ECG 2 – Explanation and Discussion

This ECG is worrying! Very worrying!

Given the history of central chest pain, the resolution of pain and the appearance of the ECG – one needs to strongly consider WELLEN'S SYNDROME!

Heard of it? Good!

Not heard of it? – read on.

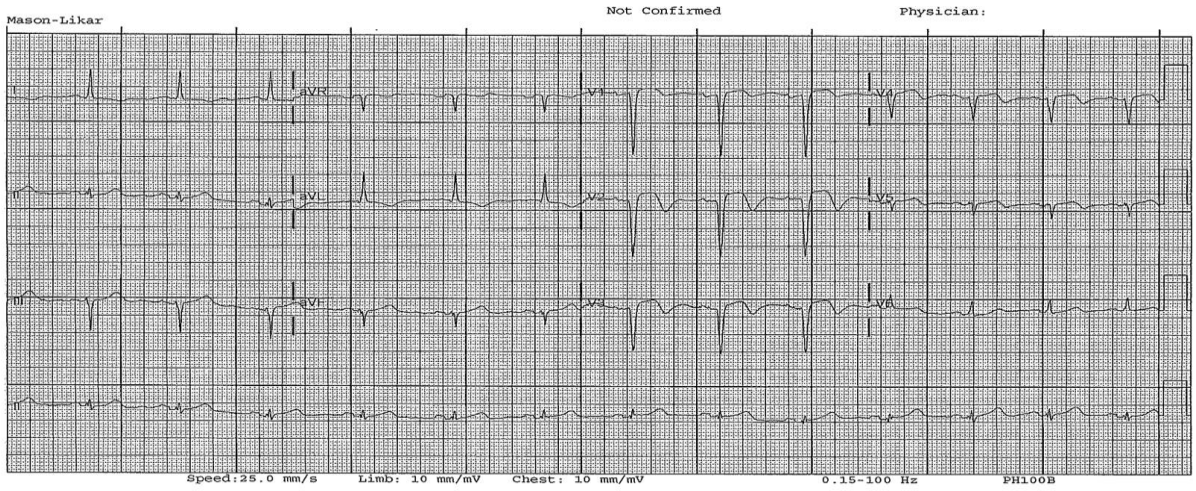
This ECG shows typical appearance of Wellen's Syndrome:

In this particular ECG – you will notice that there are bi-phasic T waves in V2, V3 and to some extent in V4. You will also note that the bi-phasic pattern is one of "up first, then down". This particular pattern is called **Type 2 Wellen's pattern**.

You must be wondering what then is **Type 1 Wellen's pattern?**

Well, Type 1 Wellen's pattern shows symmetrical, deep T-wave inversion in these same leads.

See below ECG for an example of Type 1 Wellen's pattern:



So what exactly is Wellen's syndrome?

It is a clinical syndrome wherein:

- A patient has had chest pain clinically consistent with possible ACS
- Chest pain has now resolved
- ECG taken after resolution of chest pain shows a Wellen's pattern of T-wave inversion (Type 1) or Bi-phasic T waves (Type 2).

The Wellen's syndrome is highly specific for a **critical Left Anterior Descending (LAD) artery occlusion!**

If you saw this gentleman at the time of active chest pain and took an ECG then, you would have seen a typical antero-septal STEMI!

So one might then ask – what happened? Why does the ECG not show a STEMI now?

Read on…

You might be surprised to know that if we followed up typical STEMI patients into the cath. lab – and recorded their ECGs after reperfusion (by stenting) of their occluded culprit coronary artery is established, the ST segment elevation seen in the corresponding ECG leads will dramatically resolve and subsequently, the T waves in those same corresponding leads will either invert or become bi-phasic. Pretty much like the Wellen's pattern described above! In fact, this pattern of T wave inversion is what cardiologists do want to see because it means that reperfusion of the blocked coronary artery has successfully occurred!

So, why are we to worry about this patient?

Well, this patient has luckily, but only temporarily, spontaneously re-perfused his critically stenosed LAD. Perhaps because the clot that was trying to completely occlude his stenosed LAD got dislodged or that he has got some degree of collateral supply in the LAD supply area which averted a full blown STEMI for now, and therefore the resolution of his chest pain. However, as I said, this critical stenosis in his LAD is **still very much there** and therefore, he is at a very high risk of occluding again with a resultant STEMI that could be life threatening again.

Because these patients with Wellen's syndrome look well and are pain free and often, because their **troponin levels may never rise at all** – they are sometimes misdiagnosed and then inappropriately either discharged home with potentially catastrophic results or worse still, made to do an exercise stress test which could trigger a deadly STEMI on the treadmill!

These patients need an angiography and a PCI as soon as possible and must therefore be referred for a cardiology admission on a monitored bed. Although a PCI is not needed as expeditiously as for a STEMI, it is still best done as early as possible to avoid a potentially massive anterior STEMI. Most cardiologists would now take them to the cath. lab as soon as possible.

So please remember this pattern and this clinical presentation. You might save a precious life on day!

Note: Although the classic Wellen's pattern was originally described for the anterior leads (V1-V3 or V4), the same phenomenon and the pattern can also occur on other leads for example Leads II, III and aVF (called Inferior Wellen's).

If you have any questions /comments or would like to discuss this subject a bit more, please email:

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Before you go, a little question:

- ➔ What are the most common causes of T wave inversions? When do you and when do you not worry about them? Send in your answers to any of the above emails.