (i.e., a recording of the precordial leads *with the electrodes for Leads V1 and V2 placed in the correct intercostal space*)! So, YES! – the misplacement of those electrodes is *very* frequent!