

## Epinephrine 3D Echocardiography Stress Test Analyzed by 3D Area Strain

**【 Background 】** 3D echocardiography stress test (3DSt-t) analyzed by 3D area strain (Ar-st) was confirmed whether it had high diagnostic accuracy with less stress. An epinephrine (Epi) was selected as a stress agent to avoid coronary artery vasodilation at low dose.

**【 Method 】** Epi 3DSt-t were performed in 69 patients who had suffered coronary angiography within the previous three months. Of 135 coronary arteries evaluated, 39 were normal, 48 had 50% stenosis and 48 had  $\geq 75\%$  stenosis. 3DSt-t was performed by a Vivid E9 with a 4V-D Probe. 4D Auto LVQ software was operated off-line to analyze 3DSt-t images. Epi(0.4  $\mu\text{g}/\text{kg}/\text{min}$ ) was infused continuously until HR reached 105~110/min. Then Epi was decreased to 0.25  $\mu\text{g}/\text{kg}/\text{min}$  to keep HR between 105~110/min for 5 min. 3DSt-t images were taken. Ar-st map was used to evaluate the left ventricular wall function. The

middle-anterior Ar-st-Sg was regarded as LAD area, the middle-inferior Ar-st-Sg was as RCA area and the middle-posterior Ar-st-Sg was as LCX area. A paired *t*-test was used to compare values of pairs.

**【Results】** The average stress HR was  $109.4 \pm 1.3$  beats/min. The stress/rest ratio of Ar-st was  $127.3 \pm 16.9\%$  ( $-43.9 \pm 5.8/-35.1 \pm 4.9$ ) in the normal group,  $87.4 \pm 10.6\%$  ( $-30.1 \pm 6.5/-35.6 \pm 6.9$ ) in the 50% stenosis group and  $61.7 \pm 13.3\%$  ( $-24.3 \pm 5.0/-36.9 \pm 5.5$ ) in the  $\geq 75\%$  stenosis group. These ratios were significantly different among all three groups ( $p < 0.0001$  for all). A stress/rest cut-off value; 105.9% gave 0.97 sensitivity, 0.96 specificity and 0.94 accuracy to detect 50% stenosis. A cut-off value; 91.9% gave 1.00 sensitivity, 1.00 specificity and 1.00 accuracy to detect  $\geq 75\%$  stenosis.

**【Conclusion】** The Epi 3DSt-t analyzed by Ar-st resulted in high enough diagnostic accuracy at less stress HR.