



A peek behind the curtain

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Answer

The electrocardiogram (ECG) on admission shows atrial fibrillation with slow ventricular response of 42 beats/min. In some QRS complexes, prominent biphasic T waves are seen in the precordial leads V1–V4 (Fig. 1). This Wellens' ECG sign is suggestive of critical proximal left anterior descending (LAD) stenosis [1]. The electrocardiographic features are characterised by either biphasic T waves or the more common deep T-wave inversion in the anteroseptal leads. Furthermore, precordial ST-segment deviation, pathological Q waves and poor R-wave progression should be absent. These ominous T-wave inversions mostly occur in patients with a history of angina in a pain-free period, whereas angina can cause “pseudonormalisation” of the T waves [2].

Although the underlying mechanism remains elusive, it has been postulated that myocardial stunning due to oedema causes intramyocardial repolarisation inhomogeneity resulting in characteristic inversed or biphasic T waves [3]. Interestingly, the present ECG shows that the typical Wellens' pattern only occurs after a long R-R interval and thus a prolonged diastolic filling time, whereas rather short R-R intervals are followed by normalised T waves. This phenomenon is presumably explained by the intermittent increase in left ventricular end-diastolic pressure impairing coronary perfusion and causing maximal ischaemia during contraction after a long R-R interval with a large stroke volume.

In this patient, an emergent coronary angiogram indeed revealed a subtotal stenosis of the proximal LAD (Fig. 2). This lesion was successfully treated with the placement of a drug-eluting stent.

This case underlines that early recognition and urgent revascularisation is imperative in patients with Wellens' syndrome, as delay in intervention may lead to anterior myocardial infarction [1].

Conflict of interest M. Kamali-Sadeghian, P.T.G. Bot, R. Tukkie, H.J. Wellens and D.J. van Doorn declare that they have no competing interests.

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References

1. de Zwaan C, Bar FW, Wellens HJ. Characteristic electrocardiographic pattern indicating a critical stenosis high in left anterior descending coronary artery in patients admitted because of impending myocardial infarction. *Am Heart J.* 1982;103:730–6.
2. Rhinehardt J, Brady WJ, Perron AD, Mattu A. Electrocardiographic manifestations of Wellens' syndrome. *Am J Emerg Med.* 2002;20(7):638–43.
3. Migliore F, Zorzi A, Marra MP, et al. Myocardial edema underlies dynamic T-wave inversion (Wellens' ECG pattern) in patients with reversible left ventricular dysfunction. *Heart Rhythm.* 2011;8(10):1629–34. <https://doi.org/10.1016/j.hrthm.2011.04.035>.

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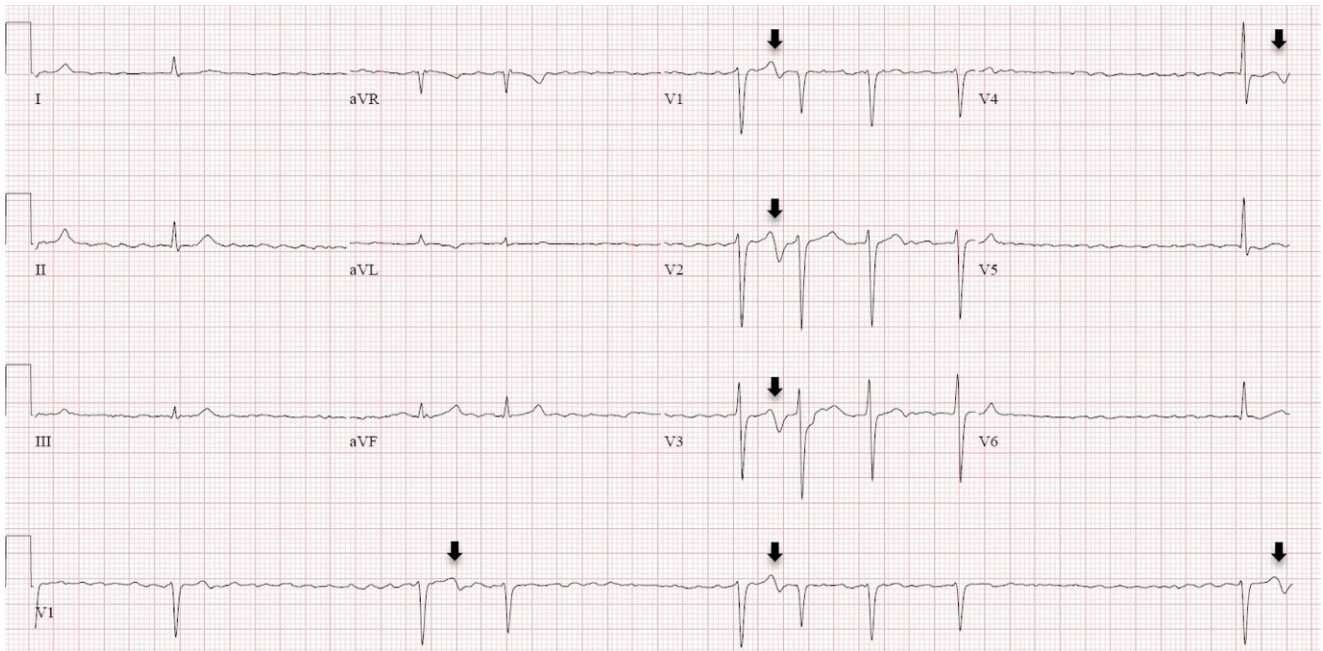


Fig. 1 The arrows indicate the biphasic T waves in the precordial leads appearing after a preceding delay

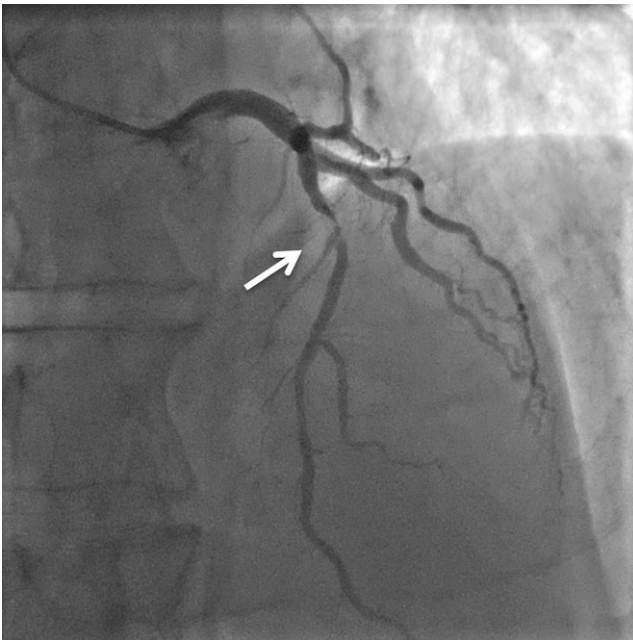


Fig. 2 Coronary angiography revealing a subtotal stenosis in the proximal left anterior descending artery