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Case Report

Inferior ST-Segment Elevation in an Asymptomatic Young Patient With Left Anterior Descending Artery Myocardial Bridging: A Case Report

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ABSTRACT

Background: Myocardial bridging (MB) is a congenital coronary anomaly in which a segment of an epicardial coronary artery courses intramyocardially, resulting in dynamic systolic compression. MB, albeit usually considered benign, has been associated with myocardial ischemia and electrocardiographic abnormalities in selected patients. Nonetheless, establishing a causal relationship may be challenging.

Case Presentation: A 33-year-old asymptomatic man with no prior cardiovascular disease was found to have inferior ST-segment elevation on routine electrocardiographic evaluation. Physical examination, transthoracic echocardiography, and laboratory findings were unremarkable. Coronary angiography demonstrated an MB involving the midsegment of the left anterior descending artery without evidence of obstructive coronary artery disease. The MB represented one potential explanation for the electrocardiographic findings; however, other mechanisms such as coronary vasomotor dysfunction could not be excluded because physiologic and vasoreactivity testing were not performed.

Conclusions: This case illustrates an uncommon coexistence of inferior ST-segment elevation and an MB of the left anterior descending artery. Although a causal relationship cannot be established, MB should be considered among the differential diagnoses after exclusion of obstructive coronary artery disease. ***(Iranian Heart Journal 2026; 27(4): 87-91)***

KEYWORDS: myocardial bridging; ST-segment elevation; left anterior descending artery; coronary anomaly; electrocardiography; non-obstructive coronary artery disease

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Myocardial bridging (MB) is a congenital coronary anomaly in which a segment of an epicardial coronary artery courses intramyocardially beneath overlying myocardial fibers, resulting in dynamic systolic compression of the tunneled vessel.[1] Although traditionally considered a benign anatomic variant, MB has been associated with myocardial ischemia, arrhythmias, and electrocardiographic abnormalities in selected patients.[2, 3]

The left anterior descending artery (LAD) is the most commonly involved vessel. In some individuals, systolic compression of the

bridged segment and associated alterations in coronary blood flow may contribute to ischemic manifestations despite the absence of obstructive coronary artery disease (CAD).[4] Whereas most reported electrocardiographic changes involve the anterior leads, atypical ST-segment elevation patterns have rarely been described.[5]

Although electrocardiographic abnormalities have been described in patients with MB, a direct causal relationship is often difficult to establish because other mechanisms, including coronary vasospasm, coronary microvascular dysfunction, early repolarization, or other nonischemic causes of ST-segment elevation, may produce similar findings.

We present a case of inferior ST-segment elevation in an asymptomatic young man with angiographically demonstrated LAD MB in whom obstructive CAD was excluded.

Case Presentation

A 33-year-old asymptomatic man with no known chronic medical conditions and no history of smoking underwent routine cardiovascular evaluation. His family history was notable for sudden cardiac death attributed to hypertrophic cardiomyopathy. Electrocardiography demonstrated ST-segment elevation in the inferior leads without reciprocal changes (Figure 1).

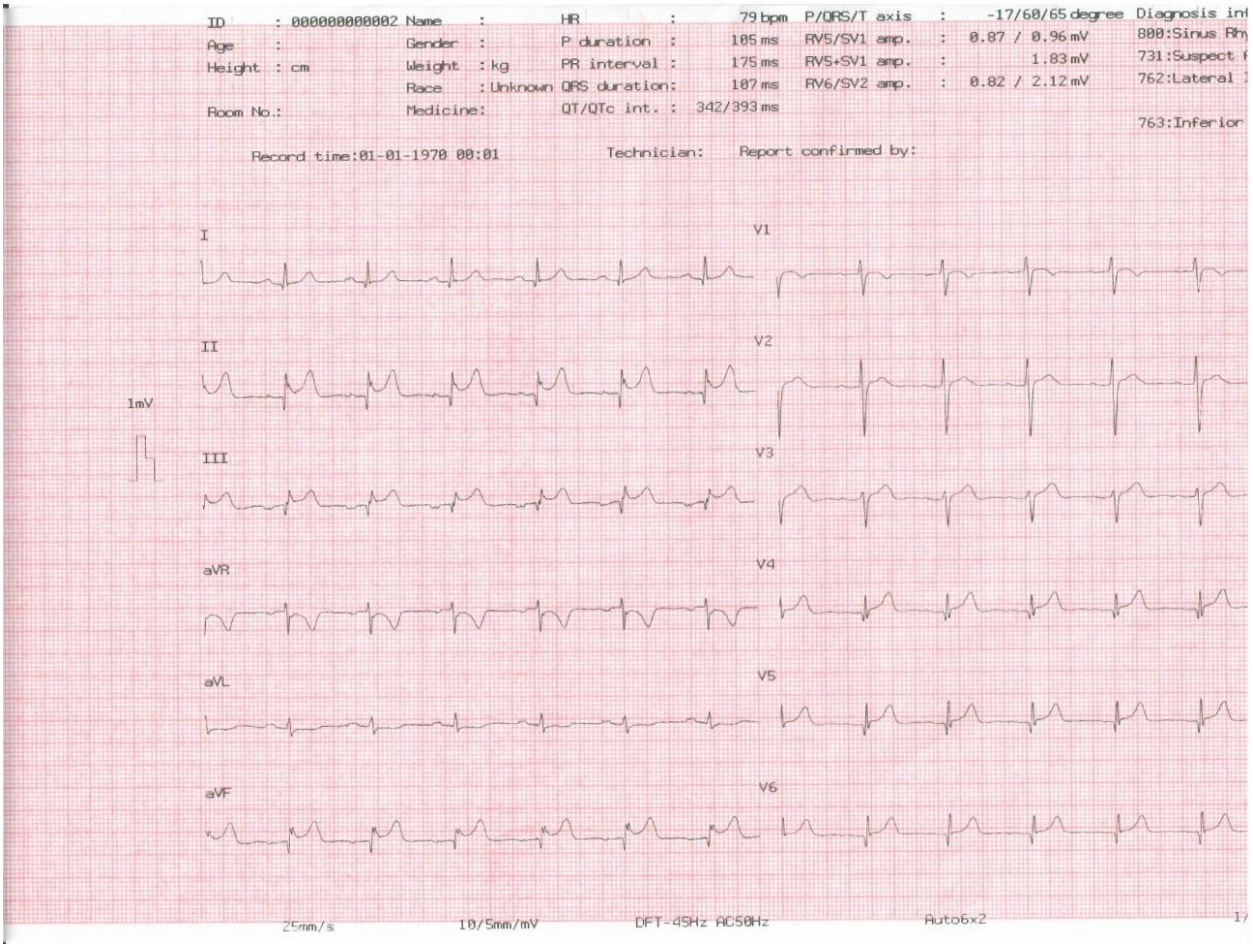

Figure 1. Twelve-lead electrocardiogram showing ST-segment elevation in the inferior leads (II, III, and aVF) without reciprocal changes

Physical examination was unremarkable. Transthoracic echocardiography showed normal cardiac chamber dimensions and preserved ventricular systolic function, without evidence of hypertrophic cardiomyopathy or regional wall motion abnormalities. Laboratory investigations were largely within normal limits, apart from borderline hyperlipidemia and impaired fasting glucose.

Given the electrocardiographic findings and family history, coronary angiography was performed to exclude obstructive CAD and evaluate for possible coronary anomalies. Angiography demonstrated an MB involving the midsegment of the LAD, with dynamic systolic compression and no evidence of obstructive CAD in the remaining coronary vessels (Figure 2A-C).

No angiographic evidence of spontaneous coronary spasm was observed during coronary angiography. Nevertheless, provocative vasomotor testing with acetylcholine or ergonovine was not performed; therefore, coronary vasospasm cannot be definitively excluded.

After exclusion of obstructive CAD, the MB was considered a possible explanation for the observed electrocardiographic abnormalities. Because the patient remained asymptomatic, conservative management with clinical follow-up and cardiovascular risk factor modification was recommended. Pharmacologic therapy was discussed but deferred in the absence of symptoms or objective evidence of ischemia.

Figure 2. Coronary angiography showing a normal right coronary artery (Panel A), normal left anterior descending artery (LAD) during diastole (Panel B), and mid-LAD systolic “milking” consistent with myocardial bridging (Panel C)

DISCUSSION

MB is most commonly observed in the LAD and is generally considered a benign congenital coronary anomaly. However, in selected individuals, dynamic systolic compression of the tunneled segment may be associated with myocardial ischemia, arrhythmias, or electrocardiographic abnormalities despite the absence of obstructive CAD.[1, 2, 4]

Most electrocardiographic manifestations reported in MB involve the anterior leads because of the frequent involvement of the LAD. In contrast, inferior ST-segment elevation represents an uncommon and atypical finding. The mechanism underlying such electrocardiographic abnormalities remains incompletely understood but may relate to altered coronary flow dynamics and regional myocardial repolarization abnormalities associated with systolic vessel compression.[5]

In the present case, coronary angiography demonstrated dynamic systolic compression

of the midsegment of the LAD without evidence of obstructive CAD. Although a direct causal relationship between the MB and the electrocardiographic findings cannot be definitively established, the MB was considered a possible explanation after exclusion of significant coronary obstruction and structural heart disease. According to the Fourth Universal Definition of Myocardial Infarction, ST-segment elevation should be interpreted in the appropriate clinical context and does not necessarily indicate acute coronary occlusion in the absence of supportive clinical or biochemical findings.[6] This highlights the importance of considering MB in the differential diagnosis of unexplained ST-segment elevation, particularly in younger individuals without symptoms suggestive of acute coronary syndrome.

Management of MB depends on symptom severity and evidence of ischemia. Asymptomatic individuals without objective evidence of ischemia are generally managed conservatively with clinical follow-up and cardiovascular risk factor modification. Pharmacologic therapy may be considered in symptomatic individuals, whereas invasive interventions are typically reserved for highly selected refractory cases.[1, 7]

This case highlights an unusual coexistence of inferior ST-segment elevation and LAD MB in an asymptomatic individual. Although the MB may have contributed to the electrocardiographic findings, a causal relationship cannot be established based on the available investigations. Additional physiologic and vasomotor assessment would have strengthened the mechanistic interpretation.

CONCLUSIONS

This case describes an uncommon coexistence of inferior ST-segment elevation and midsegment LAD MB in an asymptomatic young individual without obstructive CAD. Although MB may represent one potential explanation for the electrocardiographic findings, alternative mechanisms, including coronary vasomotor dysfunction, cannot be excluded. Careful clinical interpretation and avoidance of overattributing electrocardiographic abnormalities to MB are warranted. Further studies incorporating invasive physiologic and vasomotor assessment are needed to clarify the relationship.

Ethical Approval:

According to the policies of the Institutional Review Board of Mogadishu Somali Turkish Training and Research Hospital, formal ethical approval was not required for this single-patient case report.

Consent for Publication:

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Conflict of Interest:

The authors report no competing interests.

Authors' Contributions:

All authors contributed to the conception and design of the study, data collection, analysis, and interpretation. The manuscript was drafted and critically revised by the authors. All authors approved the final manuscript and agreed to be accountable for all aspects of the work.

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