Minimum Coronary Vessels to Diagnose Coronary Spasm by Synchrotron Radiation Coronary Angiography

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Background:
Coronary vasospasm is defined as a temporary, intense narrowing of coronary conduit artery. It brings about ischemic chest pain and becomes a one of causes of myocardial infarction. Coronary spasm is divided into two categories. One is coronary spasm of conduit artery and the other is coronary microvascular spasm. Although coronary spasms are diagnosed only in the images of coronary angiography, microvascular spasm can not be diagnosed because of limitation of conventional angiographic system. Synchrotron radiation coronary angiography (SRCA) can identify coronary arteries down to 100 um in diameter.

Aim:
The purpose of this study is to confirm whether microvascular spasm was identified or not using SRCA.

Methods:
Langendorff perfusion system with isolated rat heart was employed. Krebs-Henseleit solution (KH solution) was used for perfusate. 10 mM of 4-aminopyridine (a voltage-gated potassium channel blocker; spasm inducer) was added to KH solution and maintained 5 minutes. SRCA was performed at pre, during and 10 minutes after cessation of 4-AP contained KH solution. Coronary spasms were defined as temporal 75% reduction of coronary arterial diameter. This study was performed at Photon Factory in KEK, Japan.

Result and conclusion:
Multiple sizes of coronary arteries showed coronary spasm. Minimum size of stenosed coronary artery was 100 um. Since coronary microvascular spam are responsible for arteriole (50-500 um), coronary microvascular spasm may be diagnosed with use of synchrotron radiation coronary angiography.

KEYWORDS: Coronary angiography, coronary spasm, synchrotron radiation