

## Impact of transcatheter aortic valve implantation on coronary flow reserve by transthoracic Doppler echocardiography 1-year after the intervention in severe aortic stenosis patients

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**Funding Acknowledgement:** Type of funding sources: None.

**Background:** Coronary flow reserve (CFR) which is one of indexes reflecting coronary microcirculation in patients without significant epicardial coronary lesions can be impaired in patients with severe aortic stenosis (AS). It has been shown that CFR is an independent predictor for future cardiovascular events in AS patients. Transcatheter aortic valve implantation (TAVI) has rapidly become widespread and is becoming the standard treatment for severe AS. This procedure may have a good effect on CFR due to reduction of severe afterload in patients with severe AS. Although the recent reports evaluated change in CFR immediately and 6 months after TAVI, it has not been evaluated whether impaired CFR improves 1-year after TAVI in AS patients with preserved left ventricular ejection fraction (LVEF).

**Purpose:** The purpose of the present study was to investigate whether impaired CFR improves 1-year after TAVI in severe AS patients with preserved LVEF.

**Methods:** The study population consists of consecutive 105 patients with severe AS undergoing TAVI. Exclusion criteria were atrial fibrillation, old myocardial infarction, history of coronary artery bypass grafting, significant lesions in the left anterior descending artery (LAD), moderate or severe mitral valve disease, history of valve replacement, LVEF <50% and pre-operative CFR >2.2. CFR was obtained from coronary flow velocity by transthoracic echocardiography at rest and maximal hyperemia in LAD be-

fore, immediately and 1-year after TAVI. We compared CFR between before and after TAVI in the study patients who did not meet the exclusion criteria.

**Results:** After exclusion of 76 patients who met the exclusion criteria, the final study patients consist of 29 patients (8 male, 84.9±5.2 years). There was no significant difference in LVEF (61.3±3.4% vs 61.6±4.4%, P=0.667) and LV end-diastolic volume (LVEDVI; 58.2±9.2 mL/m<sup>2</sup> vs 55.8±9.0 mL/m<sup>2</sup>, P=0.089) between before and immediately after TAVI. LVEF (61.0±2.8%, P=0.721) and LVEDVI (58.0±9.1 mL/m<sup>2</sup>, P=0.949) 1-year after TAVI were similar to those before TAVI. There was no significant difference in coronary flow velocity at rest between before and immediately after TAVI (27.4±8.9 vs 24.4±7.0 cm/s, P=0.051) and between before and 1-year after TAVI (25.9±8.3 cm/s, P=0.396). Coronary flow velocity at maximal hyperemia 1-year after TAVI significantly increased compared with that before TAVI (from 48.8±13.9 to 67.9±21.0 cm/s, P<0.001) while there was no significant difference between before and immediately after TAVI (52.0±12.0 cm/s, P=0.186). Impaired CFR before TAVI (1.82±0.28) increased immediately (2.03±0.39, P=0.009) and 1-year after TAVI (2.69±0.57, P<0.001).

**Conclusions:** The present results suggest that impaired CFR in patients with preserved LVEF improves 1-year after TAVI. TAVI may have a good effect on CFR in severe AS patients with preserved LVEF.