

Electrocardiographic Wellens Pattern as an Indicator of Critical Proximal Left Anterior Descending Artery Stenosis: A Case Report

Running Title: *Wellens Pattern Predicting Critical LAD Stenosis*

Dr. Swaroop KS¹, Dr. Sunil Kumar², Dr. Yash Ranjan³

¹Junior Resident (JR3), Department of General Medicine, Sumandeep Vidyapeeth Deemed University, Medical College and Hospital, Vadodara, Gujarat, India

²Professor & Head of Department, Department of General Medicine, Sumandeep Vidyapeeth Deemed University, Medical College and Hospital, Vadodara, Gujarat, India

Corresponding Author Email: [sunilkumar\[at\]gmail.com](mailto:sunilkumar[at]gmail.com)

³Assistant Professor, Department of General Medicine, Sumandeep Vidyapeeth Deemed University, Medical College and Hospital, Vadodara, Gujarat, India

Abstract: *Wellens syndrome is a pre-infarction electrocardiographic entity indicative of critical stenosis of the proximal left anterior descending (LAD) coronary artery. Early recognition is essential as delayed management may culminate in extensive anterior wall myocardial infarction. We report the case of a 41-year-old male who presented with retrosternal chest pain of five days' duration radiating to the left shoulder and associated with palpitations and breathlessness. Electrocardiography obtained during a pain-free interval demonstrated deep symmetrical T-wave inversions in leads V2–V5 consistent with Type B Wellens pattern. Cardiac biomarkers were positive. Echocardiography revealed regional wall motion abnormalities with left ventricular ejection fraction of 50%. Coronary angiography demonstrated critical proximal LAD stenosis (99%) with mid-LAD 80% stenosis. The patient underwent successful percutaneous coronary intervention with drug-eluting stent deployment achieving TIMI III flow and favorable recovery. This case emphasizes the importance of early recognition of Wellens syndrome and urgent revascularization to prevent impending extensive anterior wall myocardial infarction.*

Keywords: Wellens syndrome; Deep T-wave inversion; LAD stenosis; Acute coronary syndrome; Percutaneous coronary intervention

1. Introduction

Wellens syndrome represents a characteristic electrocardiographic manifestation associated with severe stenosis of the proximal left anterior descending artery. It is considered a pre-infarction stage due to its strong association with impending large anterior wall myocardial infarction if not promptly treated.

Typical electrocardiographic findings include biphasic or deeply inverted T waves in anterior precordial leads, most often recorded during pain-free intervals. Because cardiac biomarkers may be minimally elevated, the severity of coronary disease may be underestimated. Early invasive evaluation is therefore critical.

2. Case Report

A 41-year-old male presented with retrosternal chest pain of five days' duration. The pain was sudden in onset,

intermittent, progressive, and radiated to the left shoulder. It was associated with palpitations, breathlessness, and restlessness.

Clinical Examination

At admission, pulse rate was 74 beats per minute and regular. Blood pressure was 120/70 mmHg. Respiratory system examination revealed bilateral clear air entry. Cardiovascular examination showed normal S1 and S2 without murmurs.

Electrocardiography

A 12-lead electrocardiogram recorded during a pain-free interval demonstrated sinus rhythm with deep symmetrical T-wave inversions extending from leads V2 to V5. No significant ST-segment elevation or pathological Q waves were observed. These findings were consistent with Type B Wellens pattern suggestive of critical proximal LAD stenosis.

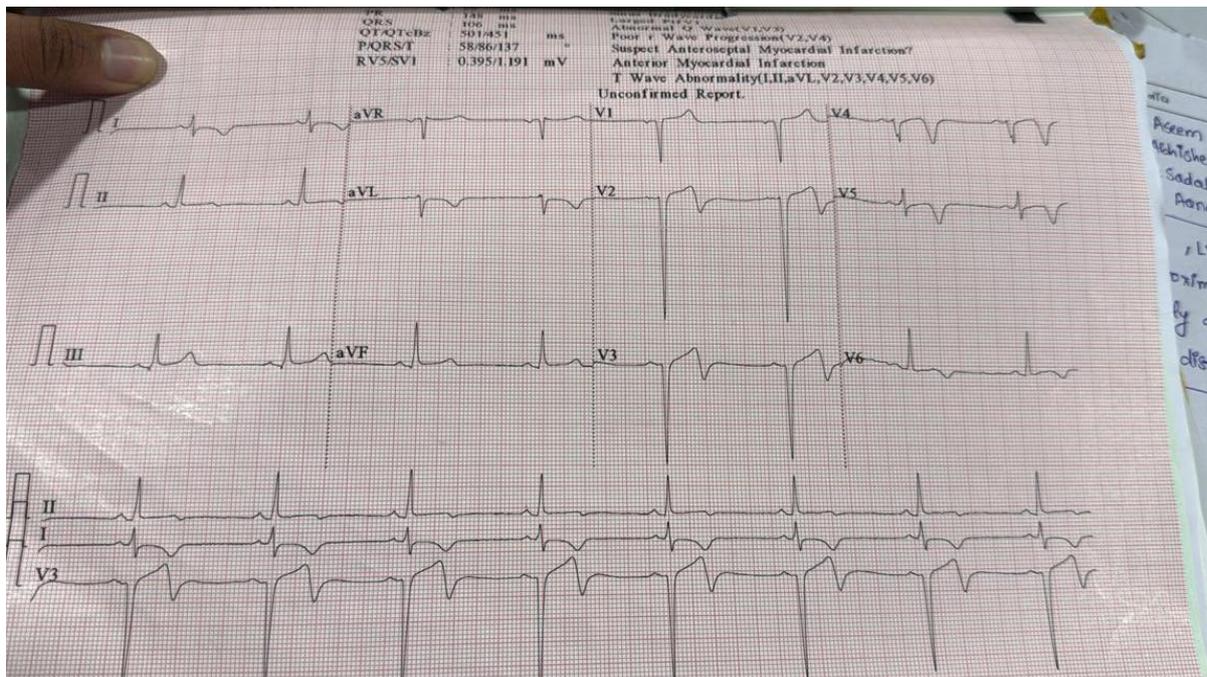


Figure 1: ECG showing deep symmetrical T-wave inversion in V2–V5 (Type B Wellens pattern).

Laboratory Investigations

Cardiac biomarkers revealed positive Troponin I. NT-proBNP was elevated at 1338 pg/ml.

Lipid profile showed:

Total cholesterol – 118 mg/dL

LDL cholesterol – 75.6 mg/dL

HDL cholesterol – 27 mg/dL

Triglycerides – 77 mg/dL

Liver enzymes were elevated with SGOT 161 IU/L and SGPT 341 IU/L, and the patient was diagnosed with drug-induced hepatitis.

Echocardiography

Two-dimensional echocardiography demonstrated mild concentric left ventricular hypertrophy with regional wall motion abnormalities involving the anteroseptum, anterior

wall, apex, and lateral wall. Left ventricular ejection fraction was 50%. No intracardiac clot or vegetation was visualized.

Coronary Angiography

Coronary angiography revealed normal left main coronary artery. The left anterior descending artery showed critical proximal 99% stenosis with additional mid-segment 80% stenosis. Left circumflex artery was non-dominant and normal. Right coronary artery showed mild luminal irregularities (20–30%).

Percutaneous Intervention

The patient underwent percutaneous transluminal coronary angioplasty to the LAD artery. Balloon predilatation was performed followed by deployment of drug-eluting stents measuring 3.0×16 mm in the mid LAD and 4.0×24 mm in the proximal LAD. Final angiography demonstrated restoration of TIMI III flow.

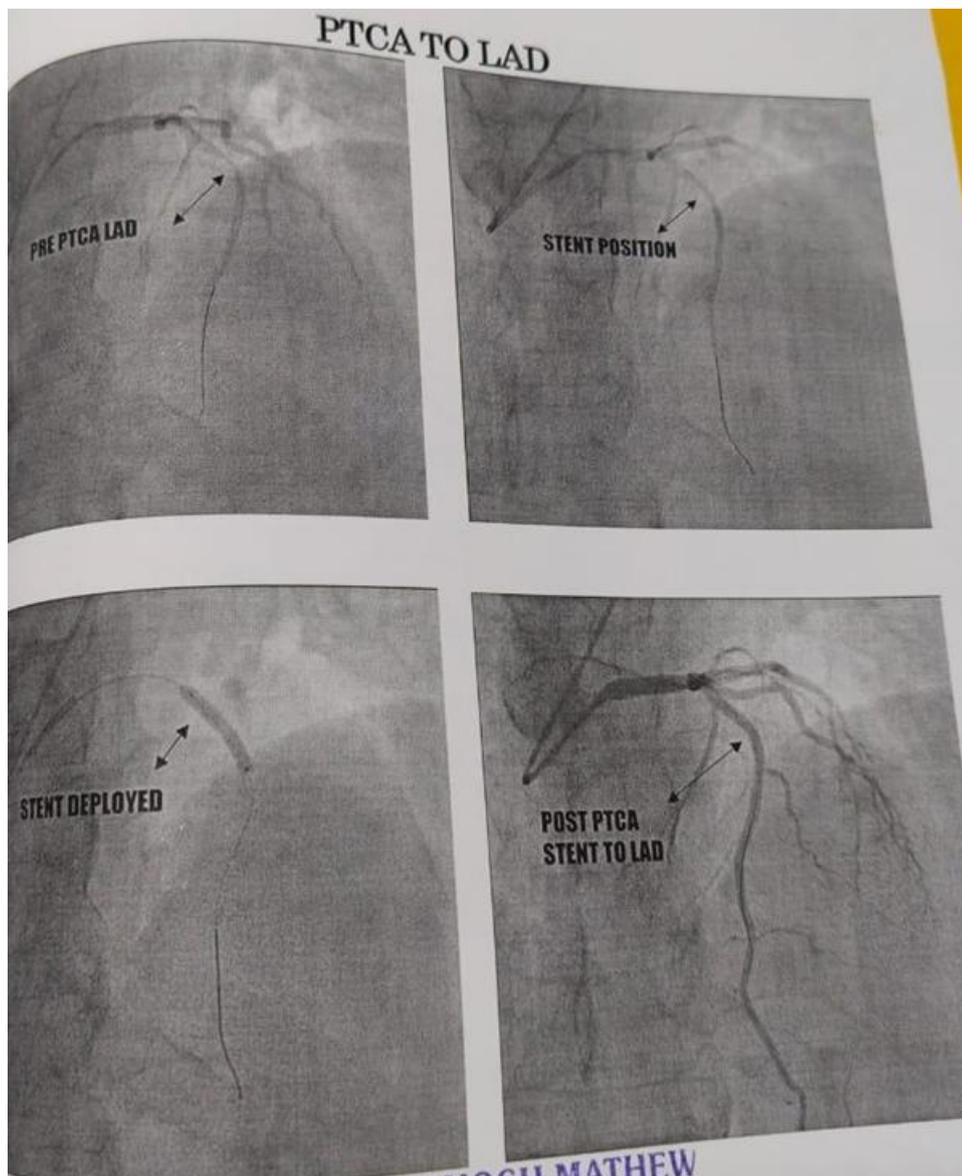


Figure 2: Post-percutaneous coronary intervention image showing drug-eluting stent placement in proximal and mid LAD with restoration of TIMI III flow.

3. Outcome

The post-procedural period was uneventful. The patient remained hemodynamically stable with complete resolution of symptoms and was discharged on dual antiplatelet therapy and optimal medical management.

4. Discussion

Wellens syndrome is an important electrocardiographic predictor of severe proximal LAD stenosis. Two patterns are described: Type A characterized by biphasic T waves and Type B showing deep symmetrical T-wave inversion. Type B is more frequently encountered and typically involves leads V2–V4, often extending to V5 or V6 as seen in this case.

These ECG findings generally occur during pain-free intervals and reflect transient reperfusion of a critically stenosed LAD artery. Without timely revascularization, most patients progress to extensive anterior wall myocardial infarction. Early recognition enabled prompt coronary angiography and successful intervention in this patient.

5. Conclusion

Deep symmetrical T-wave inversion in anterior precordial leads should raise strong suspicion for Wellens syndrome. Immediate coronary angiography and revascularization are crucial to prevent impending extensive anterior wall myocardial infarction and improve clinical outcomes.

Author Contributions

Dr. Swaroop KS: Data collection, manuscript drafting, literature review.

Dr. Sunil Kumar: Supervision, critical revision, final approval.

Dr. Yash Ranjan: Clinical management support, manuscript review.

Patient Consent

Written informed consent was obtained from the patient for publication of clinical data and images.

Conflict of Interest

None declared.

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