Background: The purpose of this study was to measure volume and distribution of aortic valve calcium using multislice computed tomography (MSCT) and to define whether they predict paravalvular regurgitation (PAR) after transcatheter aortic valve replacement (TAVR).

Methods: A total of 263 patients underwent TAVR between August 2008 and September 2013. The MSCT scans were analyzed for the volume and distribution of calcium. Leaftlet calcium volume and asymmetry index (maximum leaftlet calcium volume – minimum leaftlet calcium volume) were correlated with the severity of PAR after TAVR.

Results:
- Fourty-six percent of patients had no or trivial PAR (grade less than 1).
- 46% had mild PAR and 8% moderate to severe. The volume of annular calcium was higher in patients with mild or moderate to severe PAR compared to patients with PAR grade less than 1 (2023.9±916.4 mm$^3$, 2270.8±1558.3 mm$^3$ and 1700.9±976.9 mm$^3$, respectively, p<0.024).

Conclusions:
- Increasing volume of aortic valve calcium predicts the severity of PAR after TAVR. Asymmetrical distribution of calcium in the aortic valve apparatus is not correlated with the severity of PAR after TAVR.

TCT-670
Volume and distribution of aortic valve calcium and implications for aortic regurgitation after transcatheter aortic valve implantation
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Background:
Volume and distribution of aortic valve calcium and implications for aortic regurgitation after transcatheter aortic valve implantation

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 high risk of neurological deficit.

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).

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-667
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 of the thoracic aortic arch but not of the native valve is an independent predictor of PAR severity (BP=0.0034, p<0.01).

Conclusions:
Increasing volume of aortic valve calcium predicts the severity of PAR after TAVR. Asymmetrical distribution of calcium in the aortic valve apparatus is not correlated with the severity of PAR after TAVR.

TCT-671
Assessment of the Geometric Interaction Between the Lotus Transcatheter Aortic Valve Prosthesis and the Native Aortoventricular Interface by 320-Slice Multidector Computed Tomography
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Background:
The LOTUS (Boston Scientific, MA, USA) device is a mechanically expanded, re-shauteable and repositionable transcatheter aortic valve prosthesis. Post-implantation imaging studies of first generation TAVR devices have demonstrated variable geometric interactions with the native annulus. We sought to assess the geometric interaction between the novel LOTUS device and the native aortoventricular interface by multi-detector CT (MDCT) imaging.

Methods:
14 patients (28.6% male, mean age 83±8.5 yrs) who received a LOTUS device underwent MDCT imaging prior to and 12 months post implantation. Baseline measurements were made at the level of the LVOT, basal plane (BP), SOV and ascending aorta. Prosthesis dimensions (height, minimum and maximum diameters, perimeter and area) were measured on post implantation scans at three levels. The eccentricity index (EI=1–Dmin/Dmax)) and expansion ((area expected area) x 100) of each prosthesis was calculated.

Results:
The mean eccentricity was 0.05±0.04 in the inflow segment, 0.04±0.04 in the mid segment and 0.03±0.02 in the outflow segment. 3D models of non-circular (EI>0.10). There was no statistically significant difference in baseline eccentricity to account for non-circular deployment (BP EI=0.25±0.05 vs 0.23±0.04, p=0.60; LVOT EI=0.41±0.07 vs 0.32±0.10, p=0.15). 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 sinus area surrounding the frame area (208.7±92.0mm$^2$) 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.