Pre-existing depression significantly improves after transcatheter aortic valve implantation (TAVI): analysis of long-term effects and screening for novel biomarkers

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Background and Aims: Depression negatively affects symptom tolerance as well as clinical endpoints in cardiovascular diseases. For aortic stenosis (AS) patients undergoing Transcatheter Aortic Valve Implantation (TAVI), a reduction of pre-existing depression and anxiety in short term follow-up could be recently shown by our group. The current study was aimed to evaluate these effects in long-term follow-up and to screen for promising biomarkers, e.g., 5-Hydroxytryptamin (5-HT), Endothelin-1 (ET-1), neutrophil gelatinase associated lipocalin (NGAL) and Tenascin-C (Tn-C) variants. These molecules might reflect a pathophysiological link between reverse cardiac remodelling and mental state.

Methods: The study included 182 out of 226 patients who underwent TAVI at the University Hospital Jena since August 2016. Besides clinical parameters, the EuroQol questionnaire (EQ-5D), the Visual Analog Scale (VAS), the Clinical Frailty Scale (CFS) and, to specifically detect depression and anxiety, the Hospital Anxiety and Depression Scale (HADS-D) were assessed directly before TAVI, at 6-weeks, 6-month as well as 12-months follow-up. Blood samples were withdrawn before TAVI and during 6-weeks and 6-month follow-up.

Results: Study patients represented a typical moderate- to high-risk TAVI collective (n=182, mean age 78.1±7.9 years, 46.9% male, mean STS-Score 4.6±2.8). Before TAVI, analysis of HADS revealed =8 points, defined as pathologic, for depression and/or anxiety in 71 patients (39%) and for depression only in 46 patients (25.3%). In the depressive subgroup, there was a significant improvement after 6 weeks for depression (p<0.001) and anxiety (p=0.006). BNP serum levels were significantly reduced (p=0.007) and 6-minutes’ walk distance was significantly increased from a low level (p=0.008), VAS, CFS and 2 out of 5 parameters of the EQ-5D were significantly improved (p<0.05). All observed short-term effects continued at stable levels over time. A pre-existing depression state was not associated with an increased long-term mortality rate, which was 14.8%. Circulating biomarker levels in depressive patients before and 6 weeks after TAVI revealed no significant differences. At the 6 months follow-up, only for C+Tn-C there was a significant increase compared to both, the timepoint before TAVI (p=0.046) and the 6 weeks follow-up (p=0.033).

Conclusions: Already in short-term follow-up after successful TAVI, a remarkable decrease in depression could be detected using HADS. Especially in the depressive subgroup, the patients showed benefit also with respect to other surrogate parameters of mental health and functional performance. Interestingly, these effects were completely maintained not only in mid-term but also in long-term follow-up. We could show that the improvement of depression after TAVI is reflected by a delayed decrease of C+ Tn-C serum levels. C+ Tn-C can be suggested as promising biomarker possibly linked to reactive depression in somatic diseases.