Case Reports

A Case of Blunt Chest Trauma Induced Acute Myocardial Infarction Involving Two Vessels

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SUMMARY

Blunt chest trauma rarely induces acute myocardial infarction. We report a 36-year-old man who suffered from blunt trauma to the anterior chest wall while operating a punching machine. This case is the first report of simultaneous blunt chest trauma to the left anterior descending artery and left circumflex artery. The patient was treated surgically and discharged without any serious sequela. Early detection of the lesion site is important with regard to selecting the appropriate treatment strategy in patients with coronary injury caused by blunt chest trauma. Routine 12-lead electrocardiography and serial cardiac enzyme evaluation are necessary in every patient with chest trauma because they supply crucial information about the extent of cardiac damage. Treatment with primary angioplasty or bypass surgery should be based on the characteristics of the lesion and the associated problem. (Int Heart J 2006; 47: 639-643)

Key words: Blunt trauma, Chest contusion, Acute myocardial infarction

BLUNT chest trauma can cause injury to the heart and great vessels. Autopsy studies have revealed that the incidence of coronary artery injury secondary to blunt chest trauma is about 2%.¹⁾ Only 2 cases have been reported in which blunt chest trauma affected 2 coronary arteries simultaneously.^{1,2)} One of those 2 cases was the right coronary artery (RCA) with the left anterior descending (LAD) coronary artery, and the other one was the RCA with the left main coronary artery.^{3,4)} This is the first report of blunt chest trauma affecting the left circumflex (LCx) coronary artery and LAD simultaneously without causing aortic injury.

CASE REPORT

A 36-year-old male suffered from blunt trauma to the anterior chest wall while operating a punching machine. There was no previous history of heart dis-

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Figure 1. Electrocardiogram showing an acute extensive anterolateral myocardial infarction with Q wave formation and convex ST segment elevation in leads V₁ to V₆ and AVL, and reciprocal ST segment depression in leads II, III, and AVF

Figure 2. Computed tomography shows lung contusion (arrowheads) over retrosternal area.

ease or risk factors of coronary artery disease. He was transferred from a local hospital to our emergency department because of shock and persistent chest pain. On physical examination, his blood pressure was 82/44 mmHg and his heart rate was 78 beats per minute. Ecchymosis over the anterior chest wall was noted. Chest x-rays revealed pulmonary congestion without bone fracture. An electrocardiogram (ECG) showed a sinus rhythm with Q wave formation and a convex ST segment elevation from V₁ to V₆ and AVL, and reciprocal ST segment depression in leads II, III, and AVF (Figure 1). Creatine phosphokinase (CPK) was 586 IU with a 6.6% creatine kinase MB (CK-MB) isoenzyme fraction and a troponin I level of 2.51 ng/mL. Transthoracic echocardiography demonstrated hypokinesia to akinesia on the anteroseptal and lateral walls of the left ventricle, no pericardial effusion, and no aortic regurgitation. Chest computed tomography

Figure 3. Left coronary angiogram (left anterior oblique view) showing total occlusion of LAD (arrowhead), and dissected flap with thrombi filling defect from orifice of LCx (arrow).

showed lung contusion over the retrosternal area (Figure 2), no aortic dissection, and no bone fracture. The preliminary diagnosis was chest contusion with acute anterolateral myocardial infarction (MI). Coronary angiography showed total occlusion of the LAD, dissected flap with thrombi filling defect from the orifice of LCx, and a normal RCA (Figure 3). An intra-aortic balloon pump was inserted and the patient underwent emergency bypass surgery. Two vein grafts were connected to the LAD and the LCx, respectively. The patient was discharged without any sequelae. Follow-up 3 months later revealed no signs of heart failure.

DISCUSSION

A variety of cardiac injuries resulting from blunt chest trauma have been reported, such as cardiac arrhythmia, septal damage, valve damage, myocardial contusion, cardiac rupture, coronary artery damage, and myocardial infarction. However, coronary damage resulting in MI is a rare complication of blunt trauma. Autopsy studies have reported that the incidence of coronary artery injury secondary to blunt chest trauma is about 2%.¹⁾ In a comprehensive literature review, Christensen, *et al* reported that blunt chest trauma induced acute MI in 77 patients.²⁾ Although traumatic coronary injury is a rare complication after blunt chest trauma, it carries a high risk of mortality. Although the LAD is commonly injured, our case (2 vessels) is very rare.^{5,6)} To our knowledge, only 2 cases in which blunt chest trauma led to injury of 2 major vessels have been reported.^{3,4)}

This is the first report of blunt chest trauma which simultaneously affected the LCx and LAD without causing aortic injury. Traumatic coronary injuries that can result in MI after blunt chest trauma include dissection of the coronary artery, thrombus, focal spasm, vessel rupture, and coronary embolism. The mechanism which leads to vascular injury may be direct contusion, or an acceleration/deceleration force.^{7,8)} Based on the anatomical location, the RCA should have the highest possibility of injury by the mechanism of direct contusion. However, the RCA was not affected in our patient. It is most probable that dramatic acceleration/deceleration forces led to an intimal dissection especially in the bifurcation regions of the vessels in our patient.

Early detection of the lesion site is important in the management of posttraumatic MI. Only 13% of patients with posttraumatic MI underwent a coronary angiogram less than 24 hours posttrauma.²⁾ Angina of posttraumatic MI is usually confused with local chest injury or myocardial contusion.¹⁾ Routine 12-lead ECG and cardiac enzymes have been suggested for every patient with blunt chest trauma. An echocardiogram should be performed if warranted by the clinical situation.¹⁾

Posttraumatic MI is normally managed by either emergency coronary angioplasty^{9,10)} or bypass surgery.¹¹⁾ Thrombolytic therapies have also been reported,^{12,13)} however, the tendency for bleeding in the target organ limits their use in posttraumatic MI. Emergency coronary angioplasty is effective in single, simple lesions not affected by other organ injuries. It is a short procedure, results in only a minor wound, and involves minimal hospitalization. However, our patient presented with bilateral pulmonary contusion and a complex coronary lesion involving both ostiums of the LAD and the LCx. Bypass surgery may be a safer procedure than other therapies for managing posttraumatic MI.

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