Resolution of complete heart block after revascularization of acute marginal branch of the right coronary artery

Sağ koroner arter akut marjinal dalın revaskülarizasyon sonrasında tam kalp blokunun düzelmesi

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**Summary**– A patient presented with typical angina and a non-ST elevation myocardial infarction. Electrocardiogram showed complete heart block, and she was found to have a 90% acute marginal artery stenosis. The block resolved after balloon angioplasty of this artery that does not supply the atrioventricular node. We propose that increased vagal tone due to inferior wall ischemia from acute marginal artery stenosis has elicited the Bezold-Jarisch reflex. This is a likely mechanism for this uncommon etiology of complete heart block.

**CASE REPORT**

The case we present here is about a 39-year-old female patient who admitted due to angina and dyspnea. In the emergency room, the initial electrocardiogram revealed sinus bradycardia with an old left bundle-branch block; she progressed to complete AV block with a ventricular escape (Figure 1); with troponin elevation to 2.46 ng/ml (normal: <0.5 ng/ml).

A temporary pacemaker was inserted; coronary angiography revealed moderate atherosclerosis involving the left circumflex. There was 90% stenosis of the acute marginal branch of the RCA, which was considered the culprit lesion (Figure 2a). The other arteries had no significant lesions (Figure 3). Balloon angioplasty of the RCA lesion was performed with a
much improved angiographic result and <20% residual stenosis (Figure 2a). The patient was placed on a telemetry monitor and was transferred to the intensive care unit. Complete heart block was observed to have resolved within 1 h after the procedure, and she remained in normal sinus rhythm afterwards (Figure 4).

The temporary pacemaker remained in place and was discontinued about 6 h later after heart rate was consistently greater than the backup rate. The patient did not have any further problems and was discharged home in stable condition.

**DISCUSSION**

Resolution of complete heart block after RCA angioplasty has been described, but to the best of the authors’ knowledge this is the first case of acute marginal artery stenosis leading to complete heart block with prompt resolution after angioplasty.

Complete heart block after acute inferior wall MI usually occurs from damage to the RCA (85% of cases) and is usually proximal to its AV nodal branch. In this case, we did not find any significant obstructive disease in the proximal RCA or in the left circumflex system. Surprisingly, the culprit lesion was a 90% stenosis in a medium sized acute marginal artery. We researched possible mechanisms for this uncommon etiology of complete heart block.

Abuin et al. described the AV nodal artery, first septal perforator, Kugel’s artery and the superior descending artery as the arteries implicated in AV block with inferior MI. This suggests that AV nodal ischemia may not be a mechanism for complete heart block in our patient. AV block after MI is usually as-
Heart block caused by an unusual coronary artery stenosis

Heart block caused by an unusual coronary artery stenosis associated with a normal conduction system and is due to reversible factors rather than structural damage to the conduction system, which will be expected from ischemia with resultant infarction.[4] Other possible mechanisms proposed for heart block after MI include high vagal tone in inferior wall MI and the release of inflammatory mediators, including adenosine and potassium.[3]

This mechanism appears to be more likely in our patient. The inferior aspect of the heart is known to have rich innervation with vagal nerve terminals.[5] The inferior wall ischemia from acute marginal artery stenosis could have stimulated the vagus nerve thus eliciting the Bezold-Jarisch reflex.[5] The Bezold-Jarisch reflex results from the stimulation of cardiac mechanoreceptors associated with unmyelinated vagal afferent nerve fibers.[5] This increased vagal tone could have led to the initial sinus bradycardia progressing to complete heart block seen in our patient. Resolution of the inferior wall ischemia after angioplasty would have cut off this trigger for the vagal nerve stimulation thus leading to resolution of the complete AV block.

This patient presented with angina and was found to have a left bundle block on EKG. This was initially concerning for an STEMI equivalent, but a cursory examination of her previous records at our hospital revealed that she had the bundle branch block on old EKGs. Her risk factors for coronary artery disease (CAD) in this relatively young age included obesity and a strong family history of premature CAD, diabe-

Figure 3. Coronary angiography showing angiographically normal left anterior descending and left circumflex arteries.

Figure 4. Electrocardiogram showing resolution of complete heart block post angioplasty.
tes mellitus and hypertension.

In summary, this is a nice illustration of a case of complete heart block in a patient with an inferior MI, which resolved after angioplasty of the acute marginal artery. This case lends support to the mechanism of complete heart block in patients with NSTEMI and a culprit artery not known to supply the AV node.

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REFERENCES


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