

An intercoronary connection serving as a safety valve for the left ventricle

Sol ventrikül için emniyet supabı görevi gören interkoroner bağlantı

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Intercoronary connection is an infrequent finding during coronary angiography and may serve as a safety valve for compromised coronary circulation. A 60-year-old woman with hyperlipidemia was admitted with stable angina pectoris of one-year history. Physical examination including cardiac auscultation was normal. The electrocardiogram showed no ischemic changes. Transthoracic echocardiography showed no wall motion abnormality and she had normal ejection fraction. Coronary angiography showed total occlusion of the proximal portion of the left anterior descending (LAD) artery and severe occlusion of the circumflex artery. Selective right coronary angiography showed no stenosis, with antegrade filling of the right coronary artery (RCA) and retrograde filling of the LAD through the RCA. The totally occluded LAD was in communication with the distal RCA through a large lumen as a single conduit whose diameter was equal to that of the distal LAD. Left ventriculography showed no abnormality. Because of the retrograde filling of the LAD with TIMI III flow, grafting of the LAD was not considered. The patient underwent successful bare metal stent implantation in the circumflex artery and was discharged free of chest pain on medical treatment.

Key words: Coronary angiography; coronary circulation; coronary vessel anomalies.

Intercoronary connections are infrequent findings during routine coronary angiography.^[1] They are obviously different from coronary collaterals seen in the course of occlusive coronary artery disease. Furthermore, in the setting of coronary artery disease, these congenital connections may have a potential protective role for the left ventricle.

CASE REPORT

A 60-year-old woman with a history of hyperlipidemia was admitted to our outpatient clinic with

interkoroner bağlantı koroner anjiyografi sırasında çok nadir karşılaşılan bir durumdur ve tehlikedeki koroner dolaşım için bir emniyet supabı görevi görür. Hiperlipidemi öyküsü olan 60 yaşında bir kadın hasta, bir yıldır var olan kararlı angina yakınmasıyla başvurdu. Hastanın fizik muayene ve kalp dinleme bulguları normaldi. Elektrokardiyogramda iskemik değişiklik görülmedi. Transtorasik ekokardiyografide duvar hareketi bozukluğu izlenmedi ve ejeksiyon fraksiyonu normaldi. Koroner anjiyografide sol ön inen arterin proksimalinde tam tıkanıklık ve sirkumfleks arterde ciddi tıkanıklık saptandı. Selektif sağ koroner anjiyografide darlığa rastlanmadı; sağ koroner arterde antegrad doluş, sol ön inen arterde sağ koroner arter aracılığıyla retrograd doluş izlendi. Tamamen tıkalı olan sol ön inen arter bir kanal aracılığıyla sağ koroner arter distaliyle bağlantı halindeydi ve lümenin çapı sol ön inen arter distalinin çapıyla eşitti. Sol ventrikülografide anormallik görülmedi. Sol ön inen arterin TIMI 3 akımla retrograd doluşu nedeniyle, koroner arter greft ameliyatı düşünülmedi. Sirkumfleks arterdeki lezyona düz metal stent yerleştirildi ve hasta göğüs ağrısı yakınması olmaksızın medikal tedaviyle taburcu edildi.

Anahtar sözcükler: Koroner anjiyografi; koroner dolaşım; koroner damar anomalisi.

stable angina pectoris of one-year history. Physical examination including cardiac auscultation was normal. The admission electrocardiogram showed no ischemic changes. Transthoracic echocardiography showed no wall motion abnormality and she had normal ejection fraction. Exercise electrocardiography revealed ST-segment depression in leads V4-V6. Coronary angiography was performed with the standard Judkins procedure from the right femoral artery. Left coronary angiography revealed total occlusion of the proximal portion of the left anterior

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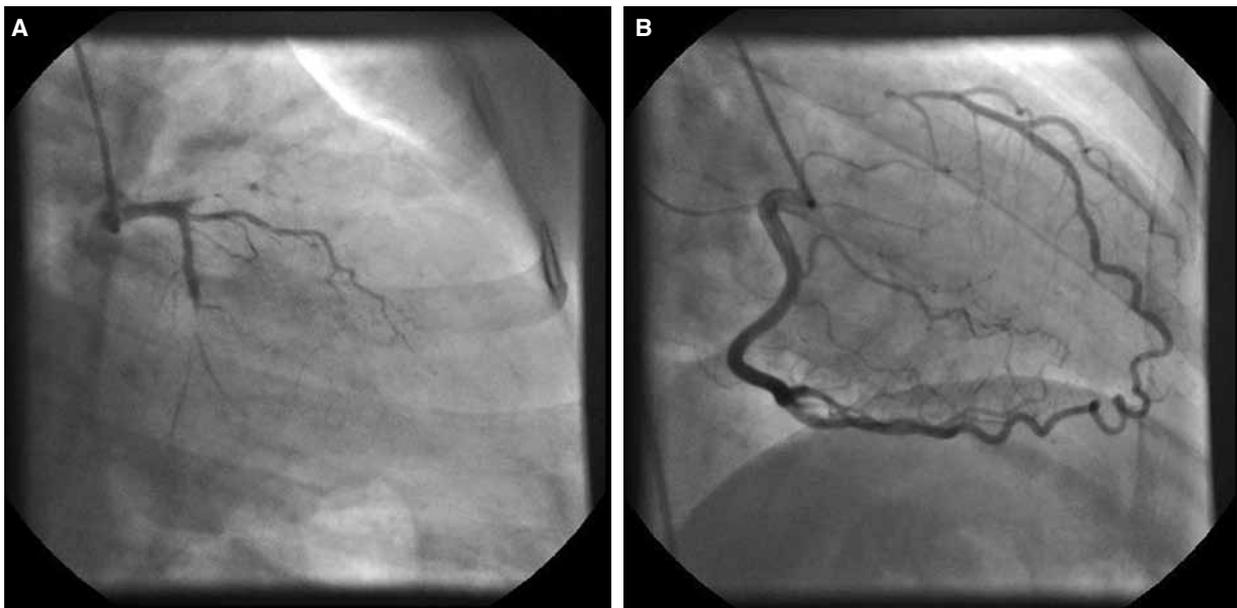


Figure 1. (A) Left selective coronary angiogram (caudal right anterior oblique view) showing complete occlusion of the left anterior descending artery and severe occlusion (99%) of the circumflex artery. (B) Right selective coronary angiogram (right anterior oblique view) showing the right coronary artery in communication with the completely occluded left anterior descending artery through an intercoronary passage.

descending (LAD) artery and severe occlusion (99%) in the nondominant circumflex artery (Fig. 1a). Selective right coronary angiography showed no stenosis, the contrast material filled the right coronary artery (RCA) in the usual anterograde fashion, then filled the LAD in a retrograde fashion. In the apical region, it was noted that the RCA turned posteriorly and continued as the LAD (Fig. 1b). The totally occluded LAD was in communication with the distal RCA through a large lumen as a single conduit. The diameter of this connection was equal to the diameter of the distal LAD. Left ventriculography showed no abnormality. Because of the retrograde filling of the LAD with TIMI III flow, it was thought that grafting of the LAD would not be necessary due to the possibility of early occlusion. Thus, coronary artery bypass grafting surgery was not considered. The patient underwent successful bare metal stent implantation in the circumflex artery and was discharged free of chest pain on medical treatment with aspirin, clopidogrel, atorvastatin, ramipril and metoprolol. Noninvasive testing for ischemia was not performed because of complete improvement of angina pectoris after stenting.

DISCUSSION

Intercoronary connections, also known as an open-ended circulation pattern, are uncommon variants of coronary anatomy.^[1] The incidence of intercoro-

nary connections was found to be 0.002% in a study comprising 126,595 patients.^[2] They are significantly different from coronary collaterals that are seen in the course of occlusive coronary artery disease. Intercoronary connections have been shown in patients with or without coronary artery lesions.^[3,4] Intercoronary collaterals are generally smaller than 1 mm in diameter and follow a very meandering course. They are histologically composed of endothelium supported by weakly organized muscle and collagen fibers. In contrast, intercoronary connections are usually single, straight, have a greater diameter (>1 mm), and present histological characteristics parallel to an extramural coronary artery with a distinct muscular layer.^[1,5] They are rarely seen during coronary angiography, and usually connect the RCA and circumflex artery.^[6,7] Connections between the RCA and LAD are relatively rare.^[1,8] In our case, there was a large continuity between the RCA and LAD in the presence of a complete LAD occlusion, resembling a coronary collateral. This entity, also known as “open-ended coronary circulation pattern” is considered to be protective for the myocardium against occlusive coronary damage.

Gavrielatos et al.^[1] presented a similar case of intercoronary connection between the LAD and RCA, having an obstructive lesion but no evidence for myocardial infarction. In their case, resting electrocardiography and myocardial perfusion scan indi-

cated latent myocardial ischemia for which no exact mechanism could be deduced. In our case, in spite of the total proximal occlusion of the LAD, no sign of myocardial ischemia was detected after successful percutaneous coronary intervention and stenting of the circumflex artery. Moreover, echocardiography showed normal left ventricular systolic function and there was no clinical sign of myocardial infarction. Kursaklıoğlu et al.^[9] reported a case of intercoronary connection between the RCA and circumflex artery with unidirectional flow, in which selective injection of the right coronary artery showed retrograde filling only of the circumflex artery, but left coronary injection did not fill the RCA. In our case, coronary artery bypass grafting surgery could be an alternative to percutaneous coronary intervention because a proximal graft to LAD would provide a more physiological anterograde perfusion of the LAD territory. However, it was thought that a graft to LAD might be nonfunctional and be occluded early because of the flow through the intercoronary connection. We thought that the retrograde flow in our case might cause graft failure so only percutaneous coronary intervention for the circumflex artery was preferred for the treatment.

The congenital connection in our patient served as a safety valve and provided significant protection of the occluded LAD territory. In the setting of coronary artery disease, these congenital anomalies may have a potential protective role for the left ventricle.

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