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Abstract: Wellens' Syndrome, An Electrocardiographic Warning Sign

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Introduction:

Wellens' syndrome is described as a characteristic biphasic or symmetrical electrocardiographic T-wave inversions in precordial leads seen in a subset of patients with unstable angina. It is associated with critical stenosis of left anterior descending coronary artery. These patients have a high likelihood of progressing to acute myocardial infarction within a few days to weeks of onset of symptoms, thus it warrants an early invasive approach.

Case Presentation:

We present a 33-year-old otherwise healthy Indo-Jamaican male who presented with chest pain and characteristic biphasic T-waves in V1, V2 during chest pain free interval (Figure 1). Biphasic T-waves disappeared during chest pain (Figure 2). Wellens' syndrome was recognized. Emergent coronary angiography revealed 99% stenosis of proximal left anterior descending coronary artery (Figure 3). It was treated with a drug eluting stent (Figure 4).

Discussion

De Zwann et al. first described Wellens' syndrome as a characteristic pattern of T-wave changes in precordial leads in a subset of patients with unstable angina. It was seen associated with >90% stenosis of proximal left anterior descending artery (LAD) and 75% of patients developed anterior wall myocardial infarction within a few days to weeks^{1, 2, 3}.

There are two distinct morphologic subtypes of Wellens' syndrome.

The common type, Type A comprises 76% of patients⁴. Type A is characterized by symmetrical T-wave inversions in V2, V3, often in V4, V5 and sometimes in V6⁴. Type B is less common and is seen in about 24 % of the patients⁴. Type B is characterized by biphasic T-waves in V2, V3. Type B has a reported association with a higher mortality⁴.

Wellens' syndrome as originally described by De Zwann et al. was associated with critical stenosis of proximal LAD. Location of the lesion in LAD may determine ECG changes. A proximal LAD stenosis jeopardizes a larger territory of myocardium and it may produce more widespread T-wave changes in precordial leads. While, a mid-LAD lesion involves a relatively smaller region of myocardium and ECG change is limited to leads V2, V3^{6, 7}.

We have mentioned about the potential of Wellens' syndrome to progress to an anterior wall myocardial infarction. It is important to note that Wellens' ECG change is not uncommon. In the initial study by De Zwann et al. 26 out of 145 patients admitted with unstable angina (18%) had



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the Wellens' electrocardiographic pattern¹. In a later prospective study² 180 out of 1260 patients (14%) had the similar ECG pattern. In the first study¹ 12 out of 16 patients (75%) who were unoperated developed anterior wall myocardial infarction within a few weeks after admission. In the second study all the 180 patients were subjected to coronary angiography and all of them had LAD stenosis ranging from 50% to complete occlusion².

Conclusion:

Electrocardiographic changes in Wellens' syndrome are subtle and characteristically appear during chest pain free interval. It can be easily overlooked as non-specific ST, T wave change. Clinicians should be well aware of this subtle yet alarming electrocardiographic sign. This case report underlines the importance of recognizing the ominous electrocardiographic sign and its association with critical stenosis of the left anterior descending coronary artery.

References:

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2. de Zwaan C, Bär FW, Janssen JH, Cheriex EC, Dassen WR, Brugada P, Penn OC, Wellens HJ. Angiographic and clinical characteristics of patients with unstable angina showing an ECG pattern indicating critical narrowing of the proximal LAD coronary artery. *Am Heart J.* 1989 Mar;117(3):657-65.
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4. Nisbet BC, Zlupko G. Repeat Wellens' syndrome: case report of critical proximal left anterior descending artery restenosis. *J Emerg Med.* 2010 Sep;39(3):305-8.



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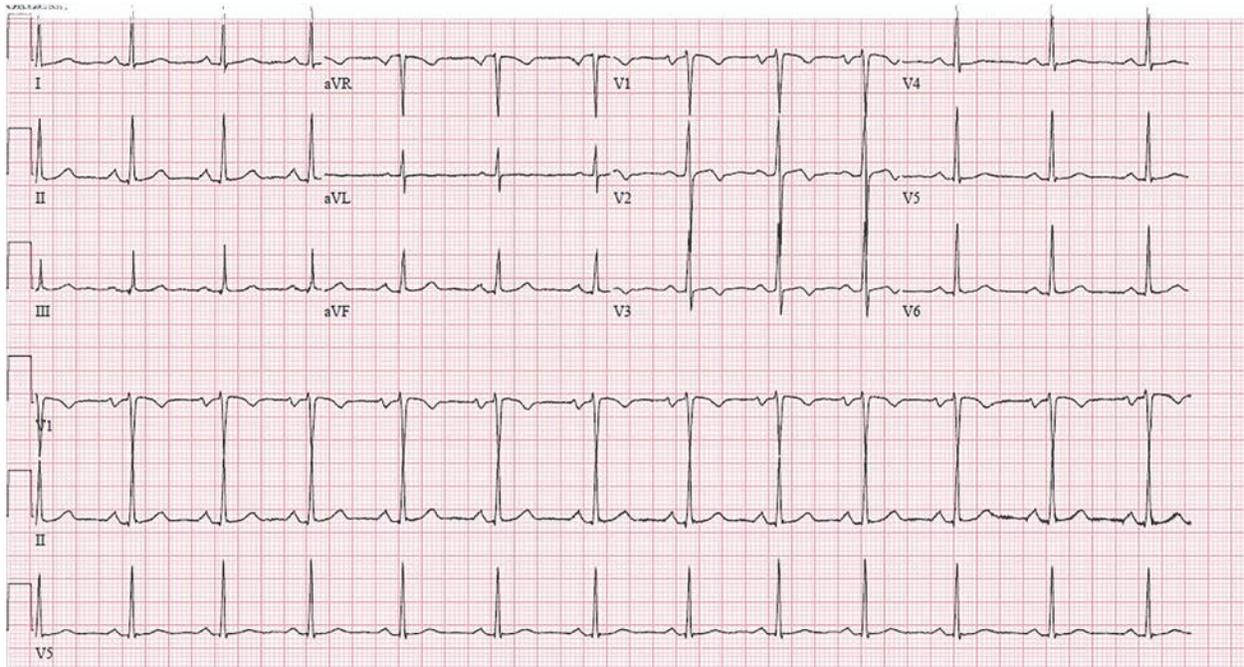


Figure 1: ECG during pain-free interval showing biphasic T-waves in lead V2, V3.

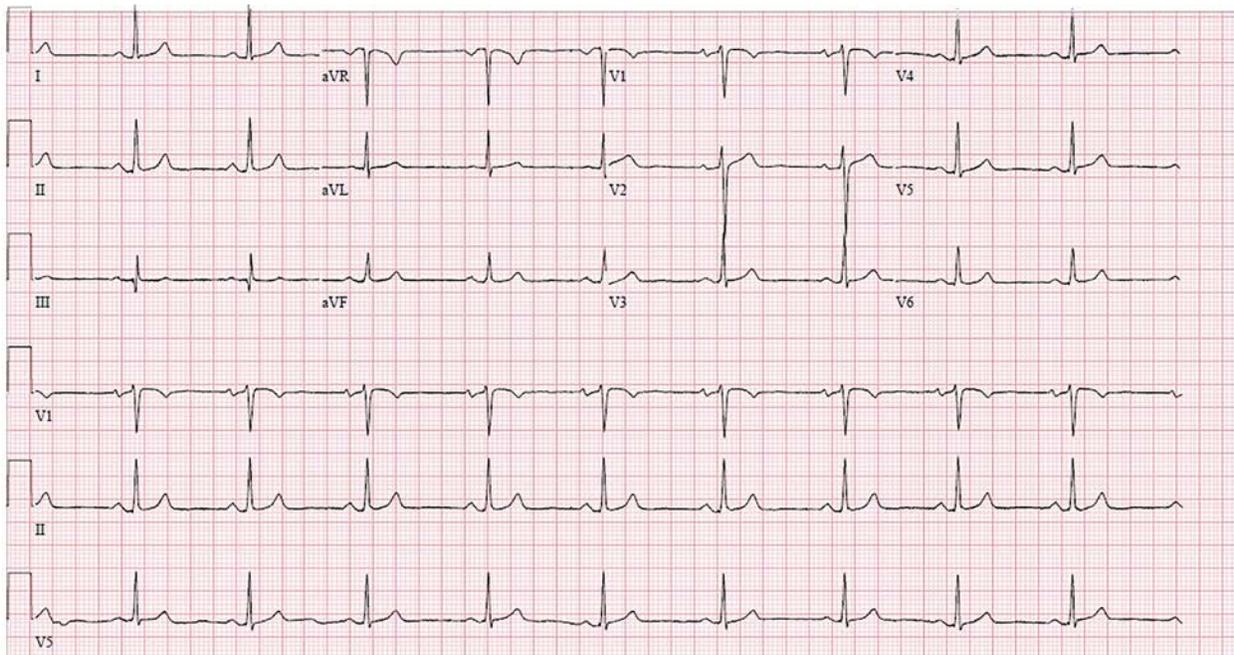


Figure 2: ECG during angina showing resolution of T-wave changes (Pseudo-normalization).

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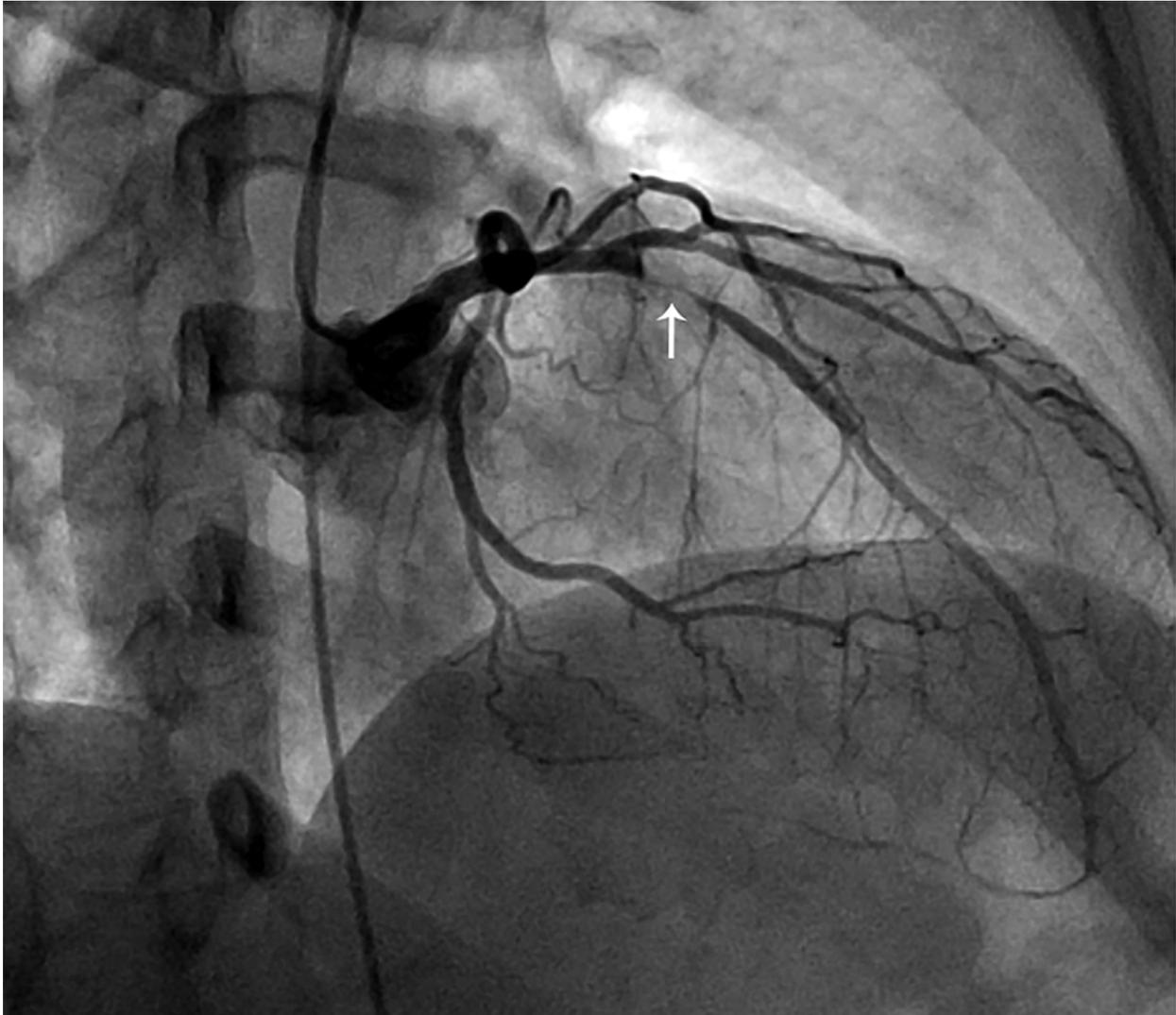


Figure 3: Coronary angiogram showing critical mid left anterior descending artery stenosis (arrow).



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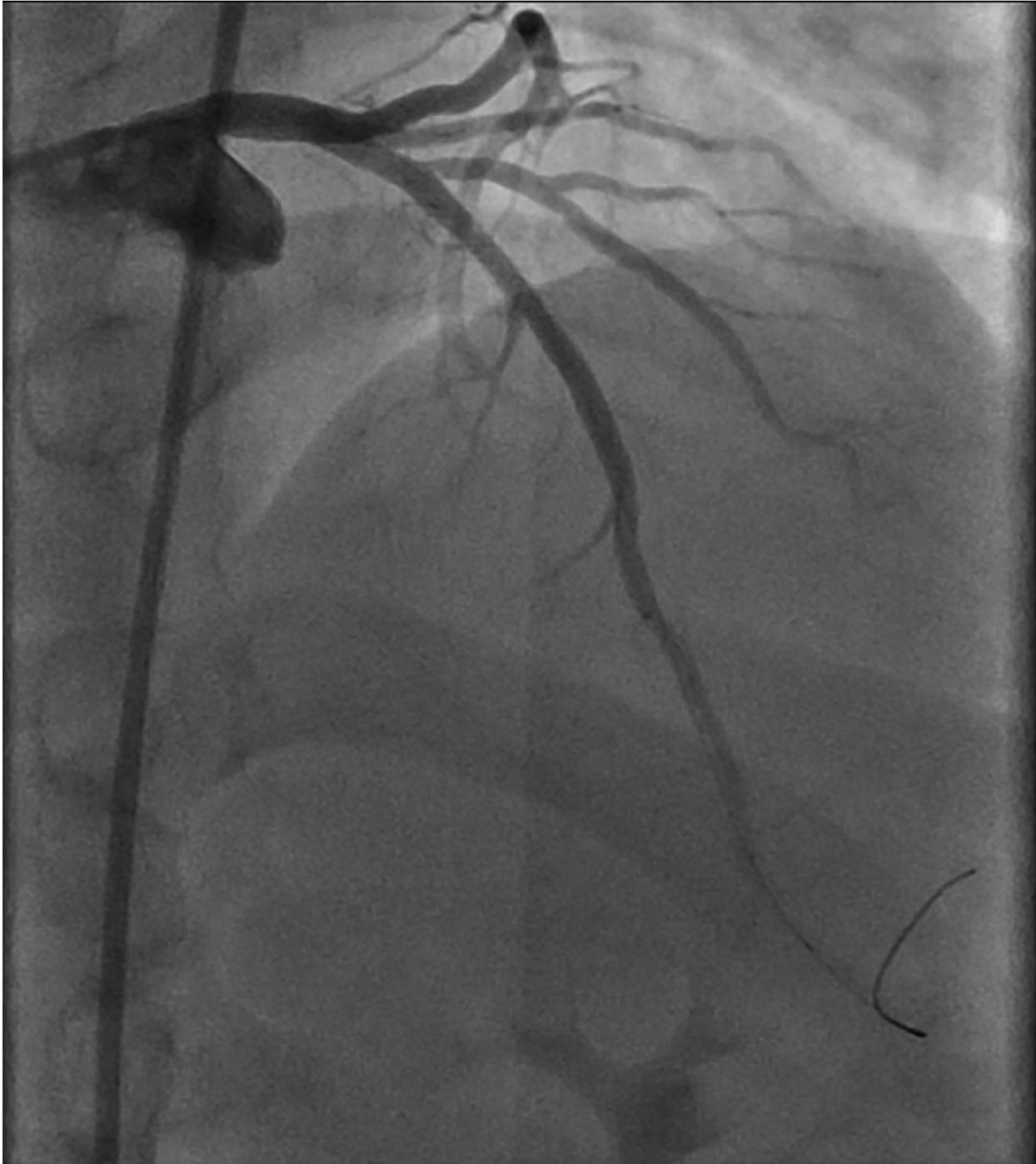


Figure 4: Critical LAD stenosis treated with drug eluting stent.