

Summary

Assessment of Myocardial Damage and Metabolic Disorder in the Left Ventricle in Patients with Mitral Stenosis Using ^{201}Tl and ^{123}I -BMIPP Myocardial SPECT

Kazuki ITO*, Hiroki SUGIHARA**, Takuji TANABE*, Tatsuya YUBA*, Tomoki DOUE*, Yoshihiko ADACHI*, Shuuji KATOH*, Akihiro AZUMA** and Masao NAKAGAWA**

*Department of Cardiology, Murakami Memorial Hospital, Asahi University

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

This study was designed to evaluate the myocardial damage and metabolic disorder of the left ventricle in patients with mitral stenosis. We studied 15 patients with mitral stenosis. Their grade of chronic heart failure using New York Heart Association classification were class I: 5 patients, class II: 5, class III: 3, class IV: 2, respectively. The severely stenotic group (valve area $< 1.5 \text{ cm}^2$) included 6 patients, mildly stenotic group (1.5 cm^2 valve area $< 2.5 \text{ cm}^2$) included 9. A 111 MBq of ^{123}I -BMIPP was intravenously injected at rest, SPECT images were obtained at 15 min and 3 hours after injection. A 111 MBq of ^{201}Tl was intravenously injected at rest, and SPECT images were obtained at 15 min after injection. Washout rate (WR) of ^{123}I -BMIPP from the whole left ventricle was obtained using polar maps. The concentration of norepinephrine (NE: pg/ml) in the blood at rest was measured. The mean values of pulmonary artery pressure was measured in ten patients using Swan-Ganz catheter. ^{123}I -BMIPP myocardial SPECT and measurement of NE were reexamined in 5 patients after mitral valvuloplasty. NE values were 476 ± 72 and 793 ± 286 in classes I + II and III + IV, respectively. NE values was increased in the severe heart failure group ($p < 0.05$). NE values were 480 ± 69 and 743 ± 295 in the mildly

and severely stenotic groups, respectively. NE value was increased in severely stenotic group ($p < 0.05$). Twelve patients showed normal uptake on both ^{201}Tl and ^{123}I -BMIPP myocardial SPECT. Three patients showed slightly reduced uptake on both ^{201}Tl and ^{123}I -BMIPP myocardial SPECT. WR was $27.2 \pm 4.8\%$ and $44.3 \pm 6.7\%$ in class I + II and class III + IV, respectively. WR was increased in severe heart failure group ($p < 0.05$). WR was $27.8 \pm 6.0\%$ and $41.3 \pm 9.4\%$ in the mildly and severely stenotic group, respectively. WR was increased in the severely stenotic group ($p < 0.05$). NE was correlated with WR ($p < 0.001$). In patients with mitral valvuloplasty, WR was $44.3 \pm 6.7\%$ and $31.4 \pm 4.7\%$ before and after mitral valvuloplasty, respectively. NE values were 857 ± 266 and 574 ± 165 , respectively. Both WR and NE were decreased after mitral valvuloplasty ($p < 0.01$). In patients with mitral stenosis, WR was increased in the severe heart failure group and severely stenotic group without apparent myocardial damage. Myocardial metabolism in the left ventricle might be influenced by right heart failure through, for example, NE and neurohormonal factors.

Key words: Mitral stenosis, Myocardial fatty acid metabolism, Heart failure, ^{123}I -BMIPP, Washout rate.