

## Woven Right Coronary Artery: A Case Report and Review of the Literature

Atila Iyisoy, M.D., Turgay Celik, M.D., U. Cagdas Yuksel, M.D.,\* Ersoy Isik, M.D.

Gulhane Military Medical Academy, School of Medicine, Department of Cardiology, Etilik-Ankara;

\*Sarikamis Army District Hospital, Department of Cardiology, Sarikamis, Turkey

### ABSTRACT

Woven coronary artery is an extremely rare and is still not a clearly defined coronary anomaly in which epicardial coronary artery is divided into multiple thin channels at any segment of the coronary artery, and subsequently, these multiple channels merge again in a normal conduit. A few cases have been reported till now. In this case report, we present a 58-year-old male with a woven right coronary artery.

### Introduction

Woven coronary artery is an extremely rare and is still a poorly defined anomaly in which epicardial coronary artery is divided into multiple thin channels at any segment of the coronary artery, and subsequently, these multiple channels merge again in a normal conduit.<sup>1,2</sup> Up to now a few number of woven coronary artery cases have been reported.<sup>1-5</sup> In the current case report, we describe a 58-year-old male with a woven right coronary artery.

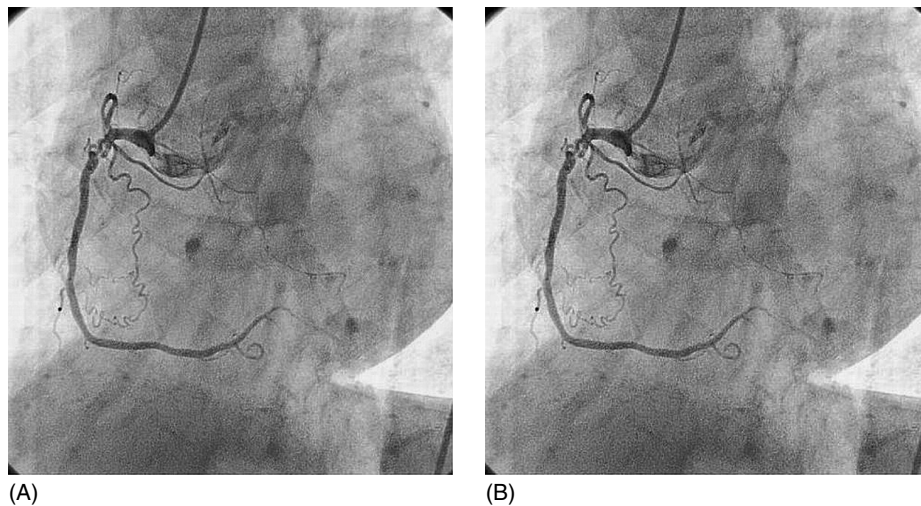
### Case

A 58-year-old male patient was admitted to our outpatient clinic with exertional chest pain. He had no previous clinical or electrocardiographic evidence of coronary artery disease. He had no other risk factors for coronary artery disease except smoking for 20 years. Transthoracic echocardiography showed normal left ventricular wall motion with a left ventricular ejection fraction of 60%. Stress electrocardiography demonstrated a 2 mm-horizontal ST depression in leads V4-V6. Myocardial perfusion imaging revealed reversible ischemia in the anterior wall. Subsequent coronary angiograms demonstrated severe stenosis in the middle segment of the left anterior descending coronary artery (LAD). Interestingly, arterial lumen was divided into multiple thin channels at the proximal segment of the right coronary artery (RCA); subsequently, these channels traversed distally with a slightly twisting course along a 1 cm length of segment. Distal to woven segment, the downstream blood flow was absolutely normal with a Thrombolysis in myocardial infarction III (TIMI-III) grade blood flow (Fig. 1A and B). The severe stenosis in the LAD was successfully dilated with direct stenting. The 6-month control angiography revealed

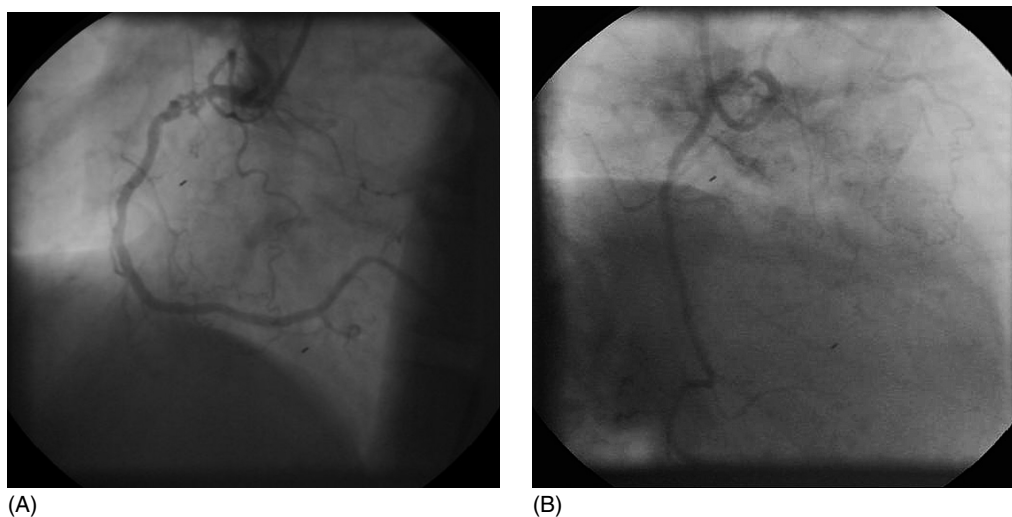
no restenosis in the LAD, and still TIMI-III blood flow was present in the RCA. Three years later, he was readmitted to the hospital with complaints of chest pain on exertion. The patient underwent myocardial perfusion scintigraphy that showed reversible apical ischemia confined to relatively small area. Although the stent implanted on LAD was widely patent, 70% diameter stenosis was detected in distal LAD just before turning into the apical region. Since the myocardium at risk was very small and the diameter of the stenotic segment was smaller than 1.5 mm, we decided not to intervene. On the other hand, there was no problem in the anomalous RCA with TIMI-III blood flow (Fig. 2A and B). Medical treatment was commenced and he was found to be asymptomatic at 1-year follow-up with intensive medical therapy.

### Discussion

Woven coronary malformation is characterized by the branching of a major epicardial artery into thin channels with a TIMI-III blood flow distally, which then merge again in order to form the main lumen after twisting along the coronary artery axis. The data about woven coronary artery anomaly are limited to a few number of case reports.<sup>1-5</sup> The differential diagnosis of woven coronary artery include spontaneous or iatrogenic coronary dissection, thrombus formation, or chronic arterial occlusion with recanalization with the development of vasa vasorum bridging collaterals. It can be claimed that the frequency of this anomaly could have been higher if woven coronary artery anomaly had not been misinterpreted as spontaneous dissection or thrombus. Some authors believed that woven coronary artery may be developed from spontaneous dissection and the twisting of thin channels probably causing intracoronary



**Figure 1.** It shows woven coronary artery anomaly at the proximal segment of the right coronary artery in the left anterior oblique (A) and right anterior oblique (B) projections. Also, it reveals normal blood flow just distal segment of the anomaly.



**Figure 2.** There is no change in the woven coronary anomaly during the coronary angiography in the left anterior oblique (A) and the right anterior oblique (B) projections after three years, and also, it is visualized that normal blood flow is maintained in right coronary artery distal to anomalous segment.

thrombus.<sup>3</sup> Interestingly, the length of the anomalous segment is limited to several centimeters and it does not disturb blood flow of the epicardial coronary artery. There are some essential points when making the differential diagnosis. Coronary dissection can be easily distinguished by angiography since it is likely to be accompanied by poor flow down the false lumen. On the other hand, the differential diagnosis of intracoronary thrombus may be very challenging for the invasive cardiologists. In the woven coronary artery, the distance of the thin channels and twisting of the channels can simulate thrombus. But, in case of thrombus epicardial blood flow should be reduced

because of intraluminal extension of the thrombus.<sup>6</sup> In the current case, blood flow distal to the interweaving segment of RCA was completely normal with TIMI-III grade flow, and multiple orthogonal projections during angiography demonstrated no dissection planes or intraluminal filling defect suggesting intracoronary thrombus.

In woven coronary artery anomaly, normal blood flow can be maintained distal to the anomalous segment, therefore coronary blood reserve is not disturbed with stress tests, especially myocardial perfusion imaging. So, in this case, anterior ischemia most probably resulted from severe stenosis in the middle segment of LAD and multiple

thin channels in RCA were not responsible for inducible myocardial ischemia.

Woven coronary artery anomaly is a probable benign entity in which no adverse coronary event occurred in the long-term follow-up period.<sup>3,5</sup> In the current case, the patient was completely asymptomatic during follow-up and no adverse coronary events have been encountered in that time period. Although he started suffering from exertional angina again after 3 years, coronary angiography revealed TIMI-III blood flow in the RCA distal to interweaving segment accompanied with severe stenosis in distal LAD which was not amenable to percutaneous coronary intervention. Reversible apical ischemia on myocardial perfusion imaging proved that severe stenosis in the distal LAD was responsible for the complaints of the patient. In that patient this malformation did not induce any reduction in coronary reserve as evidenced by myocardial perfusion scintigraphy.

In conclusion, although the woven coronary artery is an exceptionally rare coronary anomaly, considering its potential therapeutic implications, all interventional cardiologists should keep this anomaly in mind during daily practice in catheterization laboratory. Angiography in multiple projections should be obtained to make differential diagnosis of dissection, thrombosis, or chronic

total occlusion with bridging collaterals. We consider that extensive understanding of the woven coronary artery can reduce the risk of unnecessary percutaneous coronary interventions, which inherently expose the patients to possible complications. Even though, this anomaly appears to be a benign coronary anomaly without any major adverse cardiovascular events like in the current case, we need more data to figure out exactly the natural history of this malformation.

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