What Has Happened Here?
Discussion

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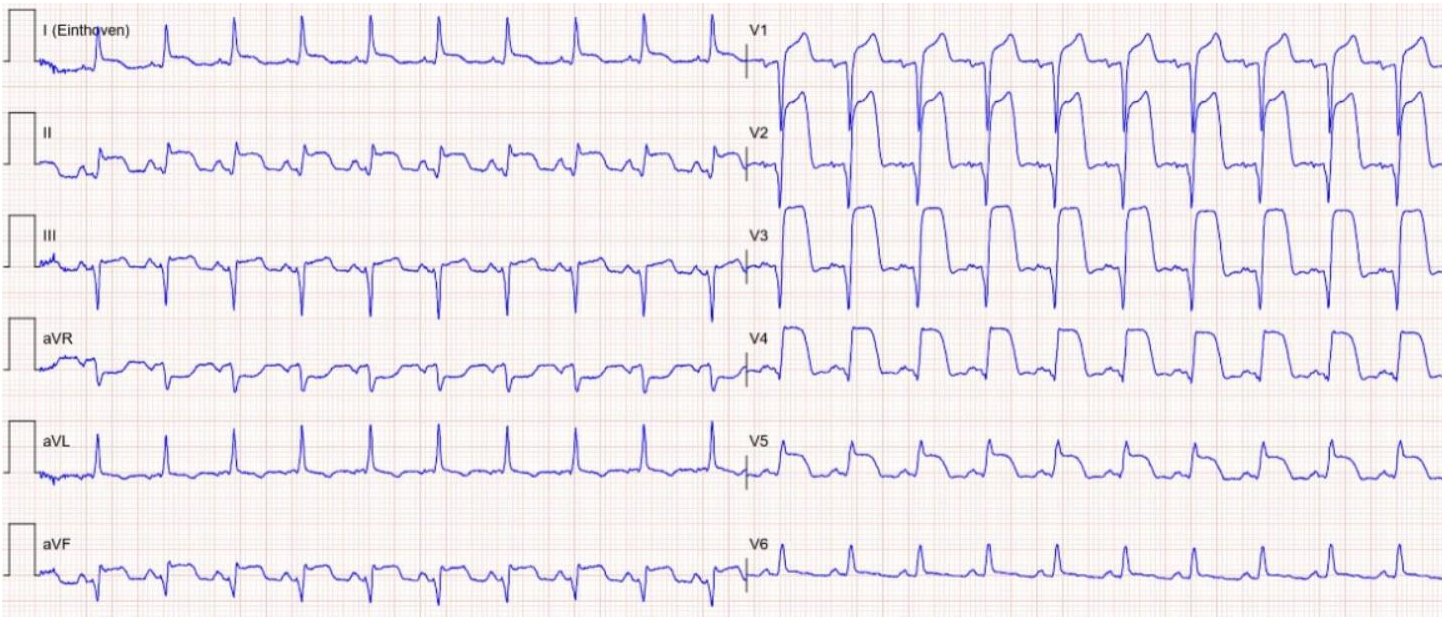

Figure 1

This ECG was sent to me by one of the participants in a Masterclass I taught a few years ago in London. I think we can safely assume this patient was seen for chest pain.

There is ST elevation in 11/12 leads. I will tell you that this is NOT acute pericarditis. Always be very, very careful making that diagnosis because *acute myocardial infarctions are much more common*. Acute pericarditis occurs between 3 – 10 cases per 100,000 while acute MIs occur in over 200 cases per 100,000. Just look at those tombstones in Leads V2 – V4! You aren't going to see anything like THAT with acute pericarditis.

There are just three coronary arteries that we must deal with: the left anterior descending artery (LAD), the right coronary artery (RCA) and the left circumflex artery (LCx).

Let's use ***Jones's Method of Diagnostic Elimination***. It works like this:

> **Instead of looking for proof that a particular artery is the culprit, look for things that will immediately rule out the other two arteries.**

Immediately, we see obvious ST elevation in Lead I and we know very quickly that the RCA cannot be the culprit artery. It does NOT produce ST elevation in Lead I*.

Next, we see phenomenal ST elevation in Leads V1 and V2 and we know that this cannot be due to an occlusion of the LCx. An occluded LCx never produces ST elevation in Leads V1 and V2*.

We see very quickly that a proximal occlusion of a type 3 ("wraparound") LAD produced this ECG with its involvement of the extensive anterior wall, the basolateral (formerly "high lateral") area and the inferior wall of the left ventricle.

Let's look at Lead aVL for a moment. Do you get the impression that there could be just a tiny bit of upward convexity there – suggestive of ST elevation? Why does Lead I have obvious ST elevation while ST elevation in Lead aVL can barely be seen – if it's present at all?

Now let's look at Lead III. There is definite ST elevation there, but not as much as in Leads II and aVF. And there's our answer to the question: why is there no ST elevation in Lead aVL when there is obvious ST elevation in Lead I? Because Leads aVL and III are both manifesting ST elevation but, since they are located on opposite sides of the left ventricle, their injury currents are pointing in opposite directions thus cancelling their forces. Obviously, the ST elevation in Lead III was greater than in Lead aVL because the ST elevation in Lead aVL was eliminated while there remains visible ST elevation in Lead III.

*In discussing this topic, several sources stated that these arteries might cause ST elevation in the stated leads following occlusion. Investigating further, it turns out that there have been no reported cases, but the authors were leaving open the possibility of an aberrantly-formed artery causing the finding. Talk about "CYA!"

If you would like to learn more, come join us in the next ***Masterclass in Advanced Electrocardiography*** or purchase a copy of my book: ***Getting Acquainted With Ischemia and Infarction – Ischemia Is NOT an Infarction!***

Or do BOTH!