

## Assessment of Takotsubo cardiomyopathy (transient left ventricular apical ballooning) using $^{99m}\text{Tc}$ -tetrofosmin, $^{123}\text{I}$ -BMIPP, $^{123}\text{I}$ -MIBG and $^{99m}\text{Tc}$ -PYP myocardial SPECT

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We compared Takotsubo cardiomyopathy (transient left ventricular apical ballooning) with acute myocardial infarction (AMI) using two-dimensional echocardiography,  $^{99m}\text{Tc}$ -tetrofosmin,  $^{99m}\text{Tc}$ -PYP,  $^{123}\text{I}$ -BMIPP and  $^{123}\text{I}$ -MIBG myocardial SPECT. **Methods:** We examined 7 patients with Takotsubo cardiomyopathy and 7 with AMI at the time of emergency admission (acute phase), and 2–14 days (subacute phase), one month (chronic phase), and 3 months (chronic II phase) after the attack. The left ventricle was divided into nine regions on echocardiograms and SPECT images, and the degree of abnormalities in each region was scored according to five grades from normal (0) to severely abnormal (4). **Results:** Coronary angiography showed the absence of stenotic regions in patients with Takotsubo cardiomyopathy, and severely stenotic and/or occlusive lesions in patients with AMI. The total ST segment elevation on electrocardiograms (mm) was  $7.8 \pm 3.7$  in those with Takotsubo cardiomyopathy, and  $7.3 \pm 3.9$  in patients with AMI. Abnormal wall motion scores on echocardiograms were  $14.2 \pm 4.6$ ,  $4.7 \pm 4.0$ ,  $1.7 \pm 2.0$  and  $0.5 \pm 0.4$  during the acute, subacute, chronic and chronic II phases, respectively, in patients with Takotsubo cardiomyopathy, and  $14.0 \pm 4.3$ ,  $11.4 \pm 3.9$ ,  $8.8 \pm 3.6$  and  $5.2 \pm 4.8$  in those with AMI. Abnormal myocardial perfusion scores on  $^{99m}\text{Tc}$ -tetrofosmin images were  $11.8 \pm 3.5$ ,  $3.2 \pm 3.0$ ,  $0.5 \pm 1.2$  and  $0.2 \pm 0.4$  during the acute, subacute, chronic and chronic II phases, in patients with Takotsubo cardiomyopathy, and  $16.2 \pm 4.3$ ,  $13.9 \pm 4.6$ ,  $7.9 \pm 4.6$  and  $5.0 \pm 4.5$ , respectively, in those with AMI. Abnormal myocardial fatty acid scores on  $^{123}\text{I}$ -BMIPP images were  $12.6 \pm 3.7$ ,  $6.8 \pm 3.2$  and  $0.4 \pm 0.6$  during the subacute, chronic and chronic II phases, respectively, in patients with Takotsubo cardiomyopathy, and  $16.5 \pm 5.1$ ,  $14.7 \pm 4.8$  and  $7.5 \pm 4.5$  in those with AMI. Abnormal myocardial sympathetic nerve function scores on  $^{123}\text{I}$ -MIBG images were  $14.8 \pm 4.0$ ,  $8.8 \pm 4.0$  and  $0.4 \pm 0.6$  during the subacute, chronic, chronic II phases, respectively, in patients with Takotsubo cardiomyopathy, and  $18.6 \pm 6.5$ ,  $16.8 \pm 6.8$  and  $12.9 \pm 5.2$  in those with AMI. Myocardial  $^{99m}\text{Tc}$ -PYP uptake was abnormal not only in patients with AMI but also in those with Takotsubo cardiomyopathy during the acute phase. **Conclusions:** Takotsubo cardiomyopathy might represent a stunned myocardium caused by a disturbance of the coronary microcirculation.

**Key words:** Takotsubo cardiomyopathy, transient left ventricular apical ballooning,  $^{99m}\text{Tc}$ -tetrofosmin,  $^{123}\text{I}$ -BMIPP,  $^{123}\text{I}$ -MIBG