Incidence, Predictive Factors and Impact of Delirium after Transcatheter Aortic Valve Implantation

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BACKGROUND To investigate the incidence, predictive factors and impact of postoperative delirium (POD) among patients treated by transcatheter aortic valve implantation.

METHODS A retrospective observational cohort study of 268 consecutive patients who underwent TAVI at our institution was conducted. Delirium was diagnosed according to the Diagnostic and Statistical Manual of Mental Disorder, 4th Edition criteria. Primary outcome of this study was the presence of in-hospital POD after TAVI.

RESULTS The incidence of POD after TAVI was 13.4% (n=36). Of these cases, 18 were associated with post-procedural complications, including major vascular complications/bleeding (n=4), stroke (n=3), acute kidney injury (n=3), atrial fibrillation (n=4) and infectious disease (n=4). POD was most frequently diagnosed on the second day after TAVI (IQR: 1-5) and was associated with prolonged in-hospital stay regardless of complications (in uncomplicated TAVI: 6[5-10] vs. 5[4-5] days, P<0.001; and in complicated TAVI: 9[8-15] vs. 6[5-9] days, P<0.001). Predictors of POD were non- transmural (transapical/transaortic) access (Odds Ratio (OR) 7.53; 95% confidence interval [CI] 3.19-17.73), current smoking (OR 3.84; 95% CI 1.21 to 12.14), symptomatic carotid stenosis (OR 3.6; 95% CI 2.6 to 5.0) and age (OR 1.09; 95% CI 1.00 to 1.18). After a median follow-up of 16 [6-27] months, patients who developed POD showed higher mortality (36 % vs. 16%; P<0.001; nadir/mid segment: 83 % vs. 95 %; p<0.001; coaptation/outflow: 90 % vs. 96 %, p<0.001). This was also the case for the adjusted eccentricity (MCS 4 ± 13 vs. ESV 21 ± 11, p<0.001) which was more prevalent in the MCS than ESV treated (MCS 36% vs 20% p<0.001). The rate of more than mild AR was 23.6 % in the MCS vs. 13.6 % in the ESV (p=0.161). The absolute and adjusted eccentricity at the nadir/mid segments and at the coaptation/outflow were associated with significant AR by echocardiography. This also holds for the presence of a frame more elliptical than the native annulus (AR > moderate 48% vs. 17 %, p=0.002).

CONCLUSIONS Despite more oversizing, the inflow of the MCS frame is less expanded than the ESV. Also, the MCS is more elliptical at all the levels. Eccentricity was associated with more-than-mild AR. These data indicate that intrinsic device related properties contribute to AR post TAVI. “Disclaimer: The concepts and information presented in this paper are based on research and are not commercially available.”

CATEGORIES STRUCTURAL: Valvular Disease: Aortic

KEYWORDS Rotational angiography, Transcatheter aortic valve replacement

Determinants of image quality of rotational angiography with motion compensation for on-line frame analysis of trans-catheter heart valves

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BACKGROUND There is an increasing clinical experience with various catheter-based valve technologies with different interaction with the recipient. This has lead to an interest in on-line assessment of frame geometry to better understand and/or to improve the immediate result. The only technique that allows that assessment is rotational angiography (R-angio). We sought to evaluate the determinants of image quality of rotational angiography for on-line frame analysis after Trans-catheter Aortic Valve replacement (TAVR).

METHODS A total of 179 patients underwent R-angio with motion compensation after TAVR using 4 valves (Medtronic Corevalve (MCS, n=98), Edwards-SAPIEN (ESV, n=52), Boston Sadda Lotus (BSL, n=23), SAPIEN XT Edwards Medical) Portico 26 mm and Edwards immediately acquiring 133 images in 5 seconds along a 198º arc during breath hold. From the projection data a motion compensated 3D image was reconstructed with research prototype software (Siemens AG, Healthcare, Forchheim, Germany). Image quality was evaluated using the following score: grade 1: excellent image quality, grade 2: distinction between struts and artifacts possible, grade 3: some regions distinction between struts and artifacts cannot be made, grade 4: degraded, grade 5: strongly degraded. Distinction was made between patients with good image quality (1, 2) and with insufficient or poor image quality (3-5). Multivariable logistic regression was used to study the independent predictors of image quality.

RESULTS Grade 1 & 2 image quality was achieved in 128 patients (72%). By univariable analysis only valve type (BSL) and the presence of an artifact (particularly ST segment, TOE probe, pigtails, stitches, prothesis or other radiopaque objects) negatively affected image quality. For valve type, the presence of good image quality - in descending order of frequency - was: ESV (45/52, 86%), SPV (5/6, 83%), MCS (68/98, 69%) and BSL (10/23, 43%). Image quality was good in 79% of the patients when no artefact was present versus 63% in the presence of an artifact. Arrhythmia (e.g. atrial fibrillation, premature ventricular contractions) was present in 35/179 patients (20%) but did not affect image quality (good image quality in 29/35, 83%). By multivariate analysis (in which BMI was forced - BMI of patients with good and poor image quality: 26.5 ± 27.5, respectively), the