Coronary microvascular dysfunction equivalent to left main coronary artery disease

Sol ana koroner arter hastalığı eşdeğeri mikrovasküler fonksiyon bozukluğu

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Özet—Koroner mikrovasküler fonksiyon bozukluğu (Kardiyak Sendrom X), koroner arterlerde önemli darlık olmadan, miyokart iskemisi kanıtı ile birlikte tipik anjina ile seyreden bir klinik tablodur. Miyokart iskemisi şüphesi ile yapılan koroner anjiyografilerin %50'si normal ya da normal yakın bulunmaktadır. Burada, efor testinde sol ana koroner hastalığı veya çok damar hastalığı düşündüğünde hipotansiyon ve ST segment çökmesi saptanan, ancak koronar anjiyografisi normal olan, koroner akım rezervi ölçümlerinde ciddi mikrovasküler fonksiyon bozukluğu saptanan bir hasta sunuldu.

Summary—Coronary microvascular dysfunction, also known as cardiac syndrome X, is a clinical syndrome presenting with typical angina and evidence of myocardial ischemia in the absence of flow-limiting stenosis on coronary angiography. Of patients undergoing coronary angiography due to suspected myocardial ischemia, 50% are found to have normal or near-normal coronary arteries. Described in this case report is a patient who developed hypotension and ST segment depressions during treadmill exercise test. Left main coronary artery or multivessel disease was suspected. Coronary angiography was normal, but coronary flow reserve measurement revealed severe microvascular dysfunction.

Coronary microvasculature has not been explored very much, as conventional imaging techniques provide insufficient information; however, new methods for assessing microcirculation are also now in use. Patients who have normal coronary arteries with typical angina or angina-like symptoms can be examined for coronary microvascular dysfunction with these functional assessment techniques.

Presently described is a case of extreme form of microvascular dysfunction.

CASE REPORT

A 62-year-old man who had type 2 diabetes mellitus for 12 years in addition to hypertension, and who had been in follow-up for 20 years, presented at our hospital with dizziness and grayout after exertion. His symptoms had become more frequent in the month prior to presenting and began after climbing even 1 flight of stairs. His neurological examination, carotid Doppler ultrasonography, and cranial magnetic resonance imaging results were normal. Echocardiography was also normal, except for mild left ventricular hypertrophy and grade 1 diastolic dysfunction. There was no sign of hypertrophic cardiomyopathy.

An exercise stress test was performed with modified Bruce protocol to evaluate for ischemia and hemodynamic response to exertion. Horizontal ST depression on inferolateral derivations and ST elevation on aVR were seen at the fifth minute of the test. When
he reached 70% of his target heart rate at the ninth minute, dizziness and grayout occurred and the test was terminated (Figure 1). Blood pressure was 117/78 bpm at baseline and dropped to 85/55 bpm at the ninth minute. Hypotension after exertion and early ST depressions and ST elevation on aVR were thought to perhaps have been caused by left main coronary artery or multivessel disease. Coronary angiography was performed and revealed that coronary arteries were normal (Figures 2a, b; Videos 1–3). Invasive coronary flow reserve (CFR) was performed for differential diagnosis of microvascular dysfunction.

Invasive CFR findings were left anterior descending (LAD) artery value of 1.62, circumflex artery value of 4, and right coronary artery value of 4. Diagnosis was myocardial microvascular dysfunction involved heterogeneously in the myocardia of the left ventricle that was limited to the area of LAD artery.

**DISCUSSION**

Coronary microvascular dysfunction (CMD), also known as cardiac syndrome X, is typically angina with evidence of myocardial ischemia in the absence of obstructive coronary artery disease.
of flow-limiting stenosis on a coronary angiography.\cite{1} Some 50% of patients who undergo coronary angiography for suspected myocardial ischemia are found to have normal or near-normal coronary arteries.\cite{2} CMD often leads to a patchy distribution, rather than the limited area of ischemia typically seen in coronary artery disease.

What makes the present case interesting is CMD confined to LAD territory, as seen in obstructive coronary artery disease, and hypotension on stress test as in left main coronary artery or multivessel coronary disease, without any significant stenosis.

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*Supplementary video file associated with this article can be found in the online version of the journal.

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