

Coronary microvascular dysfunction equivalent to left main coronary artery disease

Sol ana koroner arter hastalığı eşdeğeri mikrovasküler fonksiyon bozukluğu

Cafer Pañç¹, M.D., Mehmet Kocaağa², M.D., Onur Erdoğan¹, M.D.,
Remzi Sarıkaya¹, M.D., Sabahattin Umman¹, M.D.

¹Department of Cardiology, İstanbul University İstanbul Faculty of Medicine, İstanbul, Turkey

²Department of Cardiology, Yalova State Hospital, Yalova, Turkey

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.

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

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 gayout 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

Abbreviations:

CFR	Coronary flow reserve
CMD	Coronary microvascular dysfunction
LAD	Left anterior descending

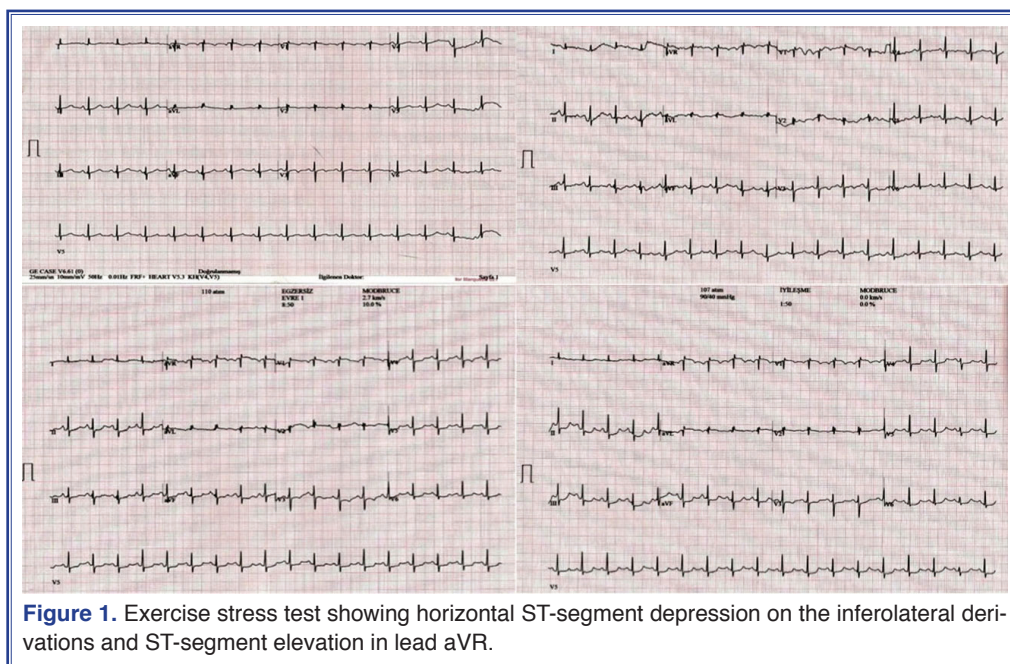
Received: June 27, 2016 Accepted: October 31, 2016

Correspondence: Dr. Cafer Pañç, İstanbul Üniversitesi İstanbul Tıp Fakültesi, Kardiyoloji Anabilim Dalı, İstanbul, Turkey.

Tel: +90 212 - 414 20 20 e-mail: caferpanc@gmail.com

© 2017 Turkish Society of Cardiology



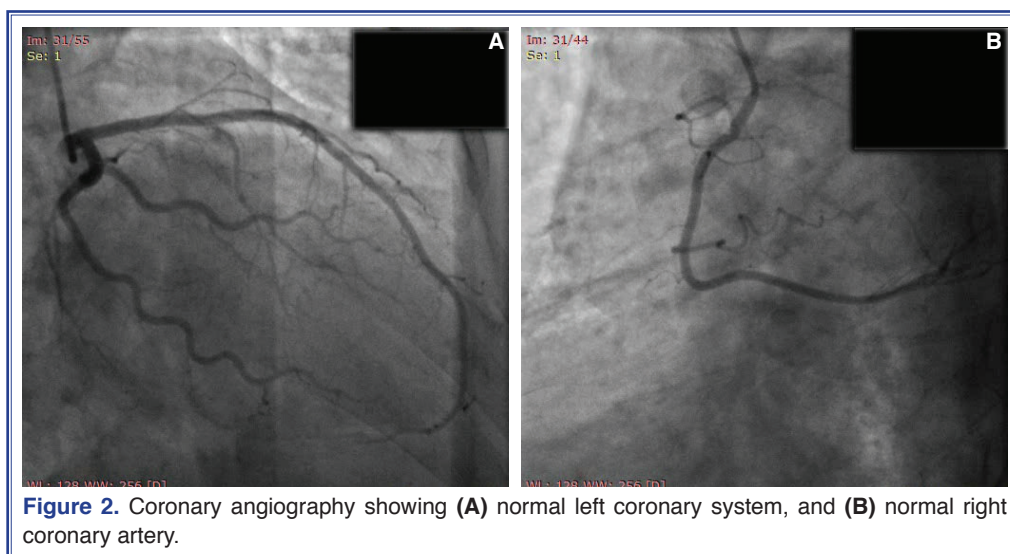


he reached 70% of his target heart rate at the ninth minute, dizziness and grayout occurred and the test was terminated (Figure 1). Blood pressure was 117/78 bpm at baseline and dropped to 85/55 bpm at the ninth minute. Hypotension after exertion and early ST depressions and ST elevation on aVR were 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 flow-limiting stenosis on a coronary angiography.^[1] Some 50% of patients who undergo coronary angiography for suspected myocardial ischemia are found to have normal or near-normal coronary arteries.^[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.

Conflict-of-interest issues regarding the authorship or article: None declared.

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

REFERENCES

1. Herrmann J, Kaski JC, Lerman A. Coronary microvascular dysfunction in the clinical setting: from mystery to reality. *Eur Heart J* 2012;33:2771–82. [CrossRef]
2. Ong P, Athanasiadis A, Borgulya G, Mahrholdt H, Kaski JC, Sechtem U. High prevalence of a pathological response to acetylcholine testing in patients with stable angina pectoris and unobstructed coronary arteries. The ACOVA Study (Abnormal COronary VAsomotion in patients with stable angina and unobstructed coronary arteries). *J Am Coll Cardiol* 2012;59:655–62. [CrossRef]

Keywords: Coronary flow reserve; coronary microvascular dysfunction; normal coronary arteries.

Anahtar sözcükler: Koroner akım rezervi; koroner mikrovasküler fonksiyon bozukluğu; normal koroner arterler.