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Early effect of transcatheter aortic valve implantation on cardiac sympathetic nervous function assessed by 123I-metaiodobenzylguanidine scintigraphy in patients with severe aortic stenosis

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Background:

Cardiac sympathetic nervous (CSN) function assessed by 123I-metaiodobenzylguanidine (MIBG) scintigraphy is associated with poor prognosis in patients with heart failure.

Purpose:

The aim of this study was to investigate the early effects of transcatheter aortic valve implantation (TAVI) on CSN function in patients with severe aortic stenosis (AS) using MIBG scintigraphy.

Methods:

This was a single-center prospective observational study that enrolled patients between July 2017 and September 2018. Among 93 registered patients who scheduled to undergo TAVI, 43 patients (11 men; mean age: 87 years) were evaluated. The MIBG scintigraphy was performed at baseline and 3-10 days after TAVI procedure to evaluate the heart-mediastinum ratio (H/M) and washout rate (WR). The MIBG parameter changes were compared with B-type natriuretic peptide (BNP) levels and echocardiographic parameters, including aortic valve area (AVA), peak velocity (Vmax), mean pressure gradient (PG), and left ventricular ejection fraction (LVEF).

Results:

All patients successfully underwent TAVI with improved BNP level (488±536 pg/mL vs. 200±181 pg/mL, p=0.02). The AVA, Vmax, mean PG and LVEF improved after TAVI (0.6±0.2 cm2 vs. 1.6±0.4 cm2, p<0.001; 4.6±0.8 m/s vs. 2.0±0.5 m/s, p<0.001; 53±20 mmHg vs. 9±4 mmHg, p<0.001; 55±13 % vs. 61±11 %, p<0.001, respectively). In the MIBG imaging, the delayed H/M significantly increased (2.5±0.6 vs. 2.6±0.7, p=0.02), and the WR decreased (33±9 % vs. 30±8 %, p=0.02) after TAVI. Multivariate logistic regression analysis showed that Vmax was an independent predictor of improved both delayed H/M and WR (odds ratio=0.356; 95% confidence interval: 0.114-0.910; p=0.04).

Conclusions:

TAVI immediately improved the CSN function in patients with AS. Such CSN improvement was related with acute hemodynamic changes.
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