# A bridge too far: myocardial bridging as a cause of NSTEMI

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## Introduction

- Myocardial bridging (MB) occurs when a portion of a coronary artery is fully embedded in the myocardial tissue.
- Usually asymptomatic, the tunneled artery can cause coronary vasospasm, leading to angina, ACS, and sudden cardiac death.
- Though estimated to be present in 1 out of 3 adults, a higher prevalence has been observed in autopsy findings (up to 86%).[1]
- Due to the varying presentation of patients with MB, it is important to include this diagnosis in the differential for NSTEMI, especially if coronary angiography reveals no obstructive lesions.

## Initial Presentation

A 65-year-old female with a history of hypertension, idiopathic myocarditis, and hyperlipidemia presented to the hospital with substernal chest pain that radiated to her left arm. The pain was pressure-like in nature. She denied any positional component to her symptoms. Additionally, she reported a cough and sore throat for four days, but denied any shortness of breath, palpitations, or fevers. She took three nitroglycerin with minimal improvement.

- Vitals: BP 175/83, HR 79, RR 18, O2 98%.
- Physical examination of the patient was normal including cardiovascular exam which revealed a regular rate and rhythm without murmurs.

| Labs | Day 1 | Day 2 | Day 3 | *Ref. range* |
|---|---|---|---|---|
| WBC | 4.9 | 5.9 | 6.2 | *K/uL* |
| Hgb | 13.1 | 11.8 | 12.7 | *g/dL* |
| Sodium | 136 | 139 | 137 | *135-145 mmol/L* |
| Potassium | 4.5 | 3.8 | 3.9 | *3.5-5.3 mmol/L* |
| BUN | 11 | 13 | 12 | *6-20 mg/dL* |
| Cr | 0.77 | 1.00 | 0.74 | *0.5-1.2 mg/dL* |
| ESR | --- | 5 | --- | *0-30 mm/HR* |
| Troponin I HS | 166 | 698 | 1087 | *<37 ng/L* |
| COVID PCR | Neg | --- | --- | *neg* |

Table 1: Notable lab findings on admission.

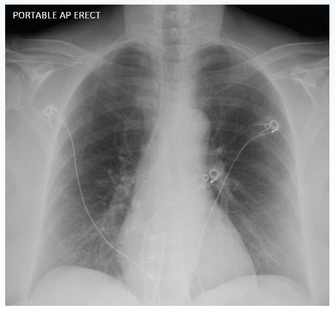
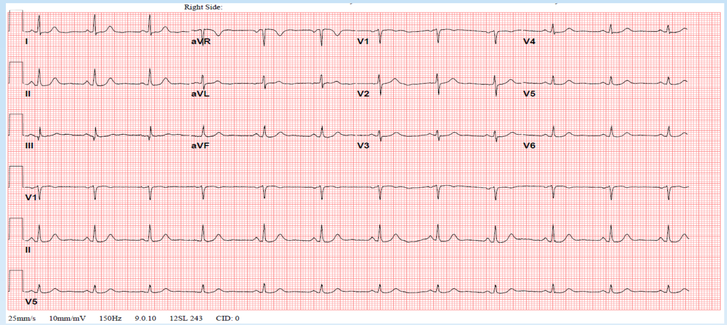



Image 1: Initial CXR (above).
Image 2: EKG results (top middle).




## Clinical Course

- The patient was started on acute coronary syndrome (ACS) protocol therapies and admitted to the cardiology service for further management.
- A transthoracic echocardiogram showed EF 60-65% without any wall motion abnormalities.
- Coronary angiography demonstrated systolic narrowing of the middle left anterior descending (LAD) coronary artery with no significant atherosclerotic plaque.
- Cardiac MRI (cMRI) showed subendocardial late gadolinium enhancement (LGE) consistent with MI in the distal LAD territory without evidence of active inflammation or myocarditis (images 4 and 5)
- She was diagnosed with NSTEMI due to myocardial bridging (MB).
- The patient was discharged on metoprolol with close outpatient follow up.

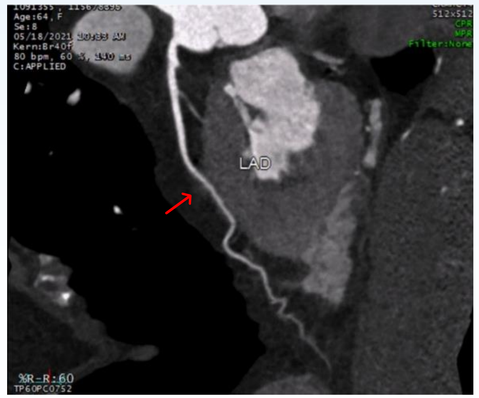



Image 3: Coronary CT angiography with the left anterior descending (LAD) artery showing myocardial bridging of the middle segment (red arrow).

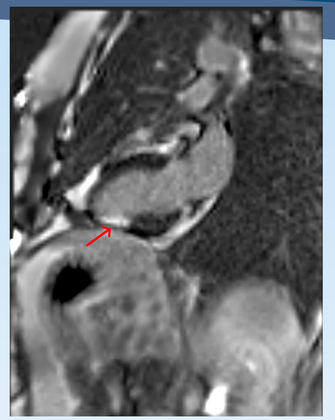


Image 4: cMRI (Sagittal view) with LGE of apical inferior LV wall (red arrow).

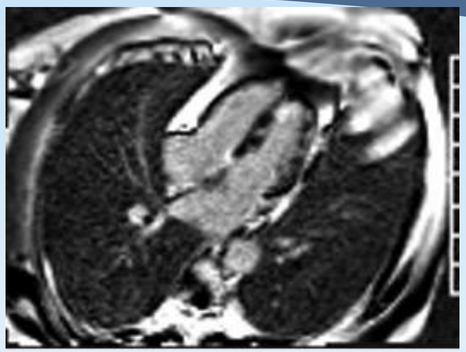


Image 5: cMRI (transverse view) with patchy septal and apical LGE consistent with prior MI or scarring.

## Discussion

- MB is commonly found incidentally on cardiac catheterization through the "milking effect" of the tunneled artery during systole.
- Non-invasive imaging modalities such as coronary computed tomography angiography (CCTA) are increasingly becoming the preferred method of diagnosis.[2]
- Once the diagnosis is made, first-line treatment consists of beta-blockers, while surgical options such as myotomy and coronary artery bypass grafting are often considered in refractory cases.
- This case demonstrates the need for early identification of MB in order to initiate appropriate medical therapy.

## References

1. Möhlenkamp S, Hort W, Ge J, Erbel R. Update on myocardial bridging. Circulation. 2002;106(20):2616-2622. doi:10.1161/01.cir.0000038420.14867.7a
2. Sternheim D, Power DA, Samtani R, Kini A, Fuster V, Sharma S. Myocardial bridging: Diagnosis, functional assessment, and management. Journal of the American College of Cardiology. 2021;78(22):2196-2212. doi:10.1016/j.jacc.2021.09.859