



## Introduction

Occlusion Myocardial Infarction (OMI) refers to the acute or near-complete occlusion of a culprit coronary artery with inadequate collateral circulation, resulting in transmural myocardial infarction. Unlike the traditional STEMI/NSTEMI classification, many OMI cases do not meet STEMI criteria on ECG, leading to delays in diagnosis and treatment, thereby increasing morbidity and mortality.

## Case Description

A 34-year-old man with underlying hypertension presented to the emergency department with acute, typical chest pain lasting one hour. Upon arrival, his vital signs were: blood pressure 118/88 mmHg, heart rate 82, respiratory rate 22 breaths per minute, SpO<sub>2</sub> 90% on room air, and pain score 5/10. Bilateral lower-zone crepitations were noted. Bedside lung scan revealed generalized B-lines, and echocardiography showed hypokinesia in the anterolateral and posterior walls, with left ventricular ejection fraction (Eyeballing) of 30%. The initial ECG demonstrated a right bundle branch block (RBBB) and continuous cardiac monitoring showing multiple PVCs.

Two hours later, patient experienced another episode of severe anterior chest pain, with evolving ECG changes, including deepening T waves and persistent RBBB. Given these changes and worsening clinical symptoms, an urgent referral was made for percutaneous coronary intervention (PCI). It revealed a proximal left anterior descending (LAD) artery total occlusion, with minor irregularities in the left circumflex and right coronary arteries. The patient was admitted to the coronary care unit (CCU) for four days and subsequently discharged in stable condition.

## Discussion

This case underscores the diagnostic difficulty of identifying acute coronary occlusion in the presence of right bundle branch block (RBBB). In this case, the absence of initial ST-elevation led to delayed recognition, despite suggestive clinical signs. It was the evolving ECG changes and worsening symptoms that eventually prompted urgent PCI, which confirmed total occlusion of the proximal LAD. This reflects a broader issue with the current STEMI/NSTEMI paradigm, which may fail to identify up to 25% of total occlusion MIs that do not meet STEMI criteria. These patients, if not recognized early, face delays in reperfusion, leading to larger infarct size and worse outcomes. An OMI-based diagnostic approach—which integrates clinical judgment, serial ECGs, cardiac imaging, and biomarker interpretation—is essential. Conduction disturbances like RBBB should not be dismissed as benign when accompanied by signs of ischemia. Instead, they should prompt a lower threshold for angiography in the appropriate clinical context. This case reinforces the principle that “time is myocardium”—and that timely intervention, even in non-STEMI patterns, can significantly alter prognosis.

## Conclusion

Diagnosing OMI requires integrating clinical findings, ECG evolution, biomarkers, and imaging. In patients with persistent ischemia and conduction abnormalities like RBBB, early recognition and prompt reperfusion are crucial. A paradigm shift toward OMI-based evaluation, rather than STEMI-only PCI criteria, is essential for improving outcomes.

### References:

1. Meyers HP, Bracey A, Lee D, Limkakeng AT, Kontos MC, Swanick C, et al. Comparison of the ST-elevation myocardial infarction (STEMI) vs. occlusion myocardial infarction (OMI) paradigm in patients with chest pain. *Am J Emerg Med.* 2021;46:683–90. doi:10.1016/j.ajem.2020.10.077
2. Farkas J, Long B, Koyfman A. The problem with STEMI: An exploration of the occlusion myocardial infarction (OMI) paradigm. *J Emerg Med.* 2021;61(6):658–65. doi:10.1016/j.jemermed.2021.09.014
3. Bracey A, Meyers HP. Right bundle branch block in anterior myocardial infarction: high-risk presentation requiring urgent catheterization. *Clin Pract Cases Emerg Med.* 2022;6(1):16–21. doi:10.5811/cpcem.2021.10.54358

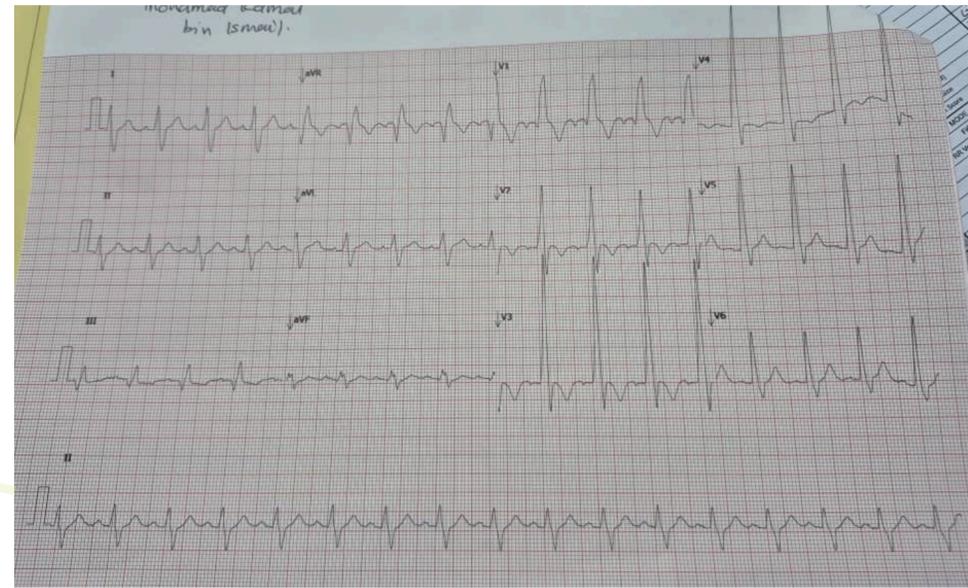


Figure 1: ECG X1 upon arrival shows right bundle branch block (RBBB)

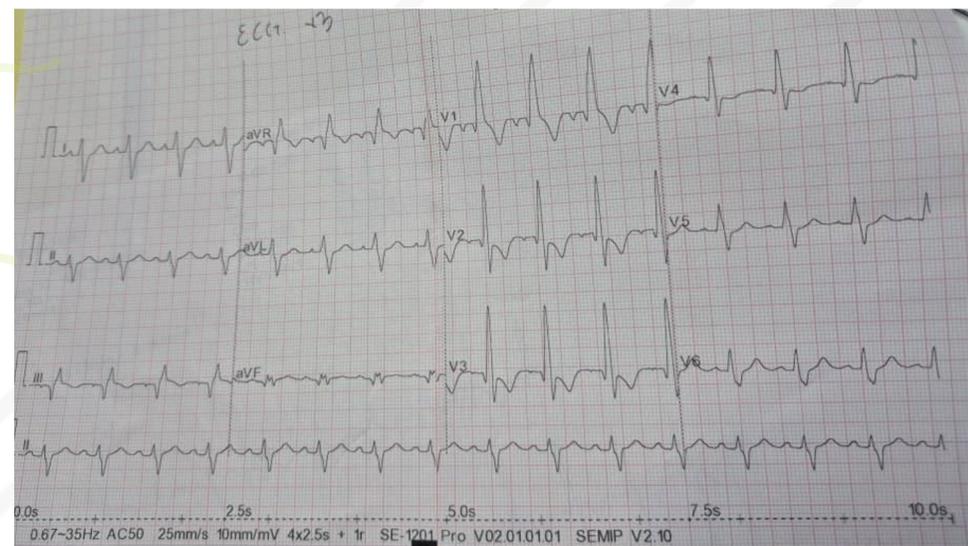


Figure 2: 2 hours later, ECG shows deepening T waves with persistent RBBB