

## Myocardial hibernation at rest in asymptomatic 75% coronary artery stenosis

— as demonstrated by strain rate function —

**Purpose:** Though classical coronary hemodynamics does not attribute ischemia to 75% coronary artery stenosis (CAS) in resting myocardium, strain value and strain rate (SR) value have been shown to decrease at rest. We studied whether 75% CAS caused abnormal left ventricular (LV) wall motion, a marker for myocardial ischemia (MIs).

For that purpose, the following longitudinal discriminant SR function (Z) was created:

$$Z = 4.91 + 1.02 \times (100\text{msec SR}) + 1.23 \times (200\text{msec SR}) - 0.46 \times (\text{minimum SR between } 100\sim 200\text{msec}) + 4.83 \times (\text{mean SR during } 100\sim 200\text{msec}).$$

For  $Z > 0$ , abnormal LV wall motion resulted from  $\geq 75\%$  CAS. The discriminant probability was 86.4%.

We examined whether SR decrease of 75% CAS was due to ischemia, using Z values of asymptomatic patients who had 75% CAS by coronary artery angiography (CAG).

**Method:** Thirty-two lesions in 26 asymptomatic patients with  $Z > 0$  who had 75% CAS, normal LV wall motion in B-mode imaging, and negative results of stress tests, were enrolled. They underwent PCI. Z values at rest were measured at CAG and at two-week intervals post-PCI until  $Z < 0$ . Then CAG was repeated.

**Results:** Z was  $2.58 \pm 2.87$  at CAG, and  $-2.87 \pm 2.19$  post-PCI ( $p < 0.001$ ). Z values significantly improved following resolution of ischemia after PCI, though recovery time was long ( $79.7 \pm 28.8$  days). Repeated CAG showed no restenosis.

**Conclusion:** Based on these results, we concluded that 75% CAS causes MIs at rest. In addition, the requirement for long-term adjustment of improvements in the Z value after PCI suggests that the myocardium being perfused by the 75% CAS was hibernating.