

Traumatic Coronary Artery Dissection in a Young Woman after a Kick to Her Back

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We present the case of a 38-year-old woman admitted to our outpatient clinic with accelerating back pain and fatigue following a kick to her back by her husband. Upon arrival, we detected ST segment elevation in the D1, aVL, and V2 leads and accelerated idioventricular rhythm. She had pallor and hypotension consistent with cardiogenic shock. We immediately performed coronary angiography and found a long dissection starting from the mid-left main coronary artery and progressing into the mid-left anterior descending (LAD) and circumflex arteries. She was then transferred to the operating room for surgery. A saphenous vein was grafted to the distal LAD. Since the patient was hypotensive under noradrenaline and dopamine infusions, she was transferred to the cardiovascular surgery intensive care unit on an extracorporeal membrane oxygenator and intra-aortic balloon pump. During follow-up, her blood pressure remained low, at approximately 60/40 mmHg, despite aggressive inotropic and mechanical support. On the second postoperative day, asystole and cardiovascular arrest quickly developed, and despite aggressive cardiopulmonary resuscitation, she died.

Key words: 1. Coronary
2. Back
3. Dissection
4. Kick
5. Traumatic

CASE REPORT

A 38-year-old woman was admitted to our outpatient clinic with accelerating back pain and fatigue following a kick to her back by her husband two days previously. On her physical examination, an ecchymotic area on her back between the scapulae was observed. She had pallor, her blood pressure was 80/60 mmHg in both arms, and was tachycardic on auscultation. ST segment elevations were observed in the D1,

aVL, and V2 leads, along with accelerated idioventricular rhythm (Fig. 1). Transthoracic echocardiography demonstrated akinesia of the anterior septal, apical, basal-mid septal, and basal-mid anterior walls, and her ejection fraction was 20%. She was immediately transferred to the catheterization unit. We performed coronary angiography after introducing a 6-Fr sheath through the right femoral artery. We detected a dissection of the left main artery, the left anterior descending artery (LAD), and the circumflex artery, originating from the

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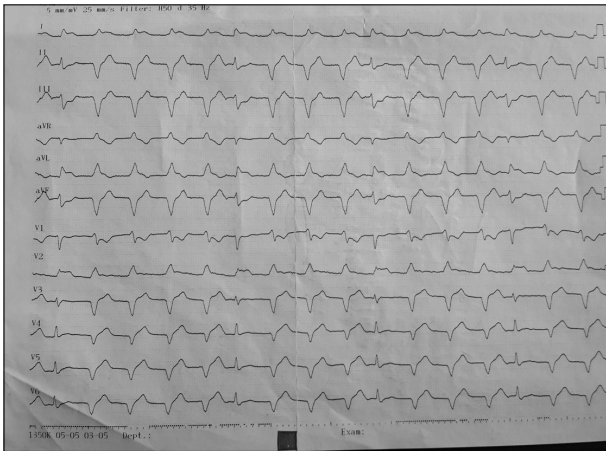


Fig. 1. Electrocardiogram of the patient on admission.



Fig. 2. Coronary angiography showing the dissection (anteroposterior view with cranial angulation).

middle portion of the left main coronary artery (LMCA) (Figs. 2 and 3, Supplemental Videos 1, 2). After emergency cardiovascular surgery consultation, she was transferred to the operation room. A saphenous vein was grafted to the distal LAD. During the intraoperative evaluation of the epicardial vessels, our team of cardiac surgeons did not plan to place a bypass graft to the circumflex artery because it was thin and non-dominant. Since the patient was hypotensive under norepinephrine and dopamine infusions, she was transferred to the cardiovascular surgery intensive care unit on an extracorporeal membrane oxygenator (ECMO) and intra-aortic

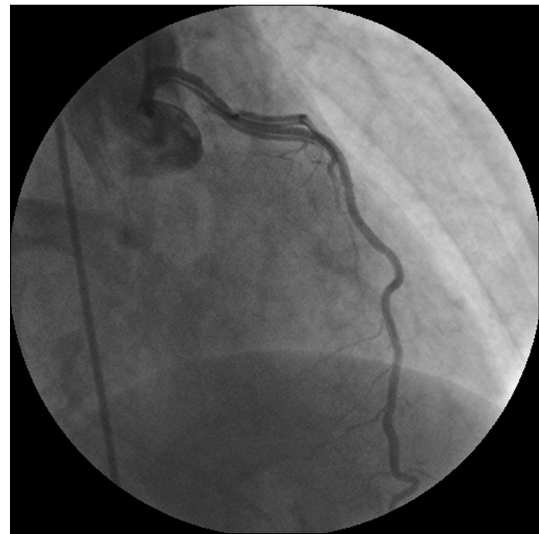


Fig. 3. Coronary angiography showing the dissection (right anterior oblique view).

balloon pump (IABP). During follow-up, her blood pressure remained low, at approximately 60/40 mmHg, despite aggressive inotropic and mechanical support. On the second postoperative day, although the patient's LAD artery had been revascularized by a saphenous vein graft, her left ventricular ejection fraction remained as low as 10%–15%, leading to ventricular failure. Asystole and cardiovascular arrest then quickly developed, and despite aggressive cardiopulmonary resuscitation, she died.

DISCUSSION

Coronary artery dissection after blunt chest trauma is an extremely rare condition that can be fatal, and some cases are detected in postmortem examinations [1]. Left main coronary artery dissection is even rarer [2]. Multiple mechanisms exist leading to coronary artery dissection, including intimal tears due to a deceleration injury, compression of the artery between the heart and sternum, coronary spasm, and impairment of the coronary flow by a dissection flap or a superimposed thrombosis [3]. Coronary artery dissection is detected most commonly in the LAD (76%), the right coronary artery (12%), and the circumflex artery (6%) [4,5]. In necropsy series, the most common cause of acquired non-atherosclerotic coronary artery disease is spontaneous coronary artery dis-

section, and the LAD is the artery in which this condition is most commonly detected [6]. The risk factors for spontaneous coronary artery dissection are exercise, arteriosclerosis, cardiovascular disease, oral contraceptive use, Marfan syndrome, systemic lupus erythematosus, and connective tissue disorders [7]. Our patient did not have any of these risk factors.

Patients with coronary artery dissection are usually admitted with myocardial infarction and sudden death. Early detection is crucial in order to provide adequate treatment. However, the time from injury to coronary artery occlusion may vary, ranging from immediately after the trauma to five weeks later [3]. Our patient was admitted to our clinic two days after the trauma. Bedside electrocardiography (ECG) provides important clues about coronary artery dissection after blunt anterior chest and back trauma. It has been previously reported that patients with baseline ECG changes [7] on admission should be monitored for 24 hours. The ECG may be normal on presentation, but was found to demonstrate ST abnormalities in 63% of patients who are admitted for blunt thoracic trauma within 24 hours of observation. Only 2% of such patients showed ST segment elevation [8]. Our patient presented with ST segment elevation in the D1, aVL, and V2 leads, along with accelerated idioventricular rhythm.

Some emergency therapeutic options exist for patients with spontaneous coronary artery dissection. In some previous case reports, the patients were managed by primary percutaneous coronary angioplasty, especially patients without LMCA lesions [9]. Medical therapy with anticoagulants has also been utilized with successful outcomes [9]. However, surgical treatment remains most common treatment and is associated with the best outcomes. Unfortunately, surgical treatment was not successful in our patient. An internal mammary artery graft was not utilized in our patient, because she was in cardiogenic shock, and the surgical team tried to save time by using a saphenous vein graft. In order to prevent death, all available measures were used by our surgical team, including intravenous inotropic agents, IABP, and ECMO. Nevertheless, using the internal mammary artery for revascularization may have been more effective for restoring left ventricular function. Additionally, complete revascularization, including the circumflex artery, may have been helpful in our patient.

In conclusion, spontaneous coronary artery dissection is a

rare and potentially fatal complication of blunt chest trauma in younger patients, and early diagnosis and prompt treatment can be life-saving. Physicians should be aware of this possibility when evaluating patients in emergency conditions after blunt trauma of any kind. The 12-lead ECG, cardiac biomarkers, and transthoracic echocardiography, along with other imaging modalities, are important in the management of suspected coronary artery dissection in trauma patients.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

SUPPLEMENTARY MATERIALS

Supplementary materials can be found via <http://dx.doi.org/10.5090/kjtcs.2015.48.4.281>. Video 1. Coronary angiography showing the dissection (left anterior oblique view). Video 2. Coronary angiography showing the dissection (right anterior oblique view).

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