Intracoronary Acetylcholine Provocation Test via Coronary Bypass Graft

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Asospastic angina is an important cardiac disorder that can induce acute coronary syndrome (ACS), ventricular arrhythmia, and sudden cardiac arrest. Although intracoronary acetylcholine (ACh) provocation test is a validated method to diagnose asospastic angina, little is known about ACh provocation via coronary bypass graft.

A 78-year-old Japanese man with rest angina was referred to the present institution. He had a history of hypertension and dyslipidemia, and had undergone coronary artery bypass grafting (CABG) at the age of 70. The left internal thoracic artery (LITA) had been grafted to the first diagonal branch, and saphenous vein grafts (SVG) had been grafted to graft the right coronary artery (RCA) and left circumflex artery (LCx). He took aspirin, angiotensin receptor blocker, and statin. At the current presentation his vital signs were normal, but an electrocardiogram (ECG) showed ST depression with negative T wave in leads V2–V4. Echocardiogram was normal, and cardiac troponin was not elevated. He then underwent urgent coronary angiography due to suspicion of non-ST-segment elevation ACS, which showed total occlusion in the proximal native left descending coronary artery (LAD) and LCx, and subtotal occlusion in the RCA, with all patent grafts. He was discharged with initiation of β-blocker therapy (carvedilol).

Two weeks after the event, he visited the emergency room with recurrent rest angina. ECG after relief of chest pain showed no specific abnormality. Thus, the patient was scheduled to undergo ACh provocation test. Although injection of 20 and 50 μg ACh into the SVG induced vasospasm in neither the SVG nor native coronary arteries (i.e., the RCA and LCx), increasing doses of 20, 50 and 100 μg ACh into the LITA provoked not LITA spasm but vasospasm in the distal LAD, accompanied by ECG change of ST depression with negative T wave in leads V2–V4 with chest pain (Figure). The patient was diagnosed with asospastic angina, and calcium channel blocker and long-acting nitrate were initiated. The post-discharge clinical course...
was uneventful, and the rest angina never recurred.

This case report illustrates that recurrent rest angina can be safely diagnosed on ACh provocation test via coronary bypass graft, leading to the appropriate medical treatment.

Recently, there has been growing interest in non-obstructive coronary artery disease, of which vasospastic angina represents an important cause. Although ACh provocation test for native coronary arteries is established to diagnose vasospastic angina, no previous study has reported, to our knowledge, ACh provocation via coronary bypass graft. The prevalence of vasospastic angina in patients with prior CABG is unknown, but approximately 40% of Japanese patients with angina have vasospastic angina. In addition, vasospastic angina can cause ACS, as in the present case. Therefore, ACh provocation test via coronary bypass graft may be useful in patients undergoing CABG with chest pain.

Increasing doses of ACh are prescribed for coronary spasm provocation according to the guidelines: 20 and 50 μg for the RCA, and 20, 50 and 100 μg for the left coronary artery (LCA). In the present case, 20 and 50 μg ACh were administered into the RCA and LCx via the SVG, and 20, 50 and 100 μg into the LAD via the LITA. Although the appropriate injection doses of ACh for coronary bypass graft are unclear, higher doses of ACh such as 80 μg for the RCA and 200 μg for the LCA have recently been demonstrated to be useful. Thus, injection doses of ACh via the LITA in the present case may be acceptable, and the test was performed without any complications.

Disclosures
The authors declare no conflict of interest.

References