CONCLUSIONS Integration of available peri-procedural CT TAVR annulus data minimizes balloon under-sizing and improves PABV results. An Aa to CT-TAVR AoAA ratio of >0.8 was associated with significant improvement in aortic stenosis parameters compared to ratio of <0.8 without significant increase in complication rate.

CATEGORIES IMAGING: Non-Invasive

KEYWORDS Aortic valve stenosis, Balloon aortic valvuloplasty, CT guidance

TCT-326 Characteristic Coronary Flow Pattern Of Left Anterior Descending Artery Stenosis By Transthoracic Echocardiography

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BACKGROUND Coronary flow reserve (CFR) as detected by echocardiography correlate well with the angiographic degree of coronary stenosis whether significant or not. However, value of resting coronary flow velocities (CFV) and their pattern in predicting coronary artery disease (CAD) severity is not studied enough. The present study aimed to assess CFV and pattern of distal left anterior descending (LAD) artery of different stenosis using transthorascoscopic echocardiography (TTE) to elucidate the possible association.

METHODS Coronary flow (CF) & CFV pattern were measured in distal LAD by TTE in 97 patients who were subjected for coronary angiography (CA) at our department for suspected CAD and were found to have LAD stenosis of different severity during the period from November 2013 to December 2014. Peak systolic velocity (PFVS), peak diastolic velocity (PFVD), average velocity (VA) and diastolic deceleration time (DDT) were obtained.

RESULTS The patients were enrolled in 3 groups, group I included 30 patients with normal CA, group II included 34 patients with LAD stenosis 50-69% and group III included 33 patients with LAD stenosis >70%. There was no significant difference between the studied groups regarding age and gender. There was no significant difference between the studied groups regarding PFVS, PFVD and VA (p > 0.05). While DDT showed significant shortening in group III (580 ± 19.3 ms versus 800.7± 6.4 ms in group I and 750. ±34.7 ms in group II, p<0.001). A receiver-operating characteristic-derived DDT cut off point <655 ms was 100% specific and 100% sensitive for detecting severe LAD stenosis (>70%).

CONCLUSIONS In patients with suspected CAD, short DDT of distal LAD flow as detected by TTE can effectively detect severe LAD stenosis.

CATEGORIES IMAGING: Non-Invasive

TCT-327 Calcium Volume Score on Contrast-Enhanced Computed Tomography Prior to Transcatheter Aortic Valve Replacement: what’s the most accurate threshold cutoff?

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BACKGROUND Previous publications have studied the predictive value of calcium volume score on computed tomographic angiography (CCTA) for paravalvular leak (PVL), an important complication which leads to morbidity and mortality after transcatheter aortic valve replacement (TAVR). The threshold CT number in Hounsfield Units (HU) chosen to detect calcium on contrast-enhanced scans has not been standardized in the literature. Suggested thresholds in the literature range from 350 to 850 HU. A threshold near or below luminal attenuation (LA) will detect contrast as calcium where a threshold much higher than LA will only detect the most dense calcification. Our aim was to find the most accurate threshold to predict PVL post-TAVR.

METHODS 82 patients with severe aortic stenosis who underwent TAVR with the Corevalve prostesis and who underwent pre-procedural CTA and intra-operative transesophageal echocardiography for PVL assessment were included. Luminal attenuation (LA) in HU was measured at the level of the aortic annulus. Total calcium volume score for the aortic valvar complex, from the left-ventricular outflow tract to the tips of the aortic valve leaflets, was measured using different threshold cutoff protocols. Receiver-operating characteristic (ROC) analysis was performed to assess predictive value for > mild PVL (n = 11).

RESULTS Mean LA was 460 ± 166 HU. Protocols using higher threshold cutoffs underestimated total calcium volume compared to those with lower cutoffs (Table 1). ROC analysis showed lower area under the curve (AUC) values for fixed threshold cutoffs of 650 or 850 HU (protocols 1-2) compared to those using a relative threshold to LA (protocols 3-6). Protocols 3-6 were significantly more predictive of > mild PVL than protocol 1 (p < 0.05 for each comparison of ROC curves). When comparing the AUC of protocol 4 to 2, the difference trends towards significance (p = 0.056). AUC for protocol 4 was numerically the highest of all techniques.

CONCLUSIONS Among the protocols studied for calcium volume scoring on contrast-enhanced CT, those based on threshold cutoffs which are relative to LA are more predictive of PVL post-TAVR than those which use fixed cutoffs. A threshold of LA + 100 HU may have the highest predictive value.

CATEGORIES IMAGING: Non-Invasive

KEYWORDS Computed tomography angiography, Paravalvular leak, TAVR

TCT-328 In Vivo Calculation of Endothelial Shear Stress Using Coronary Computed Tomography Angiography: Comparison with Invasive Coronary Angiography

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BACKGROUND It is vastly believed that regions with low endothelial shear stress (ESS) are prone to build up of atherosclerotic plaques, contributing to development of coronary artery disease. The aim of this investigation was to develop a non-invasive approach for in-vivo assessment of ESS and to validate the computed ESS against invasive coronary angiography (ICA) derived ESS.

METHODS Patients with mild or intermediate coronary stenoses who underwent both CCTA and ICA were included for analysis. Two geometrical models of the interrogated vessels including the side branches were reconstructed separately from coronary computed tomography angiography (CCTA) and ICA images. Computational fluid dynamics was applied subsequently to calculate ESS, from which ESSCTA and ESSQCA were derived, respectively. Comparisons between ESSCTA and ESSQCA were performed on the same segments that were defined by the consecutive side branches in the CCTA and ICA models.

CONCLUSIONS Among the protocols studied for calcium volume scoring on contrast-enhanced CT, those based on threshold cutoffs which are relative to LA are more predictive of PVL post-TAVR than those which use fixed cutoffs. A threshold of LA + 100 HU may have the highest predictive value.

CATEGORIES IMAGING: Non-Invasive

KEYWORDS Computed tomography angiography, Paravalvular leak, TAVR

TCT-328 In Vivo Calculation of Endothelial Shear Stress Using Coronary Computed Tomography Angiography: Comparison with Invasive Coronary Angiography

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BACKGROUND It is vastly believed that regions with low endothelial shear stress (ESS) are prone to build up of atherosclerotic plaques, contributing to development of coronary artery disease. The aim of this investigation was to develop a non-invasive approach for in-vivo assessment of ESS and to validate the computed ESS against invasive coronary angiography (ICA) derived ESS.

METHODS Patients with mild or intermediate coronary stenoses who underwent both CCTA and ICA were included for analysis. Two geometrical models of the interrogated vessels including the side branches were reconstructed separately from coronary computed tomography angiography (CCTA) and ICA images. Computational fluid dynamics was applied subsequently to calculate ESS, from which ESSCTA and ESSQCA were derived, respectively. Comparisons between ESSCTA and ESSQCA were performed on the same segments that were defined by the consecutive side branches in the CCTA and ICA models.
RESULTS A total of 57 vessels in 41 patients were analyzed. ESSCTA and ESSQCA were compared in 162 matched segments. Average, minimal, and maximal values between ESSCTA and ESSQCA were similar, being 4.03 (2.65-6.02) Pascal versus 3.79 (2.59-5.88) Pascal, p = 0.46; 0.54 (0.26-0.89) Pascal versus 0.50 (0.29-0.83) Pascal, p = 0.72; and 11.76 (6.51-17.64) Pascal versus 10.22 (6.30-15.84) Pascal, p = 0.06, respectively. Good correlations between the ESSCTA and the ESSQCA were observed: the average (r = 0.75, p < 0.001), the minimal (r = 0.61, p < 0.001), and the maximal (r = 0.62, p < 0.001) ESS values.

CONCLUSIONS In vivo calculation of ESS from CCTA data is feasible. Our results suggest that geometrical reconstruction by CCTA yields similar results to ICA in terms of ESS calculation. Thus, it has a potential to allow combined local hemodynamic and plaque morphologic information for risk stratification in patients suggestive of coronary artery disease.

CATEGORIES IMAGING: Non-Invasive

KEYWORDS Computed tomography coronary angiography, Endothelial shear stress, Quantitative coronary angiography

TCT-329
Correlation Between Visceral Fat and Coronary Artery Calcium in Metabolic Syndrome Patients
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BACKGROUND To assess the relationship between visceral fat (VF) and coronary artery calcium (CAC), we performed visceral fat scan and coronary CT angiography (CCTA) in metabolic syndrome (MetS) cohort.

METHODS From January to September 2014, among 1000 MetS patients who were referred from 24 public health centers in Seoul, 740 patients who performed visceral fat scan (HDS-2000, Omron) were enrolled in this analysis. MetS was defined as any three of the following traits in one individual: abdominal obesity (Men >/= 90cm, Women >/= 85cm), high triglycerides (TG) (/> 150mg/dL), low high-density lipoprotein cholesterol (HDLc) (Men </= 40mg/dL, Women </= 50mg/dL), hypertension (>/>130/85mmHg), and high fasting glucose levels (/>/>100mg/dL) in each public health centers. Fatty liver grade were measured from 0 to 3 by ultrasound. Brachial pulse wave velocity (PWV), carotid intima-media thickness (IMT), Left ventricular mass index (LVMI) and Augmentation index (Aix) were also measured. We also measured CAC using CCTA.

RESULTS The cut-off value of high VF area was calculated 88cm2 by Youden index. Incidence of MetS patients who had high VF area (>/>88cm2) was 35% (265/740) and the prevalence of men was higher than women (53.4% vs 18.7%, p=0.001). High VF group showed higher CAC than normal VF (11.2±4) vs 25.6±95, p=0.025). The VF showed positive correlation with PWV and IMT (p=0.028, 0.019). LVMI, CAC, abdominal subcutaneous fat, fatty liver grade, serum glucose, TG, HDLc, TG/HDLc ratio, systolic and diastolic blood pressure were also positively correlated with VF (all of the p < 0.01).

CONCLUSIONS High VF group showed high CAC. Moreover, VF area had shown correlation with PWV, IMT, LVMI, CAC, TG/HDLc ratio, abdominal obesity, fatty liver grade and abdominal subcutaneous fat in MetS cohort. It may be considered that the VF could predict severity of CAC, arterial stiffness, atherosclerosis, insulin resistance and fatty liver in MetS.

CATEGORIES IMAGING: Non-Invasive

KEYWORDS Coronary artery calcification score, Metabolic syndrome, Obesity

TCT-330
Insulin resistance is useful index for cardiovascular risk stratification in diabetic patients
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BACKGROUND Insulin resistance (IR) is associated with cardiovascular disease, but there is little data considering this index for cardiovascular risk stratification. Using coronary CT angiography (CCTA), we evaluated the association between coronary artery disease (CAD)