NEUROHUMORAL RESPONSE AFTER TRANSCATHETER AORTIC VALVE IMPLANTATION

Background: Little is known about the neurohumoral response after transcatheter aortic valve implantation (TAVI). The objectives of this study were to determine the neurohumoral response as evaluated by amino-terminal brain-natriuretic-peptide (NTproBNP) pre/post-TAVI, and to evaluate the clinical and echocardiographic parameters associated with NTproBNP changes after TAVI.

Methods: Fifty patients (age 81±7 years, logistic EuroSCORE 24±16) diagnosed with symptomatic severe aortic stenosis (SSAS) who underwent successful TAVI (Edwards-SAPIEN valve) were included. NTproBNP measurement was undertaken within the 24-hr prior-TAVI and at 6-month follow-up; 38 patients also performed a 6-minute walk test (6MWT).

Results: The mean aortic transvalvular gradient decreased from 41±16 to 10±3mmHg and aortic valve area increased from 0.6±0.2 to 1.6±0.3cm² (P<0.0001, for both) following TAVI. NTproBNP levels decreased from 1821 (interquartile range [IQR]: 862-3415) pg/mL to 1182 (IQR: 588-4031) pg/mL (P=0.09). Linear regression analysis showed that both higher NTproBNP values at baseline (r²=0.25, P=0.0002) and greater decrease in mean aortic gradient (r²=0.15, P=0.001) predicted greater improvement in NTproBNP values after TAVI. The presence of prosthesis-patient mismatch (PPM) following TAVI was associated with an increase in NTproBNP values (+675 [IQR: -547 - +1524] pg/mL) compared with no PPM (-620 [IQR: -1441 - +313] pg/mL) (P=0.026). The mean distance walked on 6MWT increased from 175±74 to 211±83 m (P=0.002). NTproBNP values correlated with distance walked at baseline (r=-0.43, P=0.007) but not at follow-up. The NYHA class improved to some degree in all but 3 patients but did not correlate with the results of NTproBNP and 6MWT.

Conclusions: High-risk patients with SSAS exhibited high levels of NTproBNP and TAVI was associated with a moderate decrease in NTproBNP values at 6-month follow-up. The main determinants of the improvement in neurohumoral response were the baseline levels of NTproBNP and the magnitude of the improvement in valve hemodynamics achieved by TAVI. Future studies should determine the clinical relevance of neurohumoral response in this high-risk population.