Comparison of ventricular pacing dependency rate by the difference of pacing mode in patients with pacemaker implantation after trans-catheter aortic valve implantation

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Introduction: Trans catheter aortic valve implantation (TAVI) has the potential to cause complications including the occurrence of atrioventricular conduction disturbance (AVCD) requiring pacemaker (PM) implantation. AVCD after TAVI may be transient but there are few reports on long-term investigations of patient after PM implantation.

Methods: We enrolled retrospectively consecutive patients who had undergone TAVI from June 2010 to June 2018. The TAVI procedures were performed using self-expandable or balloon-expandable bioprosthetic TAVI systems, that is, the Medtronic CoreValve (Medtronic Inc., Minneapolis, MN) or Edwards SAPIEN valve (Edwards Lifesciences Corp., Irvine, CA), respectively. Pacemaker implantation was performed when bradycardia such as a third-degree atrioventricular block (AVB) and type II second-degree AVB was seen, including during the follow-up period. Patients implanted for sick sinus syndrome were excluded from our study. Pacing mode was selected as conventional DDD or AAI-DDD mode switch algorithm. VVI mode was selected for patients with chronic atrial fibrillation.

Result: 216 patients had enrolled during the study period, and 21 patients (9.7%) received new PM implantation after TAVI. One patient was excluded because of sick sinus syndrome. Finally, implanted PM mode programming at hospital discharge were as follows; conventional DDD (N=8), AAI-DDD mode switch algorithms (N=8), and VVI (N=4). In each group, there was no difference of characteristics in average age and gender and PQ interval and QRS width of ECG just before TAVI procedure. PM checks were performed one month and one year later, respectively. The ventricular pacing dependency rate in each group were as follows: conventional DDD (after one month 77.0%, after one year 52.9%), AAI-DDD mode switch algorithms (after one month 0.87%, after one year 0%), and VVI (after one month 58.3%, after one year 41.6%).

Conclusion: During the follow-up period, the ventricular pacing dependency rate had lowered gradually in the cases of our Hospital. Particularly, the ventricular pacing dependency rate in AAI-DDD mode switch algorithms was extremely low. Many clinical studies have shown that unnecessary ventricular pacing can cause adverse effects, including decreased left ventricular ejection fraction and increased risk of heart failure in patients with intact atrioventricular conduction. It was suggested that the AAI-DDD mode switch algorithms might be more effective than DDD mode for the AVCD patient after TAVI.