Multidetector Computed Tomography after TAVR. Asymmetrical distribution of calcium in the aortic valve apparatus is not increasing volume of aortic valve calcium predicts the severity of PAR predictor of PAR severity (B = 0.019). The mean expansion in the inflow, mid and outflow segments were 101.8 ± 8.9%, 95.9 ± 11.2% and 101.9 ± 11.2%. 1 prosthesis was under-expanded in the mid segment, percent expansion 83%. This prosthesis was significantly more oversized than the other devices (perimeter oversizing 18.1% vs 1.8 ± 5.9%, p = 0.02; area oversizing 51.6% vs 10.5 ± 12.9%, p = 0.01). The average implantation depth was 3.5 ± 0.6mm. In 9 cases (64.3%) the frame extended above the ostium of the LMCA. In these cases there was significant residual area surrounding the frame area (208.7 ± 92.0mm²) and distance between the frame and origin of the coronary artery (5.2 ± 1.6mm).

Conclusions: The LOTUS TAVR device, with its unique mechanism of deployment, results in high rates of circularity and near full expansion. Significant prosthesis oversizing may result in modest under-expansion that has not been shown to impact on valve function.

TCT-672

Relationship between atheroma of the thoracic aorta and risk of stroke in patients undergoing transcatheter aortic valve implantation

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Background: Clinically relevant stroke is a severe complication after transcatheter aortic valve implantation (TAVI) and occurs in up to 10% of cases. The objective of this study was to assess the relationship between severity of calcification of the thoracic aorta and the aortic valve and stroke after TAVI.

Methods: Multislice computed tomography (MSCT) of the thoracic aorta was performed in 140 patients undergoing TAVI in order to quantify calcification of the aortic valve and ascending aorta, arch and descending aorta measuring the Agatston score (AgSc) and plaque size. Physical examination and cerebral imaging assessed patients with new onset of neurological deficits.

Results: Stroke occurred in 9 (6.4%) patients. Patients with stroke had higher values of AgSc in the arch (9309 ± 6048 vs. 3911 ± 3335, p = 0.01) and larger plaque size in the arch (4.8 ± 1.7 mm vs. 3.4 ± 1.2 mm; p = 0.006). AgSc of the ascending aorta (6333 ± 4834 vs. 3172 ± 2910; F = 0.06) was numerically higher in patients suffering a stroke. There was no difference in calcification of the aortic valve (2608 ± 2177 vs. 2272 ± 1518; P = ns) and ascending aorta (1569 ± 1486 vs. 1673 ± 2492; P = ns) in both groups. Multiple regression analysis identified AgSc and maximum plaque size of the arch, reduced left ventricular ejection fraction and fluoroscopy time as independent risk factors for stroke.

Conclusions: Calcification of the aortic arch but not of the native valve is an independent predictor of stroke after TAVI. Precise preoperative screening may lead to optimized outcome in these patients.

TCT-673

Transcatheter Aortic Valve Oversizing: A Comparison of Leaflet Stress and Strain Distribution

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Background: Transcatheter aortic-valve replacement (TAVR) is the recommended treatment option for patients with severe aortic stenosis who are not suitable candidates for surgery. The current guidelines for TAVR are to upsize the valve relative to the native annulus to secure the device and minimize paravalvular leakage. However, incomplete TAV expansion due to oversizing negatively impacts valvular hemodynamics and distorts leaflet coaptation. The aim of this study was to determine the impact of valve oversizing on leaflet stress and strain distribution.

Methods: 3D leaflet geometry of a 23mm TAV expanded to diameters ranging from 18 to 23mm was obtained in 1mm increments. The TAV design was based on Edwards SAPIEN XT valve design. A large deformation analysis was performed using ABAQUS. Leaflets were modeled and stent was considered to be rigid. A polynomial strain-energy function was fitted to biaxial data of each individual leaflet. An ensemble averaged transvalvular pressure waveform measured from in-vitro tests was applied to the leaflets.

Results: In a fully-expanded configuration, both high stress and large deformation were observed primarily in the commissural and basal attachment regions. The maximum principal stress value in the fully closed position was 1.8Mpa (Fig 1A). Valve oversizing induced localized high stress regions within the belly of the leaflets reaching up to 5.4Mpa (Fig 1B).

Conclusions: Leaflets have variable geometry and variable stress response to oversizing. The stress distribution might be affected by leaflet tissue, leaflet overlay, and leaflet coaptation.