

A case of simultaneous anterior, inferior, and right ventricular ST-segment elevation myocardial infarction due to occlusion of the wrapped left anterior descending coronary artery

Apeksi sarmalayan sol ön inen koroner arter darlığına bağlı olarak gelişen anterior, inferior ve sağ ventrikül ST-segment yükselmeli miyokard infarktüsü

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Simultaneous anterior, inferior, and right ventricular ST-segment elevation myocardial infarction is an unusual condition. A 50-year-old male patient presented with severe, squeezing chest pain of an hour onset. ST-segment elevations were detected in all precordial derivations, DII, DIII, aVF and V3R, V4R. Coronary angiography showed a significant lesion in the left anterior descending (LAD) coronary artery, just below the second diagonal branch. Balloon predilatation was performed after 40 minutes of admission, followed by bare metal stent implantation, which resulted in ST-segment resolution in all leads and relief of chest pain. Echocardiography showed dyskinesia of the left ventricular apical wall, and hypokinesia of the interventricular septum and inferior wall. Left ventricular ejection fraction was 40%. Coronary angiography and cardiac CT angiography demonstrated a wrapped LAD. The patient was discharged five days after percutaneous coronary intervention (PCI) with stabilization of his clinical status. Ten days after PCI, he presented with chest pain associated with left ventricular anterior and inferior reinfarction. Successful balloon dilatation was performed for thrombotic in-stent restenosis. His clinical condition improved and he was asymptomatic for a month, during which no signs of deterioration were observed in electrocardiographic and echocardiographic findings.

Key words: Coronary angiography; echocardiography; electrocardiography; myocardial infarction/physiopathology.

Acute anterior myocardial infarction (MI) is usually accompanied by elevation in leads V1-V6, and reciprocal depression in leads DII, DIII, and aVF. In some cases, simultaneous ST-segment elevations may be seen. Herein, we reported a patient with anterior, inferior, and right ventricular ST-segment elevation

Elektrokardiyografik olarak anterior, inferior ve sağ ventrikül derivasyonlarında eşzamanlı olarak görülen ST-segment yükselmesi nadir bir durumdur. Elli yaşında bir erkek hasta, bir saat önce başlayan ağır, sıkıştırıcı göğüs ağrısıyla başvurdu. Tüm prekordiyal derivasyonlarda, DII, DIII, aVF ve V3R, V4R'de ST-segment yükselmesi izlendi. Koroner anjiyografide, sol ön inen (LAD) koroner arterde, ikinci diyagonal dalın hemen altında, ciddi darlık görüldü. Başvurudan 40 dakika sonra, balonla genişletme ardından darlık bölgesine düz metal stent yerleştirildi ve tüm derivasyonlarda ST-segment çökmesi ve göğüs ağrısında yatışma izlendi. Ekokardiyografide, sol ventrikül apikal duvarında diskinezi, interventriküler septum ve inferior duvarda hipokinezi saptandı; sol ventrikül ejeksiyon fraksiyonu %40 idi. Tekrarlanan koroner anjiyografide ve BT anjiyografide LAD'nin apeksi sarmaladığı görüldü. Klinik durumu normalleşen hasta perkütan koroner girişimden beş gün sonra taburcu edildi. Ancak, girişimden 10 gün sonra, tekrarlayan sol ventrikül anterior ve inferior infarktisi nedeniyle yeniden yatırıldı. Trombotik stent içi darlık başarılı balon genişletme ile giderildi. Hastanın klinik durumu düzeldi ve bir aylık izleminde herhangi bir semptom izlenmedi; elektrokardiyografi ve ekokardiyografi bulgularında kötüleşmeye rastlanmadı.

Anahtar sözcükler: Koroner anjiyografi; ekokardiyografi; elektrokardiyografi; miyokard infarktüsü/fizyopatoloji.

MI caused by occlusion of the left anterior descending (LAD) coronary artery.

CASE REPORT

A 50-year-old, previously healthy male was referred to our emergency service with severe, squeezing

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chest pain of an hour onset. He was a smoker with two packs of cigarettes a day for 30 years. He had hypertension, but he did not take any medications. On physical examination, blood pressure was 160/80 mmHg, heart rate was 100/min. ST-segment elevations were detected in all precordial derivations, DII, DIII, aVF and V3R, V4R (Fig. 1). Troponin and CK-MB levels were 30 times and seven times higher than the normal limits, respectively, during the first 24 hours of admission. Laboratory findings including high-density lipoprotein, low-density lipoprotein, urea, creatinine, hemoglobin, leukocyte, serum iron, liver enzymes, bilirubin, and thyroid hormones were normal.

Treatment with aspirin 300 mg (p.o.), clopidogrel 600 mg (p.o.), and 7,500 IU bolus intravenous heparin was initiated. Coronary angiography showed a significant lesion in the LAD, just below the second diagonal branch. The right coronary artery was normal. Despite an insignificant lesion, there was TIMI-3 flow in the left circumflex artery.

Balloon predilatation (2.0-20 mm) was performed within 40 minutes of admission, followed by bare metal stent implantation (2.5-19 mm, Clearflex, Clearstream Technologies, Ireland) in the LAD just below the second diagonal branch. Percutaneous coronary intervention (PCI) resulted in ST-segment resolution of more than 70% in all leads and relief of chest pain. Heparin and tirofiban were infused at effective doses. His medications were continued with aspirin, angiotensin-converting enzyme inhibitor, beta-blocker, nitrate, and clopidogrel. Echocardiography showed dyskinesia of the left ventricular apical wall, and hypokinesia of the interventricular septum and inferior wall. Left ventricular ejection fraction was 40%. Coronary angiography (Fig. 2) and cardiac CT angiography (Fig. 3) demonstrated a wrapped LAD with a winding course around the apex and inferior wall of the left ventricle and partially the right ventricle. The patient was discharged five days after PCI with stabilization of his clinical status.

Ten days after PCI, he presented to the emergency service with chest pain associated with left ventricular anterior and inferior reinfarction. He was taken to emergency coronary angiography and successful balloon dilatation was performed for thrombotic in-stent restenosis. His clinical condition improved after adjustment of his medical treatment. The patient was asymptomatic for a month, during which no signs of deterioration were observed in electrocardiographic and echocardiographic findings.

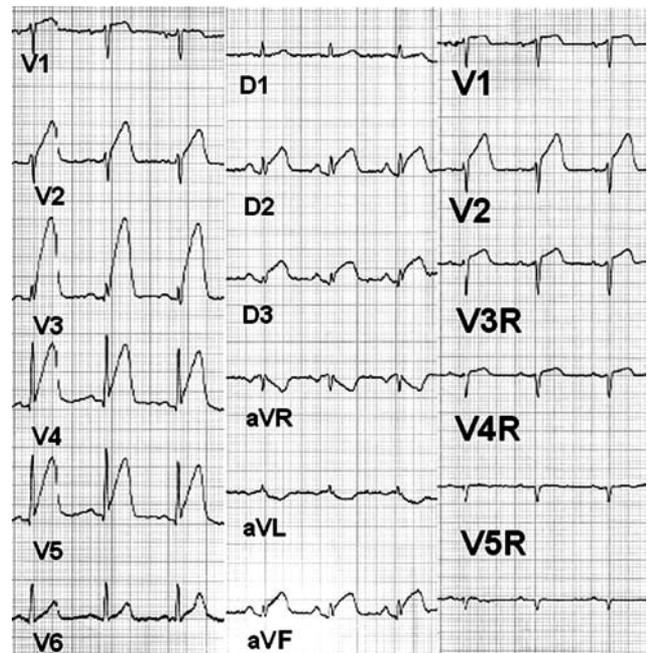


Figure 1. Admission electrocardiogram of the patient showing ST-segment elevations in precordial, inferior, and right ventricular leads.

DISCUSSION

Simultaneous anterior, inferior, and right ventricular ST-segment elevations in acute MI is an unusual condition. Its clinical implications have rarely been reported. It may be associated with either the presence of a wrapped LAD occluded below the first



Figure 2. Angiogram in the left anterior oblique projection showing significant stenosis in the wrapped left anterior descending coronary artery.

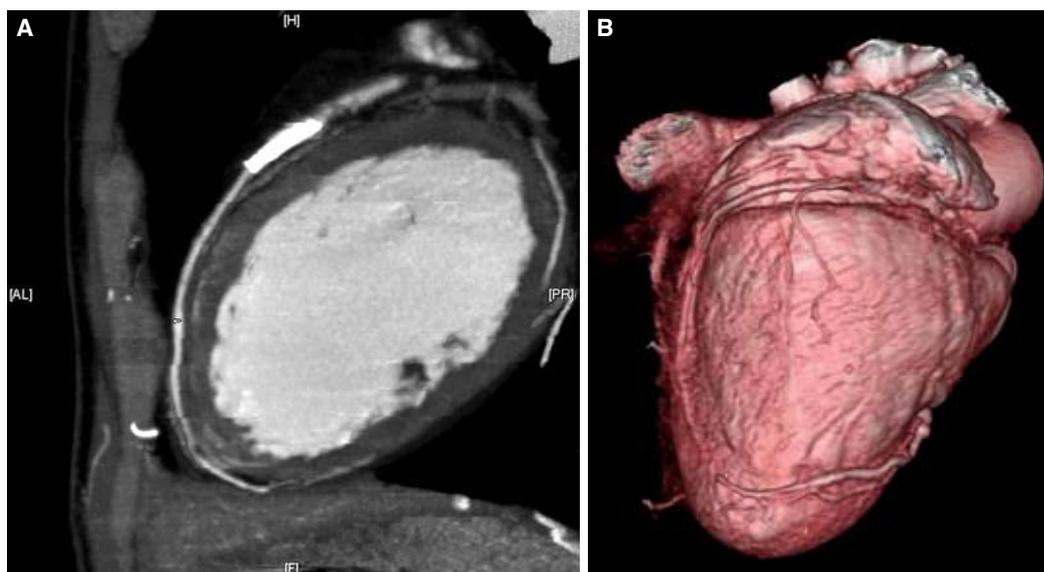


Figure 3. The course of the left anterior descending coronary artery by (A) multislice CT angiography and (B) three-dimensional volume rendered reconstruction.

diagonal branch or combination of a nonwrapped LAD with circumflex/right coronary artery stenosis.^[1] Inferior ST-segment elevation during anterior acute MI may result from two conditions acting together: the presence of a relatively small mass of ischemic anterior wall myocardium, resulting in a weaker anterior injury current and less reciprocal inferior ST-segment depression, and accompanying inferior wall transmural ischemia that further shifts the inferior ST-segments upward.^[2]

Yip et al.^[3] analyzed 37 patients with simultaneous ST-segment elevation in the precordial and inferior leads. They found that, in patients with a wrapped LAD occlusion, the mean sum of inferior ST-segment elevations was 3 mm and that these patients usually had single-vessel disease and a favorable clinical outcome. However, in patients with a nonwrapped LAD occlusion, the mean sum of inferior ST-segment elevations was 11 mm and these patients often had more serious clinical presentations and unfavorable clinical outcomes.^[3]

In our case, the occlusion was below the second diagonal branch of the wrapped LAD, and there were anterior, inferior, and right ventricular ST-segment

elevations. Despite emergency PCI, left ventricular systolic function deteriorated possibly due to myocardial stunning and to the development of thrombotic in-stent restenosis. Further studies are required to define clinical implications of electrocardiographic ST-segment manifestations and to elucidate the association between the severity of vascular occlusions and flow patterns.

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