

# Acute Infero-Lateral MI after Blood Donation in a Patient of Myocardial Bridge: a Case Report of Rare Co-Occurrence

Rahul Choudhary\*, Dinesh Gautam, Rajeev Bagarhatta, Vijay Pathak

Department of Cardiology, SMS Medical College and Hospital, Jaipur, Rajasthan, India  
Corresponding author: rahulanna@gmail.com

Received June 27, 2014; Revised July 25, 2014; Accepted August 01, 2014

**Abstract** The myocardial bridge (MB) is an anomaly of the coronary arteries that usually affect the left anterior descending artery (LAD). It mainly affect middle aged patients at low risk for CAD, but can manifest as unstable or stable angina, AMI and sudden death, with the latter two being rare. We report a case of 40 year-old-man, who presented with complaint of severe crushing chest pain associated with sweating and nausea just half hour after blood donation. The electrocardiography (ECG) was consistent with an acute infero-lateral myocardial infarction. Coronary angiography revealed substantial myocardial bridging in the 2nd posterolateral branch and some degree of bridging in the 1st posterolateral branch. An empirical diagnosis of symptomatic myocardial bridging with superimposed coronary vasospasm, probably precipitated by autonomic disturbance after blood donation, was made and patient discharged on oral  $\beta$ -blocker therapy. Although association of AMI after blood donation in a patient having myocardial bridge involving left anterior descending artery is reported, there is no reported case of such co-occurrence with right coronary artery myocardial bridge.

**Keywords:** myocardial bridge, myocardial infarction, right coronary artery, coronary angiography,  $\beta$ -blocker

**Cite This Article:** Rahul Choudhary, Dinesh Gautam, Rajeev Bagarhatta, and Vijay Pathak, "Acute Infero-Lateral MI after Blood Donation in a Patient of Myocardial Bridge: a Case Report of Rare Co-Occurrence." *American Journal of Medical Case Reports*, vol. 2, no. 7 (2014): 143-145. doi: 10.12691/ajmcr-2-7-4.

## 1. Introduction

The myocardial bridge (MB) is an anomaly of the coronary arteries that usually affect the left anterior descending artery (LAD), when one or more myocardial bundles cross or involve a segment of the epicardial coronary artery, which crosses the intramural portion of the myocardium, below the muscular bridge. It is a relatively common and usually benign pathology among the general population, affecting mainly middle aged patients at low risk for coronary artery disease (CAD); however, when symptomatic, it can manifest as unstable or stable angina, acute myocardial infarction (AMI) and sudden death, with the latter two being rare. Although association of AMI after blood donation in a patient having myocardial bridge involving left anterior descending artery is reported, [1] there is no reported case of such co-occurrence with right coronary artery myocardial bridge.

## 2. Case report

A 40 year-old-man presented to cardiology emergency within 30 minutes of blood donation having complaint of severe crushing chest pain associated with sweating and

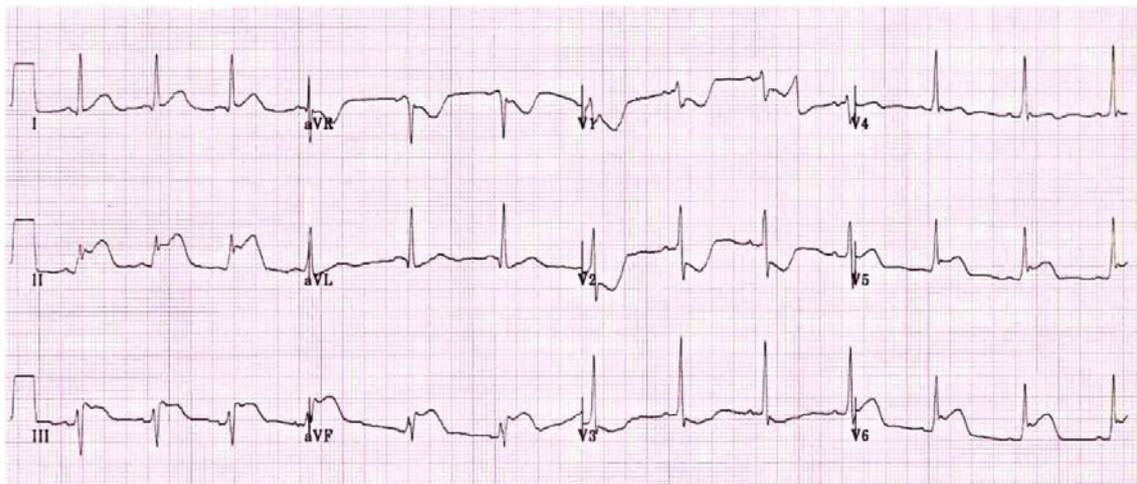
nausea. He was a smoker with no other risk factor for CAD apart from male sex. On physical examination, paleness and cold sweating were noted. His systolic and diastolic blood pressures were 110 and 70 mmHg respectively, and his heart rate was 60 /minute. The electrocardiography (ECG) was consistent with an acute infero-lateral myocardial infarction (above 2 mm ST elevation in II, III, aVF, V5 and V6 leads) and reciprocal ST depressions in V1, V2 and V3 (Figure 1).

Bedside echocardiographic examination showed hypokinesia of mid and basal inferior and lateral wall. He was given Aspirin 350 mg, clopidogrel 600 mg, and was taken for primary PCI. Coronary angiography was performed. The left coronary system was normal. In the right coronary anatomy, the angiograms revealed substantial myocardial bridging in the 2nd posterolateral branch and some degree of bridging in the 1st posterolateral branch (Figure 2).

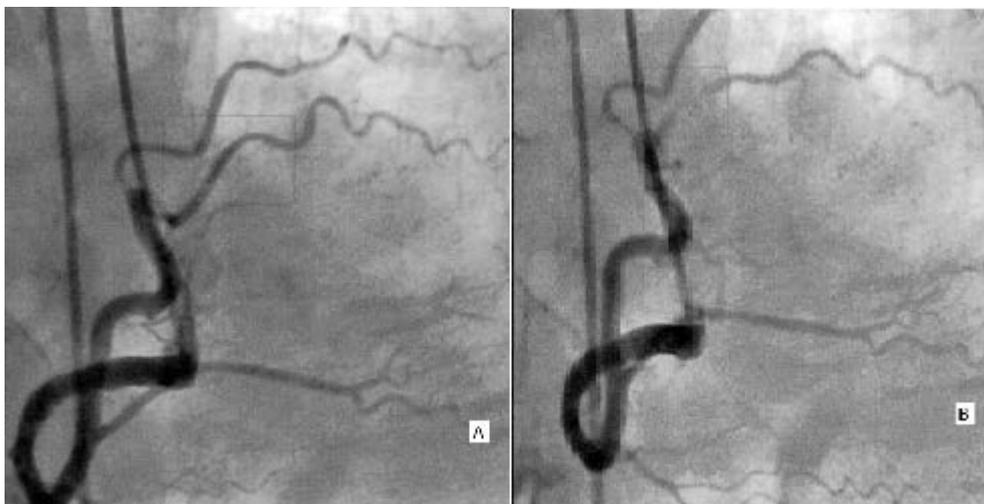
Systolic obliteration and diastolic filling were seen; no transluminal intervention was performed. The systolic obliteration persisted despite intracoronary nitroglycerin administration. During catheterization, the left ventricular ejection fraction was 0.42 with wall-motion abnormalities in inferior and lateral part. Upon completion of angiography, the patient was returned to the telemetry unit without complication. We made an empirical diagnosis of symptomatic myocardial bridging with superimposed coronary vasospasm, probably precipitated by autonomic

disturbance after blood donation. In addition to continued  $\beta$ -blocker therapy, we prescribed a non-dihydropyridine

calcium channel blocker to reduce heart rate and myocardial contractility.



**Figure 1.** ECG showing ST elevation in infero-lateral leads with reciprocal changes in anteroseptal leads



**Figure 2.** A: Angiogram of the right coronary artery shows diastolic patency of the bridged segments of the 1st posterolateral and 2nd posterolateral branches; B: Angiogram of the right coronary artery shows systolic obliteration of the bridged segments of the 1st posterolateral and 2nd posterolateral branches

### 3. Discussion

Myocardial bridging occurs when a segment of the coronary artery takes an intramural course. This phenomenon was first described by Reyman in 1737. [2] The epicardial artery is compressed during each systole and relaxes in diastole. The incidence of myocardial bridging ranges widely, from 5% to 80% in autopsy studies, whereas angiography series have recorded incidences ranging from 0.5% to 12%. [3] The inclusion of epicardial artery loops with myocardial bridging accounts for the much higher incidence in autopsy series. Numerous manifestations of myocardial bridging have been described: angina, myocardial infarction, arrhythmias, and sudden cardiac death. [4] Chest pain in myocardial bridging has its pathophysiologic origin in vasospasm, vessel thrombosis, and (rarely) shear stress due to atherosclerosis. [5] Our patient's ST-elevation myocardial infarction could have arisen from myocardial bridging with severe spasm precipitated by blood donation

induced autonomic disturbances. Myocardial bridging of the left anterior descending artery is not uncommon and continues to be a subject of investigation and reporting interest. Our review of the medical literature shows that right coronary artery distribution bridging is indeed a rare occurrence, at least in regard to focal clinical presentation. [6] We believe that further investigation into coronary vasospasm may reveal a higher incidence of bridging as a proximate cause. There is no real consensus regarding the treatment of myocardial bridging. Reported treatment has included medical management with  $\beta$ -blockers and calcium channel blockers. Stenting, although performed in selected cases, may not be beneficial, because compression of the stented segments can lead to stent thrombosis, restenosis, and stent fractures. [7] Resection of the myocardial bridge and coronary artery bypass grafting have been reported in the surgical literature. [8] The improved diagnostic methods will doubtless increase the reported incidence of bridged coronary segments. The direct correlation between myocardial bridging and ischemic symptoms has been clarified and is now established [9,10].

## 4. Conclusion

Myocardial bridging may cause acute myocardial infarction in various clinical conditions. In our case, reflex sympathetic stimulation induced vasospasm superimposed over RCA myocardial bridge may have resulted in acute myocardial infarction. This is a rare case report of acute ischemic complication related to myocardial bridging of the RCA. This report, together with previously published case report, suggests that a possible association between myocardial bridging and acute myocardial infarction following blood donation could not be excluded.

## References

- [1] Ramazan A, Huseyin G, Yunus E. Myocardial bridging as a cause of acute myocardial infarction: a case report. *BMC Cardiovascular Disorders* 2002; 2: 15.
- [2] Reyman HC. Disertatio de vasis cordis propriis [dissertation]. *Göttingen: Med Diss Univ*; 1737: 1-32.
- [3] Polacek P, Zechmeister A. The occurrence and significance of myocardial bridges and loops on coronary arteries. In: Krutna V, editor. Monograph 36, Opuscula Cardiologica. Acta Facultatis Medicinae Universitatis Brunenses. Brno: University J.E. Purkinje; 1968. p. 1-99.
- [4] Alegria JR, Herrmann J, Holmes DR Jr, Lerman A, Rihal CS. Myocardial bridging. *Eur Heart J* 2005; 26: 1159-68.
- [5] Ge J, Erbel R, Gorge G, Haude M, Meyer J. High wall shear stress proximal to myocardial bridging and atherosclerosis: intracoronary ultrasound and pressure measurements. *Br Heart J* 1995; 73: 462-5.
- [6] Woldow AB, Goldstein S, Yazdanfar S. Angiographic evidence of right coronary bridging. *Cathet Cardiovasc Diagn* 1994; 32: 351-3.
- [7] Klues HG, Schwarz ER, vom Dahl J, Reffelmann T, Reul H, Potthast K, et al. Disturbed intracoronary hemodynamics in myocardial bridging: early normalization by intracoronary stent placement. *Circulation* 1997; 96: 2905-13.
- [8] Iversen S, Hake U, Mayer E, Erbel R, Diefenbach C, Oelert H. Surgical treatment of myocardial bridging causing coronary artery obstruction. *Scand J Thorac Cardiovasc Surg* 1992; 26: 107-11.
- [9] Souibri K, Grollier G. Image in clinical medicine. Infarction due to myocardial bridging. *N Engl J Med* 2005; 353: 1147.
- [10] Podbielski FJ, Chaer R, Massad MG, Chami YG, Nawas S, O'Leary P, Benedetti E. What makes a coronary myocardial bridge symptomatic? *Minerva Cardioangiol* 1998; 46: 127-30.