Case Report

The pre-infarction ECG pattern: A case report of wellens syndrome

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Abstract

Background: Wellens syndrome represents a high-risk ECG pattern in unstable angina or NSTE-ACS patients, signaling critical proximal LAD stenosis and impending anterior myocardial infarction. This report highlights two cases emphasizing that prompt recognition and immediate invasive intervention are necessary, as traditional stress testing is hazardous for these patients.

Key words: Wellens syndrome; Non-ST Elevation Acute Coronary Syndrome (NSTE-ACS); Left Anterior Descending (LAD) artery.

1. Introduction

Wellens syndrome is a high-risk pattern of T-wave changes on ECG in patients with unstable angina or Non-ST Elevation Acute Coronary Syndrome (NSTE-ACS). It is a marker of critical stenosis of the proximal Left Anterior Descending (LAD) artery and carries a high risk of impending anterior wall myocardial infarction if not promptly recognized and treated. It accounts for 10–15% of patients presenting with unstable angina.

This case report describes two patients with Wellen Syndrome.

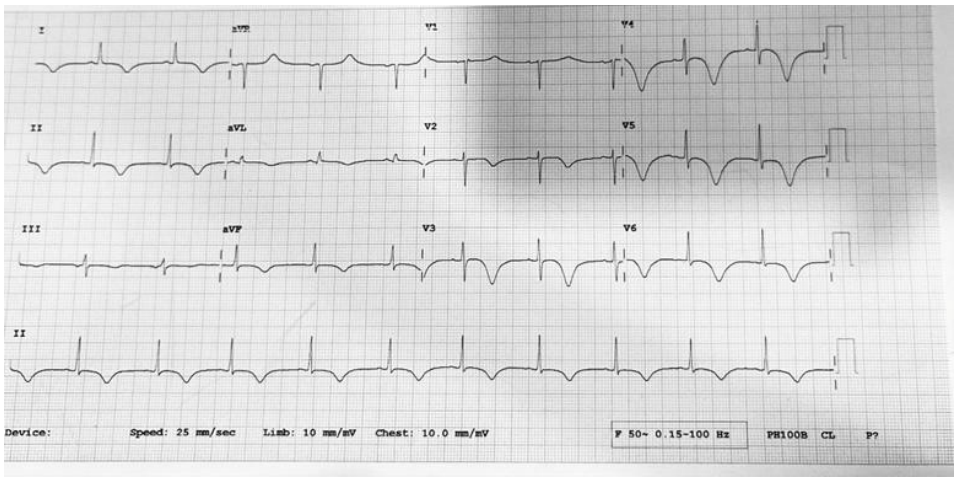
Case 1: A 69-year-old female with no known history of diabetes mellitus presented with complaints of chest discomfort for the past three days, which worsened on the morning of admission. She was initially evaluated at an outside hospital three days earlier, where her ECG was suggestive of Non-ST Elevation Acute Coronary Syndrome. She was later evaluated at PNH, where the ECG findings were suggestive of Wellens syndrome, and she was referred to our hospital for further management. On arrival at the casualty, the patient was conscious and hemodynamically stable. The ECG showed T-wave inversion in leads I, aVL, II, and aVF, with deep T-wave inversions in leads V2–V6. Echocardiography revealed regional wall motion abnormalities in the Left Anterior Descending artery territory with mild systolic dysfunction and an ejection fraction of 50%. Based on clinical presentation, ECG findings, and echocardiographic features, the patient was diagnosed with NSTE-ACS with Wellens syndrome and was taken for Percutaneous Coronary Intervention. Coronary angiography revealed single-vessel disease involving the proximal to mid Left Anterior Descending artery. Percutaneous Transluminal Coronary Angioplasty with stenting of the proximal to mid LAD was successfully performed. The

Citation: Shirlin M.S, Vignesh R, Madhumitha. The pre-infarction ECG pattern: a case report of wellens syndrome. Kauverian Med J. 2026;3(6):100-103.

Academic Editor: Dr. Venkita S. Suresh

ISSN: 2584-1572 (Online)

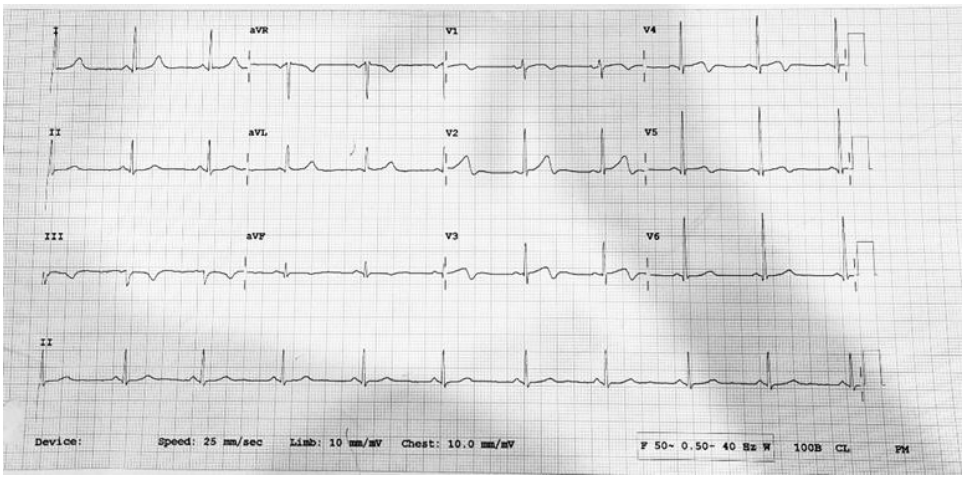
patient was also found to have dyspeptic symptoms suggestive of Acid Peptic Disease, for which an Upper Gastrointestinal Endoscopy was planned for further evaluation. The patient was discharged 3 days later in a stable condition and pain-free.



Case 2: A 44-year-old male with a known history of Hypertension presented with complaints of chest pain in the morning. He initially visited an outside hospital for evaluation. On examination, the patient was conscious, oriented, and hypertensive. The Electrocardiography showed features suggestive of Wellens Syndrome, specifically Type A (biphasic T-wave pattern). Echocardiography revealed mild left ventricular dysfunction.

Based on the clinical findings, the patient was diagnosed with Acute Coronary Syndrome. Coronary Angiography showed single-vessel disease with branch vessel involvement.

The patient subsequently underwent elective Percutaneous Transluminal Coronary Angioplasty with stenting to the proximal to mid Left Anterior Descending artery, which was successfully performed. The patient was discharged 3 days later in a stable condition and pain-free.



2. Clinical Features

2.1. History

- Intermittent chest pain, often relieved at rest.

- Pain may be predominantly in the morning.
- Patients may be hemodynamically stable and asymptomatic between episodes.

2.2. ECG Patterns

Two classic types of Wellens T-wave changes:

- Type A (Biphasic T waves): Initial positivity followed by terminal negativity, often in V2–V3.
- Type B (Deeply inverted T waves): Symmetric, deep T-wave inversions in V2–V3, sometimes extending to V1–V6.

2.3. Other ECG features

- Minimal or no ST-segment elevation.
- Often normal or only mildly elevated cardiac enzymes.

3. Pathophysiology

Caused by critical stenosis of the proximal LAD, leading to transient ischemia. The T-wave changes reflect reperfusion of the ischemic myocardium. Without intervention, patients are at high risk of anterior wall myocardial infarction from day to week.

4. Discussion

The two cases presented demonstrate the classical clinical and electrocardiographic features described in Wellens syndrome, a high-risk pre-infarction stage associated with critical stenosis of the Left Anterior Descending artery. In Case 1, the patient presented with intermittent chest discomfort for three days that worsened on the day of admission. This clinical presentation corresponds with the typical history described in Wellens syndrome, where patients experience episodes of chest pain that may be resolved temporarily, often leaving them pain-free at the time of ECG recording. The electrocardiogram in this patient showed deep T-wave inversions in leads V2–V6, which is consistent with the Type B pattern of Wellens syndrome characterized by deep, symmetrical T-wave inversions in the anterior leads. Echocardiography further supported myocardial ischemia by demonstrating regional wall motion abnormalities in the LAD territory with mild systolic dysfunction (EF 50%). Coronary angiography confirmed single-vessel disease involving the proximal to mid LAD, which correlates with the known pathophysiology of Wellens syndrome involving critical proximal LAD stenosis. Early recognition allowed timely Percutaneous Transluminal Coronary Angioplasty (PTCA) with stenting, preventing progression to a large anterior wall myocardial infarction.

Similarly, Case 2 also reflects the classical features of Wellens syndrome. The patient presented with morning chest pain, which aligns with the typical clinical pattern of intermittent ischemic episodes. The ECG demonstrated biphasic T-wave changes (Type A pattern), which is the less common but characteristic ECG manifestation of Wellens syndrome, usually seen in leads V2–V3. Echocardiography revealed mild left ventricular dysfunction, suggesting ischemic involvement of the anterior myocardial territory. Coronary angiography showed single-vessel disease with branch vessel involvement affect-

ing the proximal to mid LAD, again confirming the typical anatomical substrate associated with Wellens syndrome. The patient underwent elective PTCA with LAD stenting, resulting in clinical stabilization and symptom resolution.

Both cases highlight the importance of recognizing characteristic ECG patterns of Wellens syndrome in patients with NSTE-ACS, even when cardiac enzymes are normal or only mildly elevated. The presence of Type A (biphasic T waves) in Case 2 and Type B (deep T-wave inversions) in Case 1 illustrates the two classical ECG presentations described in the literature. These ECG findings serve as a critical warning sign of impending anterior wall myocardial infarction due to severe proximal LAD stenosis.

5. Conclusion

Prompt identification of this ECG pattern is essential because delayed recognition or inappropriate management may lead to extensive anterior wall myocardial infarction within days to weeks. In both cases, early diagnosis and timely coronary intervention successfully prevented further myocardial damage and resulted in favorable clinical outcomes.