Acetylcholine-Induced Coronary Spasm With a History of Kawasaki Disease
—— Case Report ——

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A 21-year-old woman without any known coronary risk factors was found at coronary catheterization to have normal coronary angiograms, but demonstrated acetylcholine (ACh)-induced coronary spasm. She had a history of Kawasaki disease (KD) at 19 months of age and, although coronary angiography was not performed at that time, no coronary aneurysms were detected by echocardiography. To the best of our knowledge, this is the first case report of ACh-induced coronary spasm associated with normal coronary angiograms in a young person with a history of KD. The findings suggest that subclinical, persistent coronary endothelial dysfunction may exist in this patient; furthermore, the dysfunction appears diffuse and might be unrelated to coronary aneurysm formation. The long-term significance of coronary endothelial dysfunction in patients with KD, as suspected by coronary spasm, remains unknown but may be an important risk factor for future atherosclerosis. (Circ J 2003; 67: 273–274)

Key Words: Acetylcholine; Coronary spasm; Endothelial dysfunction; Kawasaki disease

A 21-year-old woman had been treated for Kawasaki disease (KD) with only aspirin at the age of 19 months. On echocardiography, no coronary aneurysms were noted at that time. She had no risk factors for atherosclerosis, such as smoking, hypertension, diabetes mellitus, hyperlipidemia or obesity. Because she was very anxious about the possibility of coronary artery disease, she was admitted on October 25, 2000 to undergo cardiac catheterization. After obtaining written informed consent, cardiac catheterization was performed via the right femoral artery. Normal coronary angiograms of both the right and the left coronary arteries were observed (Fig 1A). Before intracoronary acetylcholine (ACh) infusion, a 0.014” Doppler guide wire (FloWire, JOMED, Rancho Cordova, CA, USA) was positioned at segment 7 of the left anterior descending artery.

During incremental ACh infusion to the left coronary artery (LCA), a 20μg infusion of ACh increased the averaged peak velocity from 25 cm/s pre-ACh infusion (Fig 2A) to 72 cm/s. However, significant diffuse spasm resulting in more than 99% stenosis at segments 7, 11, 12 and 13 and 100% occlusion at segment 8 of the LCA was provoked with 50μg of ACh (Fig 1B). Severe chest pain associated with significant ST segment depression in leads V3 to V6 was also elicited. Significant reduction in the average peak flow velocity (8.4 cm/s) was observed during intracoronary ACh infusion (Fig 2B). The normal diastolic dominant coronary flow pattern during pre-ACh infusion changed to a systolic dominant flow pattern during intracoronary ACh infusion. The LCA was subsequently dilated using an intracoronary infusion of nitroglycerin (Fig 1C), and averaged coronary flow velocity was increased to 29 cm/s (Fig 2C). The patient’s chest pain and ST segment depression also both disappeared immediately after nitroglycerin infusion.
Discussion

Endothelial dysfunction that is sufficiently severe to cause abnormal coronary vasomotion (including coronary spasm) has been suggested as an important risk factor for coronary atherosclerosis in the elderly. Similarly, coronary risk factors such as smoking, hypertension, hyperlipidemia, diabetes mellitus, obesity and aging, have been linked to endothelial dysfunction. Patients with a history of KD without coronary aneurysms have been described to have either no endothelial dysfunction or persistent endothelial dysfunction. Persistent endothelial dysfunction has also been described in patients with KD having a history of coronary aneurysms. KD may be an important risk factor for future atherosclerosis if persistent endothelial dysfunction exists in these patients, and especially if it begins at a young age.

We do not have unequivocal proof that the patient described here did not have coronary aneurysm(s) during the acute phase of KD, as coronary angiography was not performed at that time. It is well known that patients with KD may have angiographic regression of coronary aneurysms, later resulting in normal coronary artery angiograms. Intravascular ultrasound has been used to detect evidence for regressed coronary aneurysms; but we could not use it in this patient because she refused further study.

To the best of our knowledge, however, this is the first case report of ACh-induced coronary spasm in any patient with a history of KD, whether with or without a history of aneurysms. The precise anatomical extent of endothelial dysfunction in patients with KD has not been commented on reliably. The diffuse nature of the ACh-induced coronary spasm would argue for diffuse anatomical endothelial dysfunction in this patient, possibly secondary to KD-induced vasculitis, rather than more segmental dysfunction, such as from a previously undetected coronary aneurysm.

The long-term prognosis of KD-induced endothelial dysfunction, as well as its possible association with atherosclerosis, remains unknown. Identification and long-term follow up of patients with a history of KD and subclinical coronary endothelial dysfunction are needed to help answer these questions.

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References