

# Myocardial bridge: The cause of angina in a young man

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## ABSTRACT

Myocardial bridging is basically the systolic narrowing of epicardial coronary arteries, secondary to their tunneled course in myocardium. Though it is a benign condition it can have the symptoms like acute coronary syndrome, arrhythmias and sudden cardiac death. We report a 32-year-old male, who presented with typical exertional angina, had positive exercise treadmill and thallium-201 test. Coronary angiography revealed myocardial bridge of distal left anterior descending coronary artery. He was put on  $\beta$ -blockers and was doing well at 8 years of follow-up.

**Keywords:** Angina, left anterior descending artery, myocardial bridge, myocardial ischemia, single photon emission computed tomography, thallium-201

## INTRODUCTION

Coronary arteries and their major branches usually run in subepicardial tissue of the heart surface. Sometimes, a portion of epicardial coronary artery runs under the “bridge” of superficial myocardial fibers for a short distance. This condition is defined as “myocardial bridging.” It has an estimated frequency of 0.5-2.5 % in angiographic series and commonly involves left anterior descending (LAD) artery.<sup>[1]</sup> Most often, it is a benign condition but may cause angina pectoris,<sup>[2]</sup> myocardial infarction,<sup>[3]</sup> coronary spasm,<sup>[4]</sup> arrhythmias<sup>[5]</sup> and sudden death.<sup>[1]</sup> We report a case of typical exertional angina and positive exercise stress test, who had myocardial bridge of LAD on coronary angiography.

## CASE REPORT

A 32-year-old non-smoker, hypertensive male presented with angina on efforts of 2 months duration. A clinical examination was unremarkable. Electrocardiogram showed left ventricular hypertrophy without any ST and T changes.

2-D echocardiography showed no regional wall abnormality, left ventricular ejection fraction 0.60, and a concentric left ventricular hypertrophy. Exercise treadmill test with Bruce protocol showed a significant down-sloping ST depression in leads III, aVF, and V4-V6, at 10 Metabolic Equivalent of Task (METs) of exercise. An exercise stress thallium-201 single photon emission computed tomography (SPECT) showed reversible perfusion defect in septum of left ventricle [Figure 1]. His routine blood biochemistry was normal. Fasting lipid levels were-total cholesterol 145 mg%, low-density lipoprotein 89mg%, high-density lipoprotein 37 mg%, and triglycerides 95 mg%. A coronary angiography revealed myocardial bridging of mid part of LAD [Figures 2 and 3]. Left circumflex and right coronary arteries were normal. He was put on atenolol 50 mg/day and had a favorable clinical outcome and continues to be followed.

## DISCUSSION

The typical angiographic finding in myocardial bridge is systolic narrowing of an epicardial coronary artery. Tachycardia following exertion worsen the myocardial ischemia by decreasing diastolic coronary flow and increasing the systolic narrowing of the bridged coronary artery.<sup>[1]</sup> Bourassa *et al*,<sup>[1]</sup> had demonstrated that following systolic narrowing, there is persistent diastolic narrowing of bridged segment in initial 1/4<sup>th</sup> of diastole time, resulting in decrease coronary flow reserve and ischemia. The index case had typical exertional angina with positive exercise treadmill test and reversible septal perfusion defect in exercise thallium-201 SPECT imaging; which was secondary

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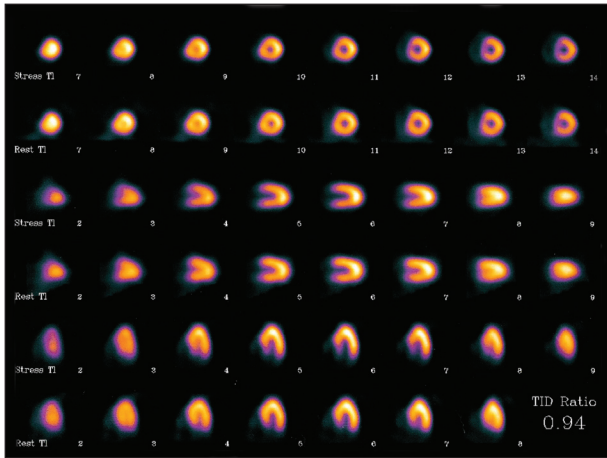


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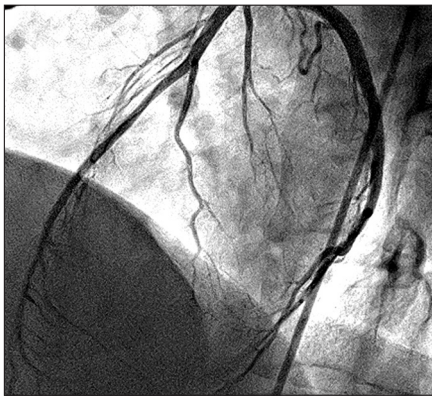
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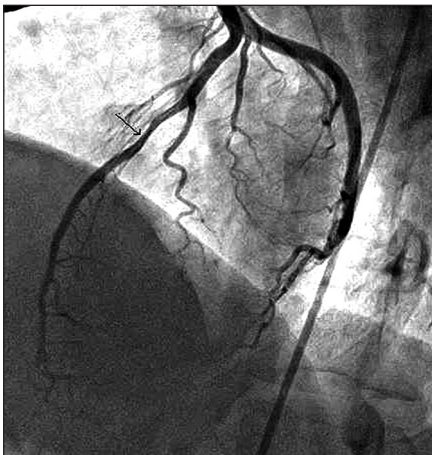
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**Figure 1:** Exercise thallium-201 single photon emission computed tomography myocardial imaging showing stress induced reversible perfusion defect in septum of left ventricle



**Figure 2:** Coronary angiogram in left anterior oblique cranial view showing normal left anterior descending artery in diastole



**Figure 3:** Coronary angiogram in left anterior oblique cranial view showing compressed distal left anterior descending in systole (marked as black arrow)

to LAD myocardial bridging. Huang *et al.*, demonstrated abnormal myocardial SPECT perfusion defect in 16 out of 17 patients, who had an abnormal exercise treadmill test and an angiographic evidence of myocardial bridge.<sup>[2]</sup> Though myocardial bridging is a benign condition with not much of clinical significance, its presence should not be ignored in patients with symptomatic or documented myocardial ischemia and otherwise normally appearing non-obstructive epicardial coronaries. Mainstay of medical treatment is  $\beta$ -blockers as it decreases systemic and extramural pressures and thereby the external vessel compression.<sup>[6]</sup> Beta-blocker's additional negative chronotropic effect also prolongs diastole, thus improving coronary perfusion.<sup>[6]</sup> Patients, who do not respond with medical therapy, coronary stenting<sup>[7]</sup> or surgical excision of myocardial bridge<sup>[8]</sup> are other options. The index case responded well with medical therapy.

In conclusion, effort angina in a young individual can be one of the presentations of symptomatic myocardial bridging. It can be defined by coronary angiography and its functional significance can be assessed by nuclear perfusion scan.

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**How to cite this article:** Vijayvergiya R, Mittal BR. Myocardial bridge: The cause of angina in a young man. *Indian J Nucl Med* 2013;28:115-6.

**Source of Support:** Nil. **Conflict of Interest:** None declared.