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BACKGROUND Novel minimally invasive mitral valve interventions for dysfunctional mitral bioprosthesis are being performed through the apex of the left ventricle. This Transapical approach is also being developed to replace diseased native mitral valve using new generations of catheter-mounted prosthesis. These procedures are imaging-guided in the main and do not permit direct visual assessment of the mitral valve. We postulate that Cardiac-gated Contrast-enhanced Multidetector Computed Tomography (CC-MDCT) imaging of the mitral prosthesis or native mitral valve can be accurately performed, and yields useful information to enhance procedural success.

METHODS Fifty patients that have undergone CC-MDCT assessment of the aortic valve for consideration of the Transcatheter Aortic Valve Replacement (TAVR) procedure were studied. CT data sets were acquired in standard DICOM 3 format, on a 320 detector MDCT scanner using a full retrospective protocol. 100ml of omnipaque 350 non-ionic contrast were used at variable flow rates of 3.5-5ml per second. Images were reconstructed at 0.5mm thickness. A 3-dimensional (3D) image processing software was used to analyze the images. The mitral annulus is viewed at the plane of the leaflet hinge-points. This reference plane is locked so that all subsequent planes remain orthogonal to each other. A corresponding 3D reconstruction of the mitral valve is then reconstructed. The native mitral valve was ‘sized’, and the fluoroscopic angle of the true profile view of the mitral annulus or ‘line of perpendicularity’ (LP) was established.

RESULTS The mitral valve was ‘sized’ showing a mean mitral annular area (a) of 792.7 ± 183.3 mm, mean perimeter (b) of 114.3 ± 10.9 mm, and mean maximum annular diameter (c) of 35.9 ± 3.5 mm in systole. Interestingly, an 11.5 ± 13.4% increment in minimum annular diameter (d) during diastole from systole was observed. The LP of the mitral annulus representative of 50 patients (expressed as mean with standard deviation) was generated.

CONCLUSIONS The proposed method of 3D analysis of the native mitral valve on CC-MDCT scan can accurately ‘size’ and predict the LP of the mitral annulus. The protocol was simple and reproducible. Accurate prosthesis sizing selection and the prediction of the coaxial implant angle during the procedure potentially reduce radiation exposure and improve procedural success.

TCT-321
Peripheral MicroRNAs May Serve As Novel Biomarkers For Identification Of Coronary Artery Calcification
Philippa J. Howlett,1 Alex Horton,2 Edward W. Leatham,2 Abdul Waheed,1 Huilai Wu,1 Nikunj R. Shah,1 Andre Gerber,1 Michael Mahmoudi1
1University of Surrey, Guildford, United Kingdom; 2Royal Surrey County Hospital, Guildford, United Kingdom

BACKGROUND Standard risk stratification methods are incapable of identifying many individuals subsequently experiencing major adverse cardiovascular events (MACE). Coronary artery calcification (CAC) is a powerful predictor of MACE however the routine use of this technique is limited by radiation exposure and cost. MicroRNAs are small, non-coding RNAs that regulate transcription. Their dysregulation is widely accepted to signify a number of disease states. We aimed to establish whether a peripheral blood-based microRNA profile was predictive of the presence and degree of human CAC.

METHODS Study subjects met the following inclusion criteria: attendance for routine cardiac computed tomography; 18-65 years of age; no established coronary artery disease, cardiac failure or tachyarrhythmia; no renal impairment; no diabetes mellitus; no autoimmune disease; no infection; no active cancer. Peripheral venesection was undertaken and an Agatston score was derived using default software. Leukocyte RNA was isolated with the LeukoLOCK Total RNA Isolation System and stored at -80°C until Toray’s microarray analysis was performed.

RESULTS Twenty-four eligible participants entered into the study (mean age 54 years; 67% male). They were categorized by CAC score: [CAC score 0] n = 6; [CAC score 1-10] n = 6; [CAC score 11-100] n = 6; [CAC score > 100] n = 6. The groups had similar baseline clinical characteristics according to age, gender and prior history of hypertension, dyslipidemia and smoking. MiR-1181 was expressed significantly less in all case groups compared to controls: [CAC 1-10] effect size (ES) = 1.26, p = 0.012; [CAC 11-100] ES = 1.74, p = 0.013; [CAC > 100] ES = 3.86, p < 0.01. Additionally there was significant down-regulation of miR-132-3p, miR-6816-3p and miR-8059 in those with a CAC score > 100 compared to controls (ES = 3, p < 0.001; ES = 2.87, p < 0.001; ES = 2.6, p = 0.001 respectively); figure 1.

CONCLUSIONS Human blood-based miRNA-1181 appears to predict the presence and degree of CAC. Likewise miR-132-3p, miR-6816-3p and miR-8059 are differentially expressed in patients with high CAC scores in comparison to their matched controls. We plan to test these findings further with quantitative real-time PCR and in a prospective validation cohort. Ultimately a miRNA signature may explain the mechanisms underpinning CAC and could serve as a novel, and long-awaited, biomarker for MACE.

TCT-333
Utility of J-Chronic Total Occlusion (CTO) Score as a Predictor of Successful Percutaneous Coronary Intervention of CTO: Comparison of Coronary Computed Tomography and Coronary Angiography
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1Higashi Takarazuka Satoh Hospital, Takarazuka, Japan

BACKGROUND Coronary computed tomography angiography (CCTA) has emerged as an important modality in the diagnostic assessment of chronic total occlusion (CTO). The aim of this study was to evaluate
whether J-CTO score calculated by CCTA can predict successful percutaneous coronary intervention (PCI) of CTO.

**METHODS** We examined 214 consecutive patients who underwent CCTA before PCI of CTO in our hospital between 2012 and 2015. J-CTO score was calculated by both CCTA and conventional coronary angiography (CAG). Relationship between these two sets of J-CTO scores and procedural success of PCI-CTO was evaluated.

**RESULTS** CTO-PCI procedure was successful in 177 cases (83%). Retrograde approach was attempted in 57 cases (27%). Both CCTA-derived J-CTO score and CAG-derived J-CTO score are significantly associated with procedural success of CTO-PCI (p<0.0001, p=0.009, respectively). In addition, the area under the curve (AUC) of CCTA-derived J-CTO score for predicting successful CTO-PCI is significantly greater than that of CAG-derived J-CTO score (AUC=0.77 vs. 0.66, respectively; p=0.02).

**CONCLUSIONS** CCTA-derived J-CTO score may be a more useful predictor of successful PCI of CTO compared with CAG-derived J-CTO score.

**RESULTS** The time interval between pre- and post-TEVAR was 4 ± 4 months. The landing location was proximal to the LSA by 21 ± 17 mm. Compared to pre-TEVAR geometry, the stented aorta increased peak curvature post-TEVAR (p<0.05) (Table 1). While no significant pre-to-post differences were found in branch angle and mean curvature, landing location was correlated to changes in left common carotid (LCCA) angle and arch mean curvature (R=0.78 and 0.70, respectively).

**CONCLUSIONS** Peak curvature of the aorta increased with TEVAR likely due to the stiffness discontinuity introduced by the endograft. Change of arch branch geometry due to TEVAR was not significant but correlated to proximal landing location of the endograft. When the proximal end was closer to the LCCA, the LCCA branch angled toward the arch and the arch segment was straightened, compared to pre-TEVAR. Further investigation is warranted to assess in vivo motion of thoracic aorta, due to cardiac pulsatility and respiration, before and after TEVAR.

**CATEGORIES** Other: Statistics and Trial Design

**KEYWORDS** Graft, Modeling, Thoracic aorta

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**Table 1. Geometric measurements of the thoracic aorta and arch branches**

<table>
<thead>
<tr>
<th>Branch angle (post-TEVAR 1)</th>
<th>BA</th>
<th>LCCA</th>
<th>LSA</th>
<th>Ascending aorta</th>
<th>Aortic arch</th>
<th>Stented aorta</th>
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<td>1. Branch angle (°)</td>
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<tr>
<td>Mean curvature (pre-TEVAR)</td>
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<td>Peak curvature (post-TEVAR)</td>
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BA = brachiocephalic artery; LCCA = left common carotid artery; LSA = left subclavian artery; Ascending aorta = aorta from right coronary to BA; Aortic arch = aorta from BA to LSA; Stented aorta = aorta with endograft; Δ = post - pre-TEVAR. Mean curvature = average curvature over the aortic segment. Peak curvature = maximum curvature within the aortic segment. Significant difference between pre- and post-TEVAR (P<0.05). Significance of correlation with endograft location (R=0.70).

**CONCLUSIONS** Peak curvature of the aorta increased with TEVAR likely due to the stiffness discontinuity introduced by the endograft. Change of arch branch geometry due to TEVAR was not significant but correlated to proximal landing location of the endograft. When the proximal end was closer to the LCCA, the LCCA branch angled toward the arch and the arch segment was straightened, compared to pre-TEVAR. Further investigation is warranted to assess in vivo motion of thoracic aorta, due to cardiac pulsatility and respiration, before and after TEVAR.

**CATEGORIES** Other: Statistics and Trial Design

**KEYWORDS** Graft, Modeling, Thoracic aorta

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**TCT-324 Elevated Echocardiographic Global Calcification Score Is Associated with Increased Mortality after Percutaneous Edge-To-Edge Repair of Mitral Regurgitation Independent of Procedural Success**

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**Categories** Imaging: Non-Invasive

**Keywords** Chronic total occlusion, Computed tomography angiography, Percutaneous Coronary Intervention. CTO

**TCT-323 Geometric analysis of thoracic aorta and arch branches before and after TEVAR**

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**Background** Next-generation endografts for TEVAR will incorporate branched components to repair complex aortic dissections with improved fixation to the aortic arch. Design and development of these endografts benefit from understanding how current TEVAR influences the native thoracic aorta and arch branches. We apply 3D geometric modeling techniques to quantify changes of thoracic aortic and arch branch geometry following TEVAR.

**Methods** 12 patients (61±5 yrs) with Type-B dissections underwent TEVAR with exclusion of the left subclavian artery (LSA). CTA images were acquired pre- and post-TEVAR, and 3D models of the thoracic aorta and arch branches were constructed to quantify geometry (Fig. I). Landing location was defined as the relative position of the proximal end of the graft to the LSA. Branch angles were computed relative to the aortic centerline. Curvature was computed as the inverse of radius of a circumscribed circle along the aorta. Pearson's coefficient (R) was computed to quantify the correlation between geometric changes and landing location.

**Results** In 5 yr and procedural success of PCI-CTO was evaluated.

**Conclusions** CCTA-derived J-CTO score may be a more useful predictor of successful PCI of CTO compared with CAG-derived J-CTO score.

**Table 1. Geometric measurements of the thoracic aorta and arch branches**

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