

The effect of β -blocker on hamster model BIO 53.58 with dilated cardiomyopathy determined using ^{123}I -MIBG myocardial scintigraphy

Aritomo INOUE, Shohei YAMASHINA and Junichi YAMAZAKI

Division of Cardiovascular Medicine, Omori Hospital Toho University School of Medicine

Objective: ^{123}I -metaiodobenzylguanidine (MIBG) myocardial scintigraphy is currently used to evaluate cardiac sympathetic nerve function, but MIBG also has the capacity to evaluate dilated cardiomyopathy (DCM) severity and therapeutic effectiveness. In this study, we administered β -blockers to a DCM hamster model and evaluated the effect of therapy using MIBG. We also pathologically compared the effects of myocardial fibrosis suppression. **Methods:** BIO 53.58 hamsters were divided into the following five groups based on β -blocker administration: vehicle (COT), 2 mg/kg/day carvedilol (CLT), 20 mg/kg/day (CHT) carvedilol, 4 mg/kg/day (MLT) metoprolol, 40 mg/kg/day (MHT) metoprolol. F1B hamsters were administered a vehicle (COF). Plasma catecholamine, noradrenaline (p-NADR), adrenaline (p-ADR), and dopamine (p-DOPA) were assayed, and MIBG was performed. The count ratio of the heart to the mediastinum (H/M) and left ventricle myocardial washout ratio (WR) were calculated. We then performed an autopsy and calculated the percent change in fibrotic area from myocardial sections. **Results:** H/M of the initial image in the COT group was significantly lower at 2.4 ± 0.2 than the 2.9 ± 0.7 in the COF group ($p < 0.05$). The CLT and CHT groups had higher H/M values compared to the COT group (3.1 ± 0.6 , 3.0 ± 0.6 versus 2.4 ± 0.2 ; $p < 0.05$). Significant correlations were evident between the H/M of the delayed image and p-NADR and p-DOPA ($p < 0.05$, $p < 0.01$, respectively) as well as between WR and p-NADR and p-DOPA ($p < 0.05$). Percent change in fibrotic area was significantly lower in the β -blocker groups than in the COT group ($p < 0.05$). Significant negative correlations were seen between the H/M of the delayed image and the percent change in fibrosis area. **Conclusions:** The delayed image H/M and WR acutely reflected cardiac disorder and sympathetic nerve function disorder in BIO 53.58 hamsters. In the carvedilol-administered groups, there was improvement compared to the initial H/M image, indicating the efficacy of the β -blocker in DCM.

Key words: BIO 53.58 hamster, DCM, MIBG, β -blocker