

## Answer

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The correct answer is B: Wellens' syndrome. The troponin-I (TnI) level was measured again after 8 hours, yielding a value of 0.28  $\mu\text{g/L}$  (slightly positive). The patient was admitted to the coronary care unit and subsequently underwent percutaneous coronary intervention (PCI), which revealed 95% stenosis of the left anterior de-

scending (LAD) coronary artery just distal to the second diagonal branch (see arrow in the upper panel of Figure 1, this page). Subsequent percutaneous coronary angioplasty with stent placement re-established LAD patency (lower panel of Figure 1).

The remainder of the patient's stay in hospital was un-

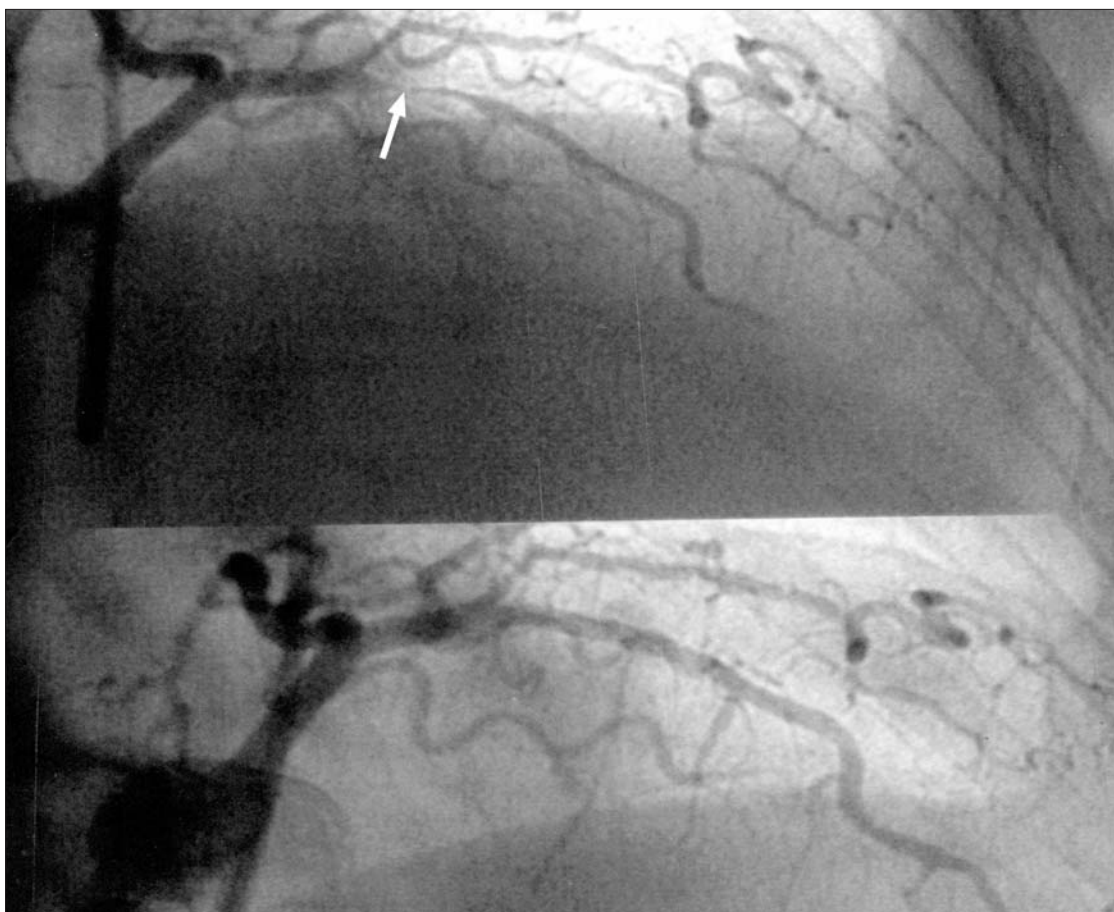


Fig. 1. Angiogram. **Upper panel:** 95% stenosis of left anterior descending (LAD) coronary artery; **Lower panel:** re-establishment of LAD patency.

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eventful, and she was discharged home 3 days later.

Wellens' syndrome (WS), also known as LAD coronary T-wave syndrome, identifies an important subgroup of patients with unstable angina.<sup>1,2</sup> Specifically, the clinical criteria and electrocardiogram (ECG) changes found in WS are highly specific for those patients with a high-grade stenosis of the proximal LAD coronary artery who are at risk of having an anterior wall acute myocardial infarction (AMI) within the next 2 weeks — usually within the next several days.<sup>3</sup>

The ECG abnormalities of WS appear in 1 of 2 ways:

1. the more common variant (76% of cases — see Fig. 1 on page 130) presents with symmetric and deeply inverted T waves in the precordial leads, usually V2 and V3, with isoelectric (normal) or minimally elevated (less than 1 mm) ST segments, or
2. the less common variant (24% of cases) presents with biphasic T waves in the precordial leads, again, usually V2 and V3.<sup>2,3</sup>

The key point about the above is that the abnormalities are present in patients when they are asymptomatic (i.e., pain-free). Moreover, the ECG findings tend to disappear during bouts of angina<sup>3</sup> — i.e., the ECG looks more “normal” during episodes of chest pain (Fig. 1 on page 130). Patients who present with WS will report previous episodes of angina and will have normal or slightly elevated cardiac enzyme markers upon laboratory investigation.<sup>2,3</sup>

WS was originally described in 1982 by Wellens in his paper with de Zwaan and Bar.<sup>4</sup> In this landmark study, 12 of the 16 (75%) patients observed went on to develop extensive anterior myocardial infarctions within a few weeks of hospitalization.<sup>4</sup> In a follow-up prospective study, where urgent percutaneous coronary intervention (PCI) was performed on all 180 patients meeting WS criteria, 100% were found to have at least a 50% obstruction in their LAD artery.<sup>5</sup>

Interestingly, a case of a 71-year-old man with biphasic Wellens' waves in the inferior leads (II, III, aVF) was recently reported in the literature.<sup>6</sup> Subsequent coronary angiography revealed this patient to have a proximal occlusion of his circumflex artery, suggesting that WS may not, in fact, be restricted to LAD coronary artery lesions.

Regardless of presentation, it is imperative that all emergency physicians learn to identify WS patients, given the natural history of the syndrome. The characteristic ECG pattern observed when patients are asymptomatic demands that physicians remember to order an ECG during chest pain-free intervals (in addition to episodes of angina) or else risk missing the diagnosis. It is also important that physicians resist the temptation to dismiss “non-specific” or “non-diagnostic” T-wave/ST-segment changes that are classically reported in emergency textbooks as having an AMI yield of 1%–5% and 4%–7%, respectively,<sup>7</sup> without first screening for WS. If such patients are identified, provocative (stress) testing is strictly contraindicated, as this may precipitate malignant arrhythmias or even result in death.<sup>2</sup> Instead, mandatory hospital admission and urgent PCI are warranted.

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## References

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For the Challenge, see page 130.

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