(THV) function, however, preliminary reports indicate potential additive clinical value of multislice computed tomography (MSCT) for the diagnosis of THV thrombosis. We sought to determine the value of MSCT for the diagnosis of THV thrombosis and the frequency of this complication after balloon-expandable TAVR.

Methods: In addition to TTE and TEE, MSCT was performed in 140 patients within 1-3 months after TAVR with the Sapien XT THV (Edwards Lifesciences, Irvine, CA) to assess the presence of THV thrombosis (distinct cusp thickening and low attenuation mass) as well as THV stent geometry and positioning.

Results: First-TAVR MSCT identified THV thrombosis in 5 patients (4%), notably 3 (60%) of them had a normal TTE without signs of thrombus formation or flow obstruction. TOE demonstrated restrictive movement of one or more THV cusps in all patients, whereas clearly mobile masses were identified in one patient only. THV thrombus formation was associated with left ventricular ejection fraction < 35% (60% vs. 13%; p<0.014). Neither aortic valve regurgitation nor THV underexpansion were associated with THV thrombosis (p=N.S for all). No THVs were noncircular.

Conclusions: THV thrombosis after balloon-expandable TAVR appears to be more common than previously anticipated and is commonly occult on transthoracic echocardiography. Patients with low-flow circumstances (e.g. depressed cardiac function) may carry a higher risk of early THV thrombosis. The role of routine post-procedural MSCT for the evaluation of THV thrombosis in patients at a heightened risk of thrombus formation warrants further investigation.

TCT-666
Short-roll C-arm computed tomography (C-arm CT) scans to guide transcatheter aortic valve replacements
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Background: A key step in transcatheter aortic valve replacement (TAVR) procedures is finding the optimal x-ray C-arm viewing angle for prosthetic valve deployment. This step is challenging and often requires performing several 2D x-ray aortograms. Another approach using short-roll 160° C-arm computed tomography (C-arm CT) scans was tested on a group of TAVR patients that automatically reconstructed, landmarked and registered 3D aortic root volumes to efficiently determine this angle.

Methods: Short roll 160° C-arm CT scans were done and reconstructed across 13 TAVR patients under direct contrast injection and rapid ventricular pacing. The segmented aortic root volume, valve cusp landmarks and optimal viewing angles were automatically determined from these scans using custom image processing software. Optimal angles determined from C-arm CT were compared to angles used during treatment.

Results: The mean differences between C-arm CT angles and angles used during deployment were 0.5° (SD=2.6°) and 0.5° (SD=2.4°) for oblique and cranial/caudal C-arm angulation respectively. For transapical patients, the angles were easier to obtain from C-arm CT than unregistered CT due to a rotated patient setup in the cath lab for better access compared to their baseline CT setup. Transapical unregistered CT mean angle differences were 18.8° (SD=14.1°) and 0.1° (SD=5.2°) for oblique and cranial/caudal angulation.

Conclusions: Short roll C-arm CT scans provide accurate optimal viewing angle estimates at treatment for TAVR patients, along with easier workflow compared to the aortogram approach and to 180° (plus fan angle) C-arm CT scans.

TCT-667
Abstract Withdrawn

Aortic Annulus and Root Characteristics In Severe Aortic Stenosis Due To Bicuspid Aortic Valve And Tricuspid Aortic Valves: Implications For Transcatheter Aortic Valve Therapies
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Background: Patients with severe aortic stenosis due to BAV are excluded from transcatheter aortic valve replacement (TAVR) due to concern for asymmetric expansion and valve dysfunction. We sought to characterize the aortic root and annulus in bicuspid aortic valve (BAV) and tricuspid aortic valves (TAV).

Methods: We identified patients with severe AS who underwent multi-detector computed tomographic (MDCT) imaging prior to surgical aortic valve replacement (SAVR, n=200) for BAV and TAVR (n=200) for TAV from 2010-2013. The presence of a BAV was confirmed on surgical and pathological review. Annulus measurements of the basal ring (short- and long-axis, area-derived diameter), coronary ostia height, sinus area (SA), sino-tubular junction area (STJ), calcification and eccentricity index (EI, 1-short axis/long axis) were made.

Results: Patients with TAV were older (78.8 years vs. 57.8 years, p=0.04) than those with BAV. The aortic annulus area (5.21±0.2 cm2 vs. 4.63±0.2 cm2, p=0.001), sinus of Valsalva diameter (3.7±0.9 cm vs. 3.1±0.1 cm, p=0.001) and ascending aorta diameter (3.5±0.7 cm vs. 2.97±0.6 cm, p<0.001) were significantly larger with BAV. Bicuspid aortic annuli were significantly less elliptical (EI 1.24±0.1 vs. 1.29±0.1, p=0.006) and more circular (39% vs. 4% vs. 0.1, p<0.001) compared to the TAV annulus. There was more eccentric annular calcification in BAV vs. TAV (68% vs. 32%, p<0.001). The mean distance from the aortic annulus to the left main coronary ostium was less than the right coronary ostium. Less than 10% of the BAV annuli would not fit a currently available valved stents.

Conclusions: Bicuspid aortic valves have a larger annulus size, sinus of Valsalva and ascending aorta dimensions. In addition, the BAV aortic annuli appear circular and most will fit currently available commercial valved stents.

TCT-669
Very Low Intravenous Contrast Dose (20 cc) Computed Tomographic Angiography Protocol for Pre-Procedural Assessment of the Aortic Annulus Prior to Transcatheter Aortic Valve Replacement: Validation by 3-Dimensional Transesophageal Echocardiography
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Background: Transcatheter aortic valve replacement (TAVR) is an approved treatment for patients at high risk for surgical aortic valve replacement. Computed tomography angiography (CTA) is essential for pre-procedural planning but patient with chronic kidney disease (CKD) are at elevated risk for contrast-induced nephropathy (CIN). Minimization of intravenous contrast while obtaining essential imaging is necessary in this at risk patient population. The accuracy of CTA annular measurements using a very low dose contrast protocol is unknown. 3-dimensional transesophageal echocardiography (3D-TEE) annular measurements have been validated in prior studies and have been the default for TAVR screening in patients with CKD.

Methods: Patients with severe, symptomatic aortic stenosis and severe CKD (estimated creatinine clearance < 30 mL/min) and BMI less than 40 kg/m2 underwent full pre-procedural TAVR CTA assessment utilizing a 320-slice volumetric scanner (Aquilion One, Toshiba Medical Systems) with a 20 cc contrast bolus injection. One experienced reader measured the aortic annulus on CTA and measurements were compared to a standard of 3D-TEE, with the latter being interpreted by one of two experienced readers. CTA and 3D-TEE readers were different, and were blinded to one another’s measurements. Measurements were compared using a paired t-test and correlated using Pearson’s correlation coefficient (R).

Results: 9 patients (average age = 84, BMI = 25 kg/m2, 67% female) who had a 20 cc protocol CTA and 3-D TEE were studied. There was excellent correlation and there were no significant differences in annular measurements between CTA and 3D-TEE (see Table I).

Conclusions: Short roll C-arm CT scans provide accurate optimal viewing angle estimates at treatment for TAVR patients, along with easier workflow compared to the aortogram approach and to 180° (plus fan angle) C-arm CT scans.