Mid-Right Coronary Artery Spasm Diagnosed by an Ergometrine Provocation Test Through a Saphenous Vein Graft

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ABSTRACT

Although coronary artery spasm is a cause of acute coronary syndrome (ACS), demonstration of its possible cause in patients with a history of coronary artery bypass grafting remains challenging. We report a case of ACS that successfully provoked coronary artery spasm by pharmacological testing through a saphenous vein graft. (Level of Difficulty: Beginner.) (J Am Coll Cardiol Case Rep 2021;3:1203–5) © 2021 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

A 53-year-old Japanese man was referred to our institution because of recurrent chest pain at rest. The patient had a history of single-vessel coronary artery bypass grafting (CABG) (a saphenous vein graft [SVG] had been grafted to the right coronary artery [RCA]) 1 year prior to presentation caused by unsuccessful percutaneous coronary intervention for inferior acute myocardial infarction. His left coronary artery (LCA) was not affected at that time. On presentation, he was afebrile without any symptoms. His blood pressure was 118/76 mm Hg, heart rate was 91 beats/min, and oxygen saturation was 98% on room air. Physical examination revealed clear lung fields without heart murmurs. He was in sinus rhythm with a QS pattern in leads III and aVF, negative T waves in leads V1-5 on electrocardiogram (ECG), and positive cardiac troponin T results (0.015 ng/mL). An echocardiogram showed left ventricular akinesia in the inferoseptal wall.

The patient underwent a coronary angiogram under the tentative diagnosis of non-ST-segment elevation acute coronary syndrome (ACS). The initial angiogram revealed no significant stenosis in the LCA, with total occlusion of the proximal RCA, which was supposed to be a former culprit lesion of inferior myocardial infarction, and 75% stenosis in the posterior descending branch of the RCA filled by the SVG (Figure 1A, Video 1). Neither right nor left coronary angiograms revealed stenotic lesions that could be a cause of chest pain at rest. Therefore, the patient was scheduled to undergo a subsequent provocation test for coronary artery spasm. After 10 μg of ergometrine was injected into the RCA through the SVG, the patient reported chest pain, and an...
angiogram revealed total occlusion of the mid-RCA (Figure 1B, Video 2). The ECG showed elevated ST-segments in leads V1-3 (Figure 1E). After intracoronary administration of vasodilators through the SVG, coronary artery occlusion was totally resolved, along with the resolution of ST-segment elevation (Figures 1C and 1F, Video 3). The provocation test was not performed for the LCA. The patient was diagnosed with non–ST-segment elevation myocardial infarction caused by coronary artery spasm and was started on a calcium-channel blocker.

Coronary artery spasm is a cause of ACS and can be diagnosed by spontaneous episodes with evidence of myocardial ischemia shown on ECG or a pharmacological provocation test (1,2). The diagnosis of coronary artery spasm in patients with ACS is essential to prevent adverse events using proper therapeutic intervention.

Although a previous report demonstrated a pharmacological provocation test through a left internal mammary artery bypass graft (3), a pharmacological provocation test through a coronary artery bypass graft has not yet been well established, which could be caused by the estimated low prevalence of coronary artery spasm in patients with extensive atherosclerosis. However, as reported herein, coronary artery spasm could be

Right coronary artery (RCA) angiogram through the saphenous vein graft (SVG) (A to C) and 12-lead electrocardiogram (D to F) are shown. Mild stenotic lesion in the mid-RCA (yellow arrowheads in A) without ST-segment elevation (yellow arrowheads in D) was observed before provocation. After injection of ergometrine into the SVG, total occlusion of the mid-RCA (red arrowheads in B) and ST-segment elevation (red arrowheads in E) were revealed. Coronary artery occlusion (yellow arrowheads in C) and ST-segment elevation (yellow arrowheads in F) were resolved subsequent to vasodilator use.
a cause of ACS even in patients with a history of CABG. A pharmacological provocation test for coronary artery spasm should be considered in post-CABG patients who develop ACS.

**FUNDING SUPPORT AND AUTHOR DISCLOSURES**

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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**KEY WORDS** acute coronary syndrome, coronary artery spasm, coronary artery bypass grafting, ergometrine provocation test, saphenous vein graft

**APPENDIX** For supplemental videos, please see the online version of this paper.