Prolapse of Aortic Intimal Flap Into the Left Ventricle
— A Rare Cause of Global Myocardial Ischemia in Acute Type A Aortic Dissection —

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A 62-year-old woman experienced an acute type A aortic dissection complicated with profound shock caused by acute myocardial ischemia. Intraoperative transesophageal echocardiography (TEE) identified a circumferentially dissected intimal flap at 5.5 cm above the aortic valve, prolapsing into the left ventricle through the aortic valve during diastole and obstructing both coronary ostia. Acute aortic dissection must be kept in mind when presented with myocardial ischemia and TEE is the most useful method for detecting a prolapsing cylindrical intimal flap. (Circ J 2006; 70: 214–215)

Key Words: Acute type A aortic dissection; Aortic regurgitation; Circumferential dissection; Myocardial ischemia; Proximal prolapse of intimal flap

Acute myocardial ischemia caused by dissection of the coronary ostium is a well-known complication associated with acute type A aortic dissection. We report another condition of lethal global myocardial ischemia associated with acute aortic dissection, in which a long intimal flap prolapsed into the left ventricle during diastole. This rare condition caused acute aortic regurgitation in addition to global coronary artery hypoperfusion.

Case Report

A 62-year-old woman, who was 150 cm tall and weighed 55 kg without a particular family history but with a history of hypertension and bronchial asthma, experienced sudden chest discomfort at home. She lost consciousness and stopped breathing. Her husband administered external cardiac compression and the patient regained consciousness and was brought to a local hospital. Electrocardiography showed ST-segment depression in leads I, II, aVL, aVF and V3–6, suggesting global myocardial ischemia (Fig 1). Trans-thoracic echocardiography (TTE) identified a dilated aortic root and moderate aortic regurgitation, and contrast computed tomography (CT) confirmed aortic dissection from the ascending aorta to the abdominal aorta. The patient then experienced complete atrioventricular block accompanied by bradycardia, and temporary pacing was therefore performed. She was transferred to Fukushima University Hospital approximately 4 h after the onset.

On admission, she was in profound shock with a blood pressure of 62/38 mmHg with a pacing rhythm of 70 beats/min. The patient was slightly responsive to painful stimuli. High-dose inotropic support was necessary to maintain blood pressure. The patient was intubated and emergency surgery was performed. The preoperative creatine kinase level was elevated to 190 U/L.

Intraoperative transesophageal echocardiography (TEE) was performed (Fig 2). At approximately 5.5 cm above the aortic valve, a circumferentially dissected intimal flap was observed to be prolapsing into the left ventricle through the aortic valve during the diastolic phase, obstructing both coronary ostia. Cardiac contractions were globally impaired with a left ventricular ejection fraction of 0.31. The ascending aorta was opened during ascending aorta replacement, the intima was circumferentially dissected and the transverse intimal tear extended all the way around 5.5 cm above the aortic valve, to where the cylindrical flap was present above the coronary ostium. The coronary ostia and aortic valve displayed no obvious abnormalities. Unfortunately, the patient died on the 8th postoperative day from low output syndrome despite the use of a left ventricular assist system. Postoperative pathological analysis of the dissected aortic wall revealed cystic medial necrosis.

Discussion

Only 3 cases of acute circumferential dissection of the ascending aorta with a cylindrical intimal flap invaginating into the aortic root have been reported in the English literature, and of these, 2 cases were accompanied by shock caused by the myocardial ischemia from obstruction of the coronary ostium during diastole2–3 and the other case presented with acute heart failure caused by severe aortic regurgitation.

In those previous reports, the longest length of the prolapsing intimal flap was approximately 3 cm, and these short flaps just reached into the left ventricular outflow tract, which induced myocardial ischemia or aortic regurgitation. Myocardial ischemia was induced by incomplete inversion of the flap, which became entangled with the...
aortic valve during diastole\textsuperscript{2,3} whereas aortic regurgitation appeared to be caused by complete flap inversion\textsuperscript{4} However, the present patient presented with both myocardial ischemia and aortic regurgitation. In this rare case, the length of the prolapsing intimal flap was 5 cm, which is the longest yet reported, and reached into the middle of the left ventricular cavity, probably causing the myocardial ischemia by completely blocking the coronary ostium during diastole.

Diagnosing this rare pathology was quite difficult. In the previous reports\textsuperscript{2,3} myocardial infarction was suspected from changes on electrocardiography, which was followed by fibrinolytic therapy or emergency coronary angiography. In all cases, including the present, TEE was the most useful method for detecting prolapse of a cylindrical intimal flap into the left ventricle. The previous reports\textsuperscript{2–4} suggested that TTE was not useful in diagnosing acute aortic dissection showing such pathology because of the poor acoustic window and in the present case we were unable to clearly observe the detailed configuration of an intimal flap on TTE. TEE is the better method for assessing the type of aortic root dissection and for examining abnormalities of the coronary ostia and aortic valves.

In conclusion, acute aortic dissection must be kept in mind when a patient presents with myocardial ischemia and shock. If the diagnosis is aortic dissection by CT, the patient should undergo surgery immediately and TEE should be performed under general anesthesia to determine the operative method.

References