

Dynamic ^{123}I -MIBG SPECT reflects sympathetic nervous integrity and predicts clinical outcome in patients with chronic heart failure

Takanori ARIMOTO,* Yasuchika TAKEISHI,* Akio FUKUI,* Hidetada TACHIBANA,* Naoki NOZAKI,*
Osamu HIRONO,* Hiroyuki YAMAGUCHI,* Makoto ITOH,* Takuya MIYAMOTO,*
Hiroki TAKAHASHI,* Akio OKADA,** Kazuei TAKAHASHI** and Isao KUBOTA*

*First Department of Internal Medicine and **Department of Radiology, Yamagata University School of Medicine

^{123}I -metaiodobenzylguanidine (^{123}I -MIBG) is useful for assessment of the severity and prognosis of patients with chronic heart failure (CHF). To examine ^{123}I -MIBG kinetics in the early phase soon after tracer injection, we performed dynamic single photon emission computed tomography (SPECT) in 76 patients with CHF and 17 control subjects. The consecutive 15 images of 2 min-dynamic SPECT were acquired for 30 min after injection. From 0 to 4 min, a significant amount of radioactivity existed in the blood pool, thus we calculated washout rate of ^{123}I -MIBG from 4 to 30 min (%WR-E). Patients were followed up with an end-point of cardiac death or re-hospitalization for 16 months (6–30 months). As the NYHA functional class advanced, %WR-E increased (control, NYHA class I, II, and III: $9 \pm 4\%$, $10 \pm 5\%$, $12 \pm 5\%$, and $17 \pm 5\%$ *, respectively, * $p < 0.01$ vs. all other groups). Significant correlation was found between %WR-E and conventional WR from 30 min to 240 min ($r = 0.606$, $p < 0.0001$). %WR-E was positively correlated with left ventricular end-diastolic dimension ($r = 0.372$, $p < 0.01$) and was inversely correlated with left ventricular fractional shortening ($r = -0.316$, $p < 0.02$). The normal upper limit of %WR-E was defined as mean + 2SD value of 17 control subjects (17.1%). Patients with abnormally rapid %WR-E levels had a higher cardiac event rate than those with normal %WR-E levels (57% vs. 12%, $p < 0.0001$). These data suggest that washout rate of ^{123}I -MIBG in the early phase from 4 min to 30 min (%WR-E) reflects cardiac sympathetic nervous integrity and is useful to evaluate the severity and prognosis of patients with CHF. The present results indicate a potential role of dynamic SPECT in shortening the ^{123}I -MIBG imaging protocol.

Key words: ^{123}I -MIBG, heart failure, prognosis