Non-Stress Echocardiographic Diagnosis of Coronary Artery Stenosis — Changing Viewpoints From Systole to Diastole —

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Stress echocardiography to evaluate left ventricular (LV) systolic wall motion abnormality is an established technique for noninvasive detection of coronary artery stenosis with acceptable diagnostic accuracy. However, this modality has not gained popularity in Japan, partly because the current health insurance system does not cover costs for stress echocardiography despite the available information and required time and effort. More important obstacles and limitations that preclude the widespread use of stress echocardiography include the difficulty of image acquisition and interpretation of stress-induced wall motion abnormalities. Echocardiographers always face considerable challenge in imaging during treadmill stress echocardiography, because post-exercise images should be acquired within 1 min after exercise to detect transient wall motion abnormalities during augmented respiration. Image acquisition is relatively easy during pharmacological stress echocardiography, but interpretation of regional wall motion is still subjective, and its accuracy heavily depends on expertise in reading images. Without any standardization of reading, there are large inter-observer and inter-institutional variabilities. In addition, a substantial number of patients are not suitable for stress echocardiography because of a limitation to exercise, poor echocardiographic window during exercise, associated conditions restricting use of pharmacological agents, such as unstable coronary artery disease, aortic aneurysm, and other reasons.

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Against that background, in this issue of the Journal, Onishi et al have demonstrated the utility of tissue Doppler echocardiography for diagnosing coronary artery stenosis without any stress or provocation. The basic idea of their study is echocardiographic detection of finite LV wall motion abnormality during isovolumic relaxation period, which is called “post-systolic shortening or contraction” and is more sensitive to myocardial ischemia than a systolic LV wall motion abnormality. This concept may not be limited to non-stress echocardiography. Higher sensitivity of diastolic LV wall motion abnormality for myocardial ischemia may allow lower doses of pharmacological agents or less exercise needed for the stress test. Nevertheless, the concept presented in this study requires further validation in a multicenter study in a blinded manner, because reproducibility is always a challenge for novel methodologies. In summary, Onishi et al present a conceptually satisfactory echocardiographic method of diagnosing coronary artery stenosis without the need for stress testing, stimulating further development of a practically satisfactory non-stress test.

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