5-year outcome comparison among aortic stenosis patients underwent transcatheter aortic valve implantation with or without permanent pacemaker

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Background: The occurrence of atrioventricular block due to local damage to the atrioventricular and infranodal tissues, requiring permanent pacemaker (PMI), is one of major complications of transcatheter aortic valve implantation (TAVI). Previous studies show conflicting results regarding impact of PMI on outcomes in TAVI patients.

Purpose: The purpose of this study was to compare the 5-year survival rate and CV mortality of TAVI patients without PM, patients with PMI before TAVI, and patients underwent PMI after TAVI. In addition, we also assessed the influence of early- and new-generation prostheses on the prevalence of PMI after TAVI and related outcomes.

Methods: A total of 778 patients who underwent TAVI in our hospital between 2009 and 2021 were included in this study (mean age 81.4±5.7 years, 50.9% male). Patients were divided into 3 groups: no PMI (n=614), PMI before TAVI (n=76), and PMI after TAVI (n=88). Primary endpoints were defined as all-cause death and cardiovascular (CV) death up to 5 years after TAVI.

Results: The prevalence of PMI after and before TAVI were 11.3% (88/778) and 9.8% (76/778), respectively. During a median follow-up time of 30 (18-49) months, the survival rate at 1, 2, and 5 years was 90.7%, 83.1%, and 69.2% in the no PMI group, 92.0%, 86.4%, and 76.1% in the PMI after TAVI group, and 89.5%, 86.8%, and 75.0% in the PMI before TAVI group. There was no significant difference in survival rate and CV mortality among the 3 groups (P>0.05, Figure 1).

Of 778 patients, 251 (32.3%) patients received early-generation prostheses (Edwards SAPIEN or SAPIEN XT), 527 (67.7%) patients received new-generation prostheses (Edwards SAPIEN 3, SAPIEN 3 Ultra, or ACURATE neo). As compared with TAVI patients who received early-generation prostheses, the prevalence of PMI after TAVI was significantly higher (13.3% vs. 7.2%, P=0.012), while the 5-year all-cause mortality (20.7% vs. 47.8%, P<0.001) or CV mortality (14.8% vs. 31.1%, P<0.001) was significantly lower in those who received new-generation prostheses. TAVI patients with new-generation prostheses was associated with a better 5-year survival rate as compared with early-generation prostheses, irrespective of age, sex, and PMI (hazard ratio=0.654, 95% CI 0.500-0.855, P=0.002, Figure 2).

New-generation prostheses (relative risk=1.784, 95% CI=1.089-2.922, P=0.022) and greater prostheses diameter (per 1 mm increase, relative risk=1.144, 95% CI=1.017-1.287, P=0.025) were independently associated with increased risk of PMI after TAVI.

Conclusion: There is no significant difference in survival rate and CV mortality between patients who underwent PMI after or before TAVI and those who did not. New-generation prostheses is related to higher risk of PMI and better 5-year survival in TAVI patients.
Figure 2