Summary

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


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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 $\leq 1.5 \text{ cm}^2$) included 6 patients, mildly stenotic group (1.5 cm$^2 <$ valve area $< 2.5 \text{ cm}^2$) included 9. A 111 MBq of $^{123}\text{I-BMIPP}$ was intravenously injected at rest, SPECT images were obtained at 15 min and 3 hours after injection. A 111 MBq of $^{201}\text{Tl}$ was intravenously injected at rest, and SPECT images were obtained at 15 min after injection. Washout rate (WR) of $^{123}\text{I-BMIPP}$ 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.

$^{123}\text{I-BMIPP}$ myocardial SPECT and measurement of NE were reexamined in 5 patients after mitral valvuloplasty. WR was 27.8 $\pm$ 6.0% and 41.3 $\pm$ 9.4% in the mildly and severely stenotic group, respectively. 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 $\pm$ 266 and 574 $\pm$ 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, $^{123}\text{I-BMIPP}$, Washout rate.