Effect of exercise-induced activation of sympathetic nerve activity on clearance of $^{123}$I-MIBG from the myocardium

Hiroki Sugihara,* Koji Shiga,** Kouji Terada,** Noriyuki Kinoshita,** Yoko Tanouchi,** Kazuki Ito,** Yoshihiko Adachi,** Yo Ushima,* Masao Nakagawa** and Tomoko Maeda*

*Department of Radiology, and **Second Department of Medicine, Kyoto Prefectural University of Medicine

The effect of exercise on the cardiac kinetics of $^{123}$I-MIBG was investigated in the present study. $^{123}$I-MIBG was administered intravenously at rest in 6 healthy male volunteers, and anterior planar and SPECT images were obtained 15 minutes, and 2 and 4 hours after administration (protocol A). After 2 weeks, $^{123}$I-MIBG was again administered intravenously at rest, and images were obtained 15 minutes later. After imaging, the subjects ran 10 km in approximately 1 hour, and anterior planar and SPECT images were obtained 2 and 4 hours after administration of $^{123}$I-MIBG (protocol B). The heart to mediastinum uptake ratio (H/M) was calculated from each anterior planar image, and the mean $^{123}$I-MIBG clearance from 15 minutes to 2 hours, and from 2 hours to 4 hours was calculated with a bull's eye display. The H/M was much lower after exercise. The mean clearance rate between 15 minutes and 2 hours in protocol B was significantly higher than that between 2 hours and 4 hours, and that between 15 minutes and 2 hours in protocol A. It was concluded that the clearance rate of $^{123}$I-MIBG may be a useful index of cardiac sympathetic nerve activity.

Key words: $^{123}$I-MIBG scintigraphy, exercise, cardiac sympathetic nerve function, clearance rate