

## Serial assessment of left ventricular performance at rest and during bicycle exercise by ECG-gated myocardial perfusion SPECT

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The present study evaluates left ventricular performance during exercise by ECG-gated myocardial perfusion SPECT with short-time data collection. **Methods:** The study population consisted of 10 healthy volunteers (Group N) and 9 patients with ischemic heart disease (Group I). Seven patients in Group I had a history of prior myocardial infarction. Rest ECG-gated SPECT was performed 40 min after an injection of Tc-99m-tetrofosmin (555–740 MBq). After resting data acquisition, Group N underwent up to two 5-min stages of exercise (75 and 125 watts) on a detachable bicycle ergometer. The Group I patients all underwent symptom-limited, maximal testing on the ergometer. ECG-gated SPECT data were acquired from both groups for 3 min at rest and during the last 3 min of each exercise stage. **Results:** Significant increases occurred in LVEF from rest to peak stress in both groups (from  $55.4 \pm 5.8$  to  $66.6 \pm 4.1\%$  in group N,  $p < 0.0001$ ; from  $49.0 \pm 12.8$  to  $56.7 \pm 13.8\%$  in Group I,  $p < 0.001$ ). The LVESV values significantly decreased to peak stress in Group N (from  $49.9 \pm 13.1$  to  $37.8 \pm 10.0$  ml,  $p < 0.0001$ ), whereas LVEDV did not change (from  $110.6 \pm 18.9$  to  $112.0 \pm 19.0$  ml). In contrast, the LVESV values at rest and under peak stress were similar in Group I (from  $52.6 \pm 23.9$  to  $51.7 \pm 31.4$  ml) and LVEDV in Group I at peak exercise tended to increase (from  $102.8 \pm 36.7$  to  $111.3 \pm 39.0$  ml). The changes in LVESV from rest to peak stress were significantly different between Groups N and I ( $-12.1 \pm 6.3$  vs.  $-0.9 \pm 11.6$  ml,  $p < 0.02$ ). **Conclusion:** ECG-gated SPECT with short-time data collection can assess left ventricular function during exercise and may offer useful information for evaluating patients with ischemic heart disease.

**Key words:**  $^{99m}\text{Tc}$ -tetrofosmin, ECG-gated SPECT, bicycle exercise, ischemic heart disease