Effectiveness of Rate Adaptive AV Delay for CRT-D Optimization: A Case Report

Kazuyuki Yahagi, Jiro Aoki, Laurence C. Lee, Yoshifumi Nakajima, Masanori Taniwaki, Sen Yachi, Shuzou Tanimoto, Kengo Tanabe, Hiroyoshi Nakajima, Kazuhiro Hara

Division of Cardiology, Mitsui Memorial Hospital, Tokyo, Japan

A 76-year-old man received a CRT-D implantation in September 2009. However, this patient was categorized to a non-responder by echocardiogram (responder is defined as having an improvement of more than 15% LVESV). AV delay was echocardiographically optimized from 160 ms to 210 ms, which was determined to be the maximum left ventricular outflow tract velocity-time integral. Although no obvious changes were observed on BNP, LVEF and LVESV, exertional dyspnea and anaerobic threshold using a cardiopulmonary exercise testing was deteriorated after AV delay optimization. Therefore, we used Electrical Velocimetry (AESCULON®, Osypka Medical, Berlin, Germany) to measure cardiac output at 30-W exercise intensity by an ergometer. We measured cardiac output at different AV delay from 50-240 ms at rest and exercise. Interestingly, maximum cardiac output value was observed with an AV delay of 100 ms at exercise and 210 ms at rest. After using rate-adaptive AV delay (Medtronic Inc., Minneapolis, MN, USA) to reduce AV delay during exercise, exertional dyspnea was ameliorated and BNP decreased. We experienced a case in which rate-adaptive AV delay could optimize CRT-D.

Keyword: CRT