Effect of cardiac resynchronization therapy on improvement of mitral regurgitation: Insight into etiologies and dominant factor for recovery of regurgitation

Hiroya Okamoto
Yasuya Inden
Toshifumi Nakagomi
Koichi Furui
Shuro Riku
Kazumasa Suga
Keita Mamiya
Toshiro Tomomatsu
Aya Fujii
Satoshi Yanagisawa
Rei Shibata
Toyoaki Murohara

**Introduction**: Cardiac resynchronization therapy (CRT) improves functional mitral regurgitation (MR); however, little is known about which factor can affect the improvement of MR. We aimed to investigate the effect of CRT on the MR according to various pathologies, and to evaluate dominant factor that could influence the improvement of MR after CRT implantation.

**Methods**: This study included 182 patients who underwent CRT implantation in Nagoya University Hospital between 2006 and 2016 with a fully echocardiography data at both baseline and 6-month after implantation. MR severity was classified into 5 grades (0; none to 4; severe). Responders were defined as a relative reduction of left ventricular end-systolic volume (LVESV) ≥15% at 6-month follow-up on the echocardiography.

**Result**: One hundred and seventeen patients (64%) were classified as responders. The MR grade was significantly reduced from 1.85 ± 1.08 to 1.31 ± 0.88 (p<0.001) in the responder group. However, the MR grade increased in the non-responder group from 1.58 ± 0.99 to 1.66 ± 1.13 (p=0.415). Both the ischemic cardiomyopathy (ICM) and non-ICM groups exhibited a significant improvement of MR. In the total population, relative reduction of LVESV (r = 0.43, p <0.01) and LVEDV (r = 0.35, p <0.01) were strongly correlated with the improvement of MR. This significant relationship was strongly found in the non-ICM group. By contrast, recovery of dyssynchrony was not correlated with the improvement of MR.

**Conclusion**: The CRT responders showed the significant MR improvement. The MR improvement was mostly associated with the reduction of LVESV and LVEDV, which was highly observed in the non-ICM group.