Prevalence and predictors of pacemaker implantation in patients with severe aortic stenosis undergoing transcatheter aortic valve implantation: TAVI-NOR study

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Background: The transcatheter aortic valve implantation (TAVI) in patients with aortic stenosis (AS) asserts mechanical forces during valve expansion both on the aortic root and conduction system. TAVI is therefore frequently associated with the development of conduction abnormalities requiring a permanent pacemaker implantation (PMI).

Purpose: To identify predictors of new PMI in unselected patients with severe AS undergoing TAVI.

Methods: Among the 600 patients consecutively enrolled in TAVI-NOR study, 52 had PMI prior to TAVI and were excluded, remaining 548 patients eligible for this analysis. Predictors of PMI were identified in binary logistic regression analyses.

Results: A total of 189 patients (31.5%) required a new PMI post TAVI, evenly distributed between females and males (30.1% vs 32.9%, p = 0.456). Higher age, comorbidities such as hypertension, chronic kidney disease, coronary artery disease, diabetes, and left ventricular hypertrophy on ECG or echocardiography, and the severity of AS had no association with the risk of PMI after TAVI (Table 1). In univariate logistic regression analyses, larger aortic root diameter was associated with a higher risk of new PMI (OR 1.66; 95% CI 1.07-2.58, p = 0.024), but was no longer significant in multivariate model, and bioprosthetic size had no association with the need for a PMI following TAVI. Bundle branch block (BBB) (OR 1.52; 95% CI 1.00-2.31, p = 0.051), and especially right BBB (RBBB) (OR 2.05; 95% CI 1.14-3.70, p = 0.017) showed increased risk of a new PMI, also in a multivariable-adjusted analysis (OR 2.67; 95% CI 1.39-5.11, p = 0.003). Lotus bioprosthesis with mechanical expansion was associated with an increased risk of PMI (OR 2.92; 95% CI 1.92-4.45, p < 0.001), while balloon expandable Sapiens had a lower risk for PMI (OR 0.15; 95% CI 0.06-0.37, p < 0.001). In a multivariable-adjusted analysis, the use of Lotus valve (OR 2.23; 95% CI 1.44-3.46, p < 0.001) was still associated with a higher risk, and use of Sapiens with a lower risk of PMI (OR 0.15; 95% CI 0.06-0.37, p < 0.001) independent of non-significant association with atrial fibrillation (p = 0.087), lower heart rate (0.077), aortic root (p = 0.225) and stroke volume index (p = 0.097). Adding age and gender to the same primary multivariable-adjusted model did not change our conclusions: Lotus (OR 2.28; 95% CI 1.46-3.57, p < 0.001) and RBBB (OR 2.63; 95% CI 1.37-5.04, p = 0.004) and Edward Sapient (OR 0.15; 95% CI 0.06-0.39, p < 0.001) of post-procedural PMI.

Conclusion: Our data from less selected patients with severe AS patients show that pre-intervention RBBB and the use of bioprosthesis with mechanic expansion (Lotus) were associated with a higher risk, and the use of balloon expandable bioprosthesis (Sapiens) with a lower risk of PMI after TAVI. We found no gender differences in risk of PMI.