

Troponin is Not Everything, a Difficult Diagnosis That Should be Kept in Mind: Wellens' Syndrome

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ABSTRACT Chest pain is one of the most common problems evaluated in the emergency department (ED). In addition to physical examination, electrocardiography (ECG) and cardiac biomarkers are often used in the initial assessment of patient in ED. Wellens' syndrome is characterized by electrocardiographic T-wave changes especially in leads V2-V3 with severe proximal stenosis of the left anterior descending artery (LAD). We report a Wellens' syndrome case which acute anterior myocardial infarction developed after 7 hours later since after the first emergency contact. It is important to rapidly and accurately risk-stratify patients with suspected acute coronary syndrome. Especially emergency physicians must be aware of negative T wave in leads V2-V3 on ECG and must know that only one normal troponin value alone does not exclude the diagnosis of acute coronary syndrome. It is very important to recognize Wellens' syndrome early, as it allows rapid invasive intervention for cardiologist and cardiovascular surgery, so that extensive myocardial infarction can be prevented and perhaps a life can be saved.

Keywords: Chest pain; acute anterior myocardial infarction; acute coronary syndromes

Chest pain is a very often complaint evaluated in the emergency department (ED). In addition to clinical assessment, electrocardiography (ECG) and cardiac biomarkers are used to evaluate the patient.¹ However, 2% to 4% persons who arrive with chest discomfort and acute myocardial infarction (AMI) are inappropriately discharged to home. This error in the diagnosis of MI is dangerous and costly. Early recognition and treatment are also important because time to treatment is the single most important factor in the management of AMI.¹ Wellens' syndrome known as "LAD coronary T-wave syndrome" was first described in 1982 by Wellens and colleagues, who identified a subgroup of patients with unstable angina who had specific precordial T-wave changes

and subsequently developed a large anterior wall MI.² Early recognition of this ECG abnormality is of paramount importance because this syndrome represents a preinfarction stage of severe coronary artery disease (CAD) that often progresses to a devastating anterior wall MI. The characteristic ECG pattern of Wellens' syndrome is relatively common in patients who have symptoms consistent with unstable angina. In studies performed by Dr. Wellens and colleagues, the ECG pattern was present in 14% to 18% of patients admitted for unstable angina.² We herein report a case of Wellens' syndrome but the patient could not be early diagnosed with acute coronary syndrome because of normal troponin values in the first admission.

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CASE REPORT

A 60-year-old male patient presented with typical chest pain to the emergency department at 19:15. He had only diabetes mellitus for cardiovascular risk factors and was taking oral metformin 1000 mg twice a day. First ECG revealed deeply and symmetrically inverted T wave in V1-V3 leads (Figure 1). HEART Score of the patient was calculated as 4.³ But, the patient was sent home by emergency physicians because of the chest discomfort relieved and only one troponin value was normal. Almost 7 hours later, the patient again admitted to the ED with typical chest pain at 02.00 am. This time ECG revealed 2 mm ST segment elevation in V1-V3 as well as biphasic T wave in V1-V4 (Figure 2). The diagnosis of the patient was acute anterior wall MI and he was immediately taken to coronary intensive care unit. After the first treatments were given, immediately performed coronary angiography. Coronary angiography showed critical proximal stenosis of LAD and intermediate artery (Figure 3, Figure 4). So we decided to perform coronary artery bypass surgery. And next morning the patient was operated. Seven days later the patient was discharged uneventfully. Informed consent was taken from the patient.

DISCUSSION

Acute chest pain is a very common presentation in the ED. Given that there is symptom overlap among several clinical entities, in most diagnosis strategies, it is assumed that chest pain is cardiac origin until proven otherwise. The main purpose of the assessment is to rule out acute coronary syndrome. Wellens' syndrome reported in the early 1980s first time, is characterized by deeply inverted or biphasic T wave in the precordial leads showing that critical obstruction of the left anterior descending artery. He described a subgroup of patients who have high risk for occurrence an anterior myocardial infarction.² Wellens' syndrome is diagnosed as follows: having chest discomfort before, no Q waves or loss of R waves, no significant ST-segment elevation, normal or minimally elevated cardiac markers, and biphasic/inverted T-wave changes in the precordial leads.^{4,5} Wellens' syndrome has two different manifestations. Biphasic T waves are called Type A like in our second presented ECG approximately 25% of cases and the deeply symmetrical inverted T waves are called Type B like in our first presented ECG approximately 75% of cases.⁴⁻⁶ It is important to recognize the elec-

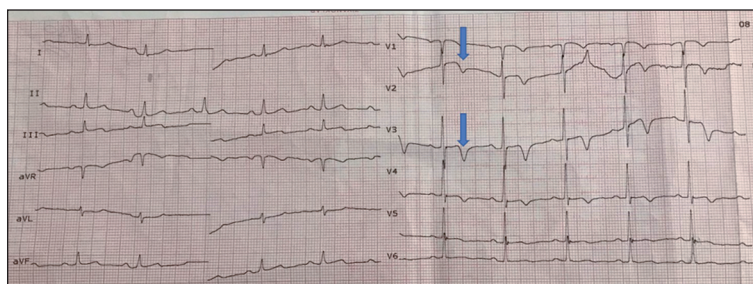


FIGURE 1: ECG revealed deeply symmetrical inverted T wave in V1-V4 on first admission.

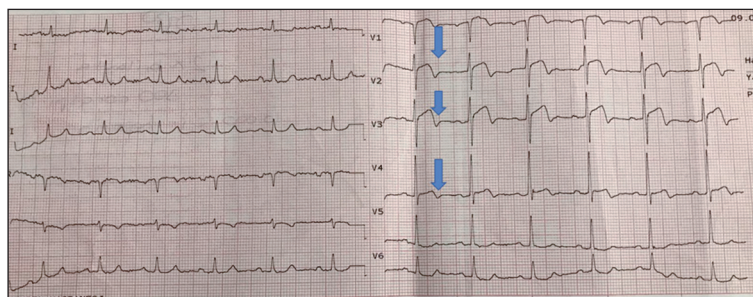


FIGURE 2: ECG revealed 2 mm ST segment elevation in V1-V3 and biphasic T wave in V1-V4 on second presentation.

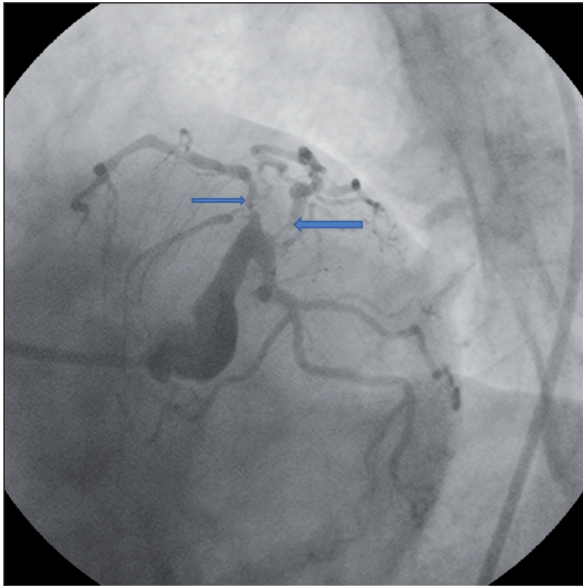


FIGURE 3: Coronary angiography showed critical proximal stenosis of LAD and intermediate artery on left anterior oblique caudal known as spider view.

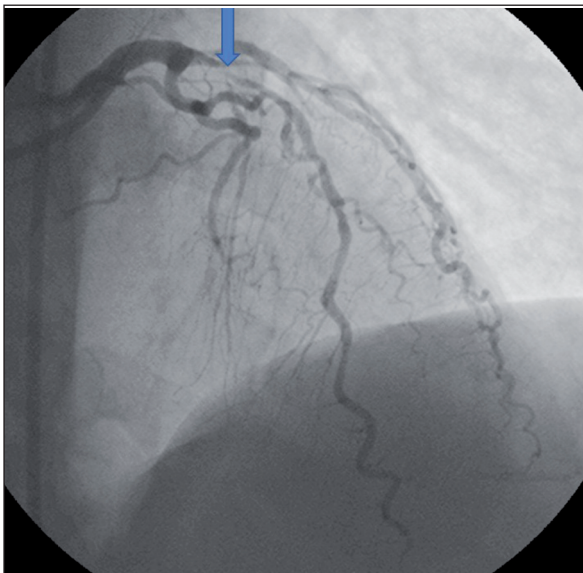


FIGURE 4: Coronary angiography showed critical proximal stenosis of LAD and intermediate artery on AP cranial view.

trocardiogram characteristics of Wellens' syndrome in order to provide early invasive treatment before myocardial infarction develops. Although most physicians recognize STEMI in an ECG but other clinical situations such as Wellens' syndrome are not well known.⁵ The biphasic T waves are often commented as nonspecific repolarization changes and oc-

asionally ignored, which can be mortal.⁶⁻⁸ ECG changes with inverted T waves can develop in different clinical situations including myocardial infarction in the past, persistent juvenile T wave pattern, bundle branch block, left ventricular hypertrophy, acute myocarditis, pre-excitation syndromes, acute pulmonary embolism, pericarditis, cerebrovascular event, and digitalis effect.⁶ Without rapid diagnosis and treatment, patients with Wellens' syndrome can develop extensive anterior STEMI, with a mean time of 8.5 days.² In our patient, acute anterior myocardial infarction developed in 7 hours. This is a very short period so it is very important to diagnose Wellens syndrome for patients life. In emergency departments in daily practice, physicians usually rule out acute coronary syndromes according to the cardiac troponin level but clinical assessment and ECG is more important than laboratory results. In our ED the patient first presented with unstable angina with T wave inversion ACS was ignored because of troponin value was normal. But according to the 2015 ESC Guidelines for the management of acute coronary syndromes; it is recommended to repeat cardiac biomarkers 3 hours later integrated with a detailed clinical assessment and 12-lead ECG.¹ The ED is where life-saving therapy initiated in patients with ACSs. It is important to rapidly and accurately risk-stratify patients with suspected ACS. There is a spectrum of ACSs, which ranges from high risk to low risk. The highest risk patients require emergent reperfusion therapy, because of improved outcomes and survival.^{7,8} Especially emergency physicians must be aware of deeply symmetrically inverted and biphasic T wave in 12-lead ECG and must know that troponin is not everything in cardiac assessment. It is very important to recognize Wellens' syndrome so that rapid invasive intervention can be done and extensive myocardial infarction, heart failure and death can be prevented.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Ömer Faruk Keskin, Mustafa Demir; **Design:** Ömer Faruk Keskin; **Control/Supervision:** Mustafa Demir; **Data Collection and/or Processing:** Ömer Faruk Keskin; **Analysis and/or Interpretation:** Mustafa Demir; **Literature Review:** Ömer Faruk Keskin; **Writing the Article:** Ömer Faruk Keskin; **Critical Review:** Mustafa Demir.

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